Vodafone
Digital Subscriber Signalling System No. 1
DSS1 Layer 1

Interface Specification

Version: 2.1
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Contents

Conventions

The statement of compliance is abbreviated as follows:

I = Implemented, the function is implemented according to the relevant ITU-T Recommendation, unless the "comment" field specifies a variation,

NU = Not Used, the function is not implemented,

NA = Not Applicable-- =   Descriptive text or title in the recommendation, no comment necessary.

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1 Scope

The implementation of the DSS1 Layer 1 in EWSD is based on the specification produced by ETSI and ITU-T (previously CCITT) to support the hardware level of the protocol.

This interface specification may be changed at any time. The user of this interface specification has to check for the newest version available from Vodafone GmbH. This interface specification may be superseded in total or in part by the terms of a contract between the individual network user and Vodafone GmbH.

2 References

In the case of a conflict between specific requirements in this document with requirements in any of the directly or indirectly referenced documents, the specific requirements of this document are applicable.

2.1 Normative References

The publications listed hereafter form the basis for the DSS1 Layer 2 implementation in EWSD.

I.430	ITU-T Rec. I.430 (05/95) Integrated Services Digital Network (ISDN); Basic user-network interface Layer 1 specification and test principles
I.431	ITU-T Rec. I.431 (3/1993) Integrated Services Digital Network (ISDN); Primary rate user-network interface Layer 1 specification and test principles
G.703	ITU-T Rec. G.703 (3/1991) General aspects of digital transmission systems Terminal equipments Physical/electrical characteristics of hierarchical digital interfaces
G.704	ITU-T Rec. G.704 (7/1995) General aspects of digital transmission systems Terminal equipments Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 kbit/s hierarchical levels.

2.2 Informative References

The ITU-T documents have an ETSI counterpart which are the prETS 300 011 and the prETS 300 012.

300 011	ETS 300 011 (04/92) Integrated Services Digital Network (ISDN); Primary rate user-network interface Layer 1 specification and test principles
300 012	ETS 300 012 (04/92) Integrated Services Digital Network (ISDN); Basic user-network interface Layer 1 specification and test principles

2.3 Reference Acquisition

- European Telecommunications Standards Institute: http://www.etsi.org

- ITU Recommendations: http://www.itu.int

3 Definitions and Abbreviations

3.1 Definitions

The definitions in the referenced standards apply.

3.2 Abbreviations

The definitions in the referenced standards apply.

4 Tables

In order to give information about the implemented messages, parameters and procedures, each relevant paragraph of the ITU-T Rec. Q.XXX are listed thereafter in tabular form.

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.	ISDNUSER-NETWORKINTERFACES BASICUSER-NETWORKINTERFACE – LAYER 1SPECIFICATION	--	
I.430.1	General	--	
I.430.2	Service characteristics	--	
I.430.2.1	Services required from the physical medium	--	
I.430.2.2	Service provided to layer 2	--	
I.430.2.2.1	Transmission capability	--	
I.430.2.2.2	Activation/deactivation	--	
I.430.2.2.3	D-channel access	--	
I.430.2.2.4	Maintenance	--	
I.430.2.2.5	Status indication	--	
I.430.2.3	Primitives between layer 1 and the other entities	--	
I.430.3	Modes of operation	--	
I.430.3.1	Point-to-point operation	--	
I.430.3.2	Point-to-multipoint operation	--	
I.430.4	Types of wiring configuration	--	
I.430.4.1	Point-to-point configuration	--	
I.430.4.2	Point-to-multipoint configuration	--	
I.430.4.3	Wiring polarity integrity	I	
I.430.4.4	Location of the interfaces	I	Selected option: The terminating resistor is included in the NT, but may be switched off.
I.430.4.5	NT and TE associated wiring	I	NTBA 2B1Q: Two jacks according to ISO 8877 are provided to connect the NT to the S Bus. No cord is provided. Optionnaly, EWSD can also support: NTBA 4B3T: A hard wired connection is provided. No cord is provided. T wiring not applicable.
I.430.5	Functional characteristics	--	
I.430.5.1	Interface functions	--	
I.430.5.1.1	B-channel	I	
I.430.5.1.2	Bit timing	I	
I.430.5.1.3	Octet timing	I	
I.430.5.1.4	Frame alignment	I	
I.430.5.1.5	D-channel	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.5.1.6	D-channel access procedure	I	
I.430.5.1.7	Power feeding	I	The sentence in brackets "(In some applications unidirectional power feeding or no power feeding at all, across the interface, may apply) " is deleted. The term "NT" is replaced by "network side". The term "TEs" is replaced by "terminals".
I.430.5.1.8	Deactivation	I	The sentence in brackets "(For some applications it will be appropriate for NTs to remain in the active state all the time)" is deleted.
I.430.5.1.9	Activation	I	The sentence in brackets "(For some applications it will be appropriate for NTs to remain in the active state all the time)" is deleted.
I.430.5.2	Interchange circuits	I	
I.430.5.3	Connected/disconnected indication	NA	This description is only valid for TE-Side.
I.430.5.3.1	TEs powered across the interface	NA	This description is only valid for TE-Side.
I.430.5.3.2	TEs not powered across the interface	NA	This description is only valid for TE-Side.
I.430.5.3.3	Indication of connection status	NA	This description is only valid for TE-Side.
I.430.5.4	Frame structure	I	
I.430.5.4.1	Bit rate	I	
I.430.5.4.2	Binary organisation of the frame	I	NOTE 2 of figure 3/I.430 is deleted.
I.430.5.4.2.1	TE to NT	NA	This description is only valid for TE-Side.
I.430.5.4.2.2	NT to TE	I	The NOTE under table 3/I.430 is replaced by: NOTE: S shall bet set to binary ZERO. Fa and M shall also be set to binary ZERO except for NT2 providing multiframing". This NOTE is normative. The text to bit position 37 in table 3/I.430 and under figure 3/I.430 is modified as follow: S - the use of this bit is for further study" is deleted; the following text is inserted: „S - reserved for future standardisation.
I.430.5.4.2.3	Relative bit positions	NA	This description is only valid for TE-Side.
I.430.5.5	Line code	I	
I.430.5.6	Timing considerations	I	
I.430.6	Interface procedures	--	
I.430.6.1	D-channel access procedure	NA	This description is only valid for TE-Side.
I.430.6.1.1	Interframe (layer 2) time fill	I	The option NT send binary ONEs, is implemented.
I.430.6.1.2	D-echo channel	I	The text given in brackets under this clause is informative.
I.430.6.1.3	D-channel monitoring	NA	This description is only valid for TE-Side.
I.430.6.1.4	Priority mechanism	NA	This description is only valid for TE-Side.
I.430.6.1.5	Collision detection	NA	This description is only valid for TE-Side.
I.430.6.1.6	Priority system	NA	This description is only valid for TE-Side.
I.430.6.2	Activation/deactivation	--	
I.430.6.2.1	Definitions	--	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.6.2.1.1	TE states	--	
I.430.6.2.1.1.1	state F1 (Inactive)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.2	state F2 (Sensing)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.3	state F3 (Deactivated)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.4	state F4 (Awaiting signal)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.5	state F5 (Identifying input)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.6	state F6 (Synchronized)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.7	state F7 (Activated)	NA	This description is only valid for TE-Side.
I.430.6.2.1.1.8	state F8 (Lost framing)	NA	This description is only valid for TE-Side.
I.430.6.2.1.2	NT states	--	
I.430.6.2.1.2.1	state G1 (Deactivated)	I	
I.430.6.2.1.2.2	state G2 (Pending activation)	I	The term "NT" in the last sentence is amended to "network side"
I.430.6.2.1.2.3	state G3 (Activated)	I	
I.430.6.2.1.2.4	state G4 (Pending deactivation)	I	
I.430.6.2.1.3	Activate primitives	I	
I.430.6.2.1.4	Deactivate primitives	I	
I.430.6.2.1.5	Management primitives	I	
I.430.6.2.1.6	Valid primitive sequences	I	
I.430.6.2.2	Signals	I	
I.430.6.2.3	Activation/deactivation procedure for TEs	NA	
I.430.6.2.3.1	General TE procedures	NA	
I.430.6.2.3.2	Specification of the procedure	NA	"Annex C" is changed to read "Annex C/I.430" NOTEs 2 and 4 to table 5/I.430 are normative In the last sentence of NOTE 2 the term "TE" is amended to "terminal" In the last sentence of NOTE 2 the term "NT" is amended to "network" The following text is added to NOTE 4 under table 5/I.430: If INFO 2 or INFO 4 is not recognised within 5 ms after the appearance of a signal, TE shall go to F5. To ensure that a TE will go to state F5 when receiving a signal to which it cannot synchronise, operation of TEs shall be verified where the received signal is any bit pattern (containing at least 3 ZEROs in each frame interval) to which TEs conforming to subclause A.6.3.1.2 are not able to synchronise. The normative NOTE 5 is modified as follow: INFO 0 shall be detected when 48 or more contiguous binary ONEs have been received and the TE shall perform the actions specified in table 5/I.430

ITU-T Rec. Paragraph	Title	Compliance	Comment
			[2]. Conformance shall be tested with a sinusoidal signal having a voltage of 100mV peak-to-peak (with a frequency in the range of 2kHz to 1000 kHz, preferably 100 kHz). TE being in state F6 or F7 shall react on receipt of this signal by transmitting INFO 0 within a period of time 250 μs to 25 ms. The normative NOTE 6 is modified as follow: Add the following sentence, this prevents the loss of an on-going communication caused by spurious effects.
I.430.6.2.4	Activation/deactivation for NTs	--	
I.430.6.2.4.1	Activating/deactivating NTs	I	The headline of this subclause is deleted, the text under this subclause is inserted under subclause 6.2.4 The normative NOTE 5 to table 6/ I.430 is modified as follow: For conformance test purposes, in the state G3 when receiving a sinusoidal signal having a voltage of 100 mV peak-to-peak (with a frequency in the range of 2 kHz to 1000 kHz, preferably 100 kHz), the NT shall react by transmitting INFO 2 within a period of time 250 μs to 25 ms. Selected option: − Note 1/Table 6/I.430:Timer T1 is implemented in the network side. − Note 2/Table 6/I.430: 25 msec $\leq$ T2 $\leq$ 100 msec − Note 3/Table 6/I.430:The primitives MPH-D1 and MPH-E1 are not transferred to a management entity at the NT. − Note 4/Table 6/I.430: Not implemented.
I.430.6.2.4.2	Non-activating/non-deactivating NTs	NA	This clause is deleted in ETS.
I.430.6.2.5	Timer values	I	The normative clause is modified as follow: − Timer T1 is implemented in the network side and its value for 2B1Q: T1 = 15s − Timer T2 = 32 msec − Timer T3: valid for TE-side only. Optionnaly, Siemens EWSD can also support: − ine code used: 4B3T: Timer T1= 35s
I.430.6.2.6	Activation times	--	
I.430.6.2.6.1	TE activation times	NA	This clause is only valid for the TE-Side. The text given in brackets under this subclause is informative. In the first paragraph, the second sentence shall start with: "In state F6, ..."
I.430.6.2.6.2	NT activation times	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.6.2.7	Deactivation times	I	
I.430.6.3	Frame alignment procedures	I	
I.430.6.3.1	Frame alignment procedure in the direction NT to TE	NA	This description is only valid for TE-Side.
I.430.6.3.1.1	Loss of frame alignment	NA	This description is only valid for TE-Side.
I.430.6.3.1.2	Frame alignment	NA	This description is only valid for TE-Side.
I.430.6.3.2	Frame alignment in the direction TE to NT	I	The end of the sentence (and including) except if the Q-channel..." is deleted.
I.430.6.3.2.1	Loss of frame alignment	I	
I.430.6.3.2.2	Frame alignment	I	
I.430.6.3.3	Multiframing	I	The complete text under 6.3.3 is replaced by: The multiframing mechanism is intended to provide extra layer 1 capacity in the TE-to-NT direction (Q channel). The use of multiframing is out of the scope of this ITU-T Recommendation. The NT1 shall not provide multiframing, therefore the FA bit in the frame NT-to-TE (see figure 3/I.430) shall be set to binary ZERO. The NT2 may provide multiframing in accordance with ITU-T Recommendation I.430, 6.3.3. However, TEs shall provide for identification of the bit positions which provide this extra capacity, designated Q-bits. The TE shall echo the binary value of the received FA bits in the corresponding FA bit position of the frame transmitted to the NT.
I.430.6.3.3.1	General mechanism	NA	This clause is not relevant in the ETS implementation.
I.430.6.3.3.2	Q-bit position identification algorithm	NA	This clause is not relevant in the ETS implementation.
I.430.6.3.3.3	TE multiframe identification	NA	This clause is not relevant in the ETS implementation.
I.430.6.3.4	S-channel structuring algorithm	NA	This clause is not relevant in the ETS implementation.
I.430.6.4	Idle channel code on the B-channels	NA	This description is only valid for TE-Side.
I.430.7	Layer 1 maintenance	--	
I.430.7.1	Provision for operational and maintenance functions between terminal and NT1	--	
I.430.7.1.1	Introduction	I	
I.430.7.1.2	Test loopbacks	I	
I.430.7.1.3	Codes, message durations, and detection algorithms for a Q-channel and SC1-subchannel	I	
I.430.7.1.4	Code priorities for Q-channel and SC1-subchannel	I	
I.430.7.1.5	TE-to-NT direction messages (Q bits)	I	
I.430.7.1.5.1	Idle channel (NORMAL)	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.7.1.5.2	Loss-of-power indication (LP)	I	
I.430.7.1.5.3	Request self test (ST)	I	
I.430.7.1.5.4	Request a loopback (LB1, LB2, LB1/2)	I	
I.430.7.1.6	NT-to-TE direction messages (SC1 bits)	I	
I.430.7.1.6.1	Idle channel (NORMAL)	I	
I.430.7.1.6.2	Loss-of-power indication (LP)	I	
I.430.7.1.6.3	Detected access transmission system error (DTSE-OUT, DTSE-IN)	I	
I.430.7.1.6.4	Self test indication	I	
I.430.7.1.6.5	Self test report (STP, STF)	I	
I.430.7.1.7	B-channel loopback indications (LB1I, LB2I, LB1/2I)	I	
I.430.7.1.8	Loss-of-received-signal indication (LRS)	I	
I.430.7.1.9	Disruptive NT Operation Indication (DOI)	I	
I.430.8	Electrical characteristics	--	
I.430.8.1	Bit rate	--	
I.430.8.1.1	Nominal rate	I	
I.430.8.1.2	Tolerance	I	
I.430.8.2	Jitter and bit-phase relationship between TE input and output	--	
I.430.8.2.1	Test configurations	NA	This description is only valid for TE-Side.
I.430.8.2.2	Timing extraction jitter	NA	This description is only valid for TE-Side.
I.430.8.2.3	Total phase deviation input to output	NA	This description is only valid for TE-Side.
I.430.8.3	NT jitter characteristics	I	
I.430.8.4	Termination of the line	I	
I.430.8.5	Transmitter output characteristics	--	
I.430.8.5.1	Transmitter output impedance	I	
I.430.8.5.1.1	NT transmitter output impedance	I	
I.430.8.5.1.2	TE transmitter output impedance	NA	This description is only valid for TE-Side.
I.430.8.5.2	Test load impedance	I	
I.430.8.5.3	Pulse shape and amplitude (binary ZERO)	--	
I.430.8.5.3.1	Pulse shape	I	
I.430.8.5.3.2	Nominal pulse amplitude	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.8.5.4	Pulse unbalance	I	The text under this subclause is replaced by: The unbalance may be the consequence of ICs tolerance or circuit design but also the consequence of the dynamic behaviour of the power feeding circuit of the transmitter which may result in a pattern dependent pulse amplitude. Two new normative subclauses are added: A.8.5.4.1 and A.8.5.4.2.
I.430.8.5.4.1	Pulse amplitude when transmitting a high N density pattern	I	A new clause is added with following text: For both positive and negative pulses, 2 thresholds are set, corresponding to the minimum and maximum amplitude defined by the pulse mask (nominal amplitude +/- 10 %). When transmitting 40 frames with continuous binary ZERO in at least both B-channels into a test load of 50 Ohm the pulse amplitude in the middle of the pulse shall be within the threshold as given in figure 13/I.430.
I.430.8.5.4.2	Pulse unbalance of an isolated couple of N pulses	I	A new clause is added with following text: The absolute sum of $\int U(t)dt$ for a positive pulse (one bit) and of $\int U(t)dt$ for a negative pulse (one bit) shall be < 5 % of the nominal pulse. Therefore the reference voltage is given by the signal when transmitting INFO 0. The edge between two adjacent pulses shall be the crossing of the zero voltage. From this edge the integral shall be defined for a time period of 1.5 UI in each direction. For TEs the conformance test shall be performed with the first frame INFO 3 containing all binary ONEs in both B-channels and in the D-channel following INFO 0. For NTs the conformance test shall be performed with the signal INFO 4. In the B1-channel two alternated octets 1111 1111 and 1111 1100 shall be inserted so that the two binary ZEROs are set in the bit position 33 and 34 (see table 3/I.430). All B2-, D- and E-bits shall be set to binary ONE."
I.430.8.5.5	Voltage on other test loads (TE only)	NA	This description is only valid for TE-Side.
I.430.8.5.5.1	400-ohm load	NA	This description is only valid for TE-Side.
I.430.8.5.5.2	5.6-ohm load	NA	This description is only valid for TE-Side.
I.430.8.5.6	Unbalance about earth	I	Two new normative subclauses are added: 8.5.6.1 and 8.5.6.2.
I.430.8.5.6.1	Longitudinal conversion loss	I	
I.430.8.5.6.2	Output signal balance	NA	Not relevant in this ETS. Requirements are based on ETS 300 126. SIEMENS clarification: Relevant test criteria are modified in order to be applicable for NTBA. The output signal balance requirements are covered by prEN 50096.
I.430.8.6	Receiver input characteristics	--	
I.430.8.6.1	Receiver input impedance	--	
I.430.8.6.1.1	TE receiver input impedance	NA	This description is only valid for TE-Side.

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.8.6.1.2	NT receiver input impedance	I	
I.430.8.6.2	Receiver sensitivity – Noise and distortion immunity	I	
I.430.8.6.2.1	TEs	NA	This description is only valid for TE-Side.
I.430.8.6.2.2	NTs for short passive bus (fixed timing)	I	
I.430.8.6.2.3	NTs for both point-to-point and short passive bus configurations (adaptive timing)	I	
I.430.8.6.2.4	NTs for extended passive bus wiring configurations	I	
I.430.8.6.2.5	NTs for point-to-point configurations only	I	
I.430.8.6.3	NT receiver input delay characteristics	--	
I.430.8.6.3.1	NT for short passive bus	I	
I.430.8.6.3.2	NT for both point-to-point and passive bus	I	
I.430.8.6.3.3	NT for extended passive bus	I	
I.430.8.6.3.4	NT for point-to-point only	I	
I.430.8.6.4	Unbalance about earth	I	
I.430.8.7	Isolation from external voltages	NA	Not relevant in this ETS. Requirements are based on ETS 300 126. Relevant test criteria are modified in order to be applicable for NTBA. These requirements are defined in prETS 300 047
I.430.8.8	Interconnecting media characteristics	NA	This description is not applicable to NT.
I.430.8.9	Standard ISDN basic access TE cord	NA	This description is only valid for TE-Side. The sentence "- the resistance of an individual conductor shall not exceed 3 ê." is modified as follow: the resistance R of an individual conductor shall not exceed 3 ê. The difference in the resistance of the conductors of a pair shall not exceed 60 mê + 0,04 R. Under the fourfth line of alinea a), the sentence is modified to read: „... at both ends in identical plugs ..." The second sign "-" is deleted under alinea b); the penultimate sentence starts at the left margin
I.430.8.10	Longitudinal output voltage	I	
I.430.8.11	Electromagnetic compatibility (EMC)	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.9	Power feeding	I	A new sentence is inserted under this clause: All the values referring to power in Watts shall be measured using an instrument which integrates the measurement over a period of 50 ms. NOTE: According to ITU-T I.430 list of items to be studied the definition of power values provided by power sources or consumed by power sinks may be changed from fixed values to Power Consumption Units (PCU). This concept has not yet been adopted in this ITU-T. Further study is required especially on backward compatibility.
I.430.9.1	Reference configuration	--	Additional notes to figure 21/I.430: NOTE 4: Power source 2 may also be implemented as a separate device and attached to the interface wiring outside of NT. NOTE 5: NT requiring remote power feeding from a TE via the interface shall implement a power sink. NOTE 6: In TE-to-TE application remote power feeding of a TE from an other TE may be performed by application of power source 3
I.430.9.1.1	Functions specified at the access leads	I	
I.430.9.1.2	Provision of power sources and sinks	I	The text of subclause 9.1.2/I.430 is modified as follow: The provision of power source 1 (normal) is optional. NOTE: Optional in this case refers only to the responsibility of the network provider for the provision of power source 1. The capability of the provision of power source 1 shall always be available, either: as an integral part of the NT1, and/or; − physically separate and connected at any point in the interface wiring. The provision of power source 1 (restricted) is mandatory. NOTE: Mandatory in this case refers only to the responsibility of the network provider for the provision of power source 1 (restricted) in a single basic access configuration. In the case of a multiple basic access to an NT2 configuration, power source 1 (restricted) shall be mandatory for at least one of the NT1 accesses. In some cases the provision of power source 1 (restricted) can be guaranteed only for a limited period of time. The provision of power source 2 is optional. The provision of power source 3 is outside the scope of this ITU-T. Power sinks 1 and 2 are optional Selected option: − The Power source 1 is implemented as an integral pat of the NTBA
I.430.9.1.3	Power feeding voltage	I	
I.430.9.2	Power available from NT	I	Selected option: − The current limiting is included.

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.9.2.1	Power source 1 normal and restricted mode	I	Selected option: – Power source 1: max. power under normal conditions: 4,5W max. power under restricted conditions: 420mW when power source 1 enters a condition where it is able to supply only restricted power, it indicates this condition by reversing its polarity. Please refer also to comments to 9.1.
I.430.9.2.2	Voltage NT from power source 1	--	
I.430.9.2.2.1	Normal mode	I	
I.430.9.2.2.2	Restricted mode	I	
I.430.9.2.3	Voltage of power source 2	NA	Not applicable to the NT, please refer also to comments to 9.1.
I.430.9.2.4	Short circuit protection	I	
I.430.9.3	Power available at TE	--	
I.430.9.3.1	Power consumption unit	--	
I.430.9.3.1.1	Normal mode	NA	This description is only valid for TE-Side.
I.430.9.3.1.2	Restricted mode	NA	This description is only valid for TE-Side.
I.430.9.3.2	Power source 1 – Phantom powering	--	
I.430.9.3.2.1	Normal mode	NA	This description is only valid for TE-Side.
I.430.9.3.2.2	Restricted mode	NA	This description is only valid for TE-Side.
I.430.9.3.3	Power source 2 – Optional third pair	--	
I.430.9.3.3.1	Normal mode	NA	This description is only valid for TE-Side.
I.430.9.3.3.2	Restricted mode	NA	This description is only valid for TE-Side.
I.430.9.4	PS1 current transient	NA	The text under this subclause is replaced by: "The rate of change of current drawn by the TE shall not exceed 5 mA/μs. (can be deleted as remarks) This requirement is not applicable during 100 ms or a time C according to figure 2 of this ITU-T as elapsed (see also Annex C) after the connection of the terminal." NOTE: See subclause 7.1 of this ITU-T.
I.430.9.5	TE power consumption	--	
I.430.9.5.1	Power source 1	--	
I.430.9.5.1.1	Normal mode	I	NOTE: Permitted leakage current is defined in subclause 7.1.1 to this ITU-T. The reference to the note under subclause 9.3.1.1 is deleted. The end of the fourth sentence is modified to read: "..this TE shall enter a "local action" state" (can be deleted as remarks)
I.430.9.5.1.2	Restricted mode	--	
I.430.9.5.1.2.1	Power available to a TE "designated" for restricted power	I	In the second sentence the term "powered down" is replaced by "in low-power mode" The third sentence is replaced by: "The value of the low-power mode consumption

ITU-T Rec. Paragraph	Title	Compliance	Comment
	operation		shall be ó 25 mW." NOTEs 1, 2 and 3 under table 811/I.430 are deleted A new NOTE is added under both boxes indicating "0 mW": "NOTE - See subclause A.9.5.1.2.2
I.430.9.5.1.2.2	Power available to other TEs	I	The complete text under this subclause is replaced by: TEs not powered from power source 1 having a disconnection detector which utilises the phantom voltage shall not draw more than 3 mW from the interface. "TEs not powered from power source 1 not having a disconnection detector which utilises the phantom voltage and non-designated TEs which are normally powered from power source 1 (normal conditions) shall not consume any power from power source 1 in restricted power conditions. NOTE: Permitted leakage current is defined in subclause 9.7.1.1 to this I.430.
I.430.9.5.2	Power source 2	--	
I.430.9.5.2.1	Normal mode	I	
I.430.9.5.2.2	Restricted mode	I	
I.430.9.5.2.2.1	Power available to a TE "designated" for restricted power operation	I	
I.430.9.5.2.2.2	Power available to other TEs	I	
I.430.9.6	Galvanic isolation	I	At the end of the text a new sentence is added: "See also ITU-T 300 047".
I.430.9.7	Limitations on power source and sink during transient condition	I	
I.430.9.7.1	Current/time limitations for TEs	I	
I.430.9.7.1.1	Terminals powered from power source 1	I	NOTE: The total effective capacitance at the PS1 input to the TE is expected to be less than 100 mF under all conditions of normal operation, startup and switch-over between normal and restricted mode, or vice versa.
I.430.9.7.1.1.table.12		I	X: current equivalent to 1 Wat never exceeding 55 mA independent of the input voltage
I.430.9.7.1.1.table.13		I	X: current equivalent to 380 mWat never exceeding 55 mA independent of the input voltage
I.430.9.7.1.2	Terminals powered from power source 2	I	
I.430.9.7.2	Power source switchover time (PS1 or PS2)	I	Restricted mode power source requirements under overload conditions After the switch-over from normal mode to the restricted mode the power source shall provide a minimum current of 9 mA when the voltage is forced to a level below 1 V (overload condition). After the switch-over from normal mode to the restricted mode the power source shall be able to provide a minimum current of 11 mA when the source voltage is forced to 34 V. For conformance test purposes the current shall be measured with a load resistor applied for at least 1 second.

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.9.7.3	Other TE requirements	I	
I.430.9.7.3.1	Minimum TE start up current from power source 1	I	
I.430.9.7.3.1.1	Restricted mode	I	
I.430.9.7.3.1.2	Normal mode	I	
I.430.9.7.3.2	Minimum TE start up current from power source 2	I	
I.430.9.7.3.2.1	Restricted mode	I	
I.430.9.7.3.2.2	Normal mode	I	
I.430.9.7.3.3	Verification	I	
I.430.9.7.3.4	Protection against short term interruptions	I	
I.430.9.7.3.5	Behaviour at switch-over	I	
I.430.9.7.3.6	Effective capacitance at the PS1 or PS2 input to the TE	I	
I.430.9.7.3.7	TE behaviour at low input voltage	I	
I.430.9.7.4	Other power source requirements	I	
I.430.9.7.4.1	Power source 1 restricted mode	I	
I.430.9.7.4.2	Power source 1 normal mode	I	
I.430.9.7.4.3	Power source 2 restricted mode	I	
I.430.9.7.4.4	Power source 2 normal mode	I	
I.430.9.8	PS1 direct current unbalance	I	
I.430.9.8.1	TE requirements	I	
I.430.9.8.1.1	TE PS1 power sink current balance	I	
I.430.9.8.1.2	Effect of PS1 current unbalance	I	
I.430.9.8.2	NT requirements	I	
I.430.9.8.2.1	NT power source 1 current balance	I	
I.430.9.8.2.2	Effect of PS1 current unbalance	I	
I.430.9.9	Additional requirements for an auxiliary power supply (APS)	I	
I.430.9.9.1	Power available from an APS	I	
I.430.9.9.2	APS switch-on time	I	
I.430.9.9.3	APS switch-off time	I	
I.430.9.9.4	APS power consumption when off	I	
I.430.9.9.5	Dynamic behaviour of APS	I	
I.430.9.10	Additional requirements for NT1 restricted mode source for compatibility with an APS	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.430.9.10.1	PS1 restricted mode back-off	I	
I.430.9.10.2	PS1 restricted mode power-up	I	
I.430.9.10.3	NT1 power consumption from APS normal mode	I	
I.430.10	Interface connector contact assignments	I	The first sentence under this clause is replaced by: "The interface connector and the contact assignments are defined in prEN 28 877 [4] AND ENV 41 001 [5]." The S-bus is connected with 8-contact as per ISO 8877.
I.430.A	Wiring configurations and round trip delay considerations used as a basis for electrical characteristics	I	Selected option: − The NT complies with all possible wiring configurations, except the NT1 STAR configuration acc. to Fig. A-4/I.430.
I.430.A.1	Introduction	I	
I.430.A.2	Wiring configurations	I	
I.430.A.2.1	Point-to-multipoint	I	
I.430.A.2.1.1	The point-to-multipoint wiring ...	I	
I.430.A.2.1.2	Short passive bus (Figure A.1)	I	
I.430.A.2.1.3	Extended passive bus (Figure A.2)	I	
I.430.A.2.2	Point-to-point (Figure A.3)	I	
I.430.B	SDL representation of a possible implementation of the D-channel access	NA	This description is only valid for TE-Side.
I.430.C	(see Table 5)	--	When SDL representation and activation/ deactivation tables are inconsistent, the tables shall apply
I.430.C.1	SDL representation ...	NA	This description is only valid for TE-Side.
I.430.C.2	In 6.2.3 the procedure ...	NA	This description is only valid for TE-Side.
I.430.C.3	SDL representation of ...	I	Please, also refer to I.430.6.2.4.
I.430.C.figure.C.1		--	Under state F6 at the event "Expiry of timer T3" the state "F3" in the final box is replaced by "F6" Under states F3, F4, F5, F6, and F8 timer T3 shall be stopped and reset at the event "receive INFO 4"
I.430.C.table.C.1		--	The following text is modified in NOTE 3: "To ensure that a TE will go to state F5 when receiving a signal to which it cannot synchronise, operation of TEs shall be verified where the received signal is any bit pattern (containing at least 3 ZEROs in each frame interval) to which TEs conforming to subclause A.6.3.1.2 are not able to synchronise." The following text is modified in NOTE 4: „A timer is started when leaving the states F7 or F8 upon the reception of INFO 0. The following text is added in NOTE 4: "This prevents the loss of an on-going

ITU-T Rec. Paragraph	Title	Compliance	Comment
			communication caused by spurious effects." The following text is added in NOTE 5: „INFO 0 shall be detected when 48 or more contiguous binary ONEs have been received and the TE shall perform the actions specified in table C-1/I.430. Conformance shall be tested with a sinusoidal signal having a voltage of 100mV peak-to-peak (with a frequency in the range of 2kHz to 1000kHz, preferably 100 kHz). TE being in state F6 or F7 shall react on receipt of this signal by transmitting INFO 0 within a period of time 250 μs to 25 ms."
I.430.C.table.C.2		--	The event "Application of power" is replaced by: "Power on and detection of power" The signs "/" at the event "Power on and detection of power" are replaced by the sign "-" under the states F1.1, F2, F3, F4, F5, F6, F7 and F8. Under states F2 timer T3 shall be stopped and reset at the event "Receive INFO 4" Under states F6 and F7 at the event "Disappearance of power S" the indication of "MPH-II(d), MPH-DI, PH-DI; F1.1" is replaced by the sign: "-" (no state change) The following text is added in NOTE 4: "This prevents the loss of an on-going communication caused by spurious effects." The following text is added in NOTE 6: „INFO 0 shall be detected when 48 or more contiguous binary ONEs have been received and the TE shall perform the actions specified in table C-1/I.430. Conformance shall be tested with a sinusoidal signal having a voltage of 100mV peak-to-peak (with a frequency in the range of 2kHz to 1000kHz, preferably 100 kHz). TE being in state F6 or F7 shall react on receipt of this signal by transmitting INFO 0 within a period of time 250 μs to 25 ms."
I.430.C.table.C.3		--	
I.430.C.figure.C.2		--	In the SDL representation of the activation/deactivation procedures for NTs the action "start timer 2" under state G4 is replaced by: "start timer 1"
I.430.D	Test configuration	I	This description is only valid for TE-Side.
I.431.	INTEGRATEDSERVICESDIGITAL NETWORK (ISDN) ISDN USER-NETWORK INTERFACES PRIMARY RATE USER-NETWORK INTERFACE – LAYER 1 SPECIFICATION	--	
I.431.1	Introduction	--	
I.431.1.1	Scope and field of application	--	
I.431.2	Type of configuration	--	
I.431.2.1	Point-to-point	--	
I.431.2.2	Location of interfaces	I	
I.431.3	Functional characteristics	--	
I.431.3.1	Summary of functions (layer 1) (see Figure 2)	I	H0, H1 channels are not supported. For maintenance functions refer to Technical Specification ITU-T recommendation

ITU-T Rec. Paragraph	Title	Compliance	Comment
			I.604.
I.431.3.2	Interchange circuits	I	
I.431.3.3	Activation/deactivation	I	
I.431.3.4	Operational functions	--	
I.431.3.4.1	Definition of signals and signal detection at the interface	I	The note to table 1/I.431 is not relevant. Add a new note to table 1/I.431: „Contiguous CRC blocks with errors shall result in contiguous CRC error information
I.431.3.4.1.1	Definition of signals at the interface	I	
I.431.3.4.1.2	Signal detection algorithm	I	Add the following text at the end of subclause 3.4.1.2 The detection algorithm for signals given in table 1/I.431 and others is defined as follows: Normal operational frames: the algorithm shall be in accordance with ITU-T Recommendation G.706 paragraphs 4.1.2 and 4.2 Loss of frame alignment: the algorithm shall be in accordance with ITU-T Recommendation G.706 paragraph 4.1.1. RAI: RAI is detected when both of the two following conditions occur: frame alignment condition, reception of one bit A with binary content ONE. Loss of signal: the equipment shall assume "loss of signal" when the incoming signal amplitude is more than 20 dB below the nominal output amplitude defined in ITU-T Recommendation G.703 for this interface for more than 1 ms. NOTE: The detection of this event is necessary if an implementation cannot detect loss of frame alignment in case of loss of incoming signal. AIS: AIS is detected when both of the two following conditions occur: loss of frame alignment Reception of 512 bit periods containing less than 3 binary ZEROs (reference is made to ITU-T Recommendation 0.162 paragraph 3.3.2) CRC error information: reception of one E bit set to ZERO according to table 1/I.431. RAI and continuous CRC error information: this event is identified when A bit set to ONE and E bit set to ZERO are continuously received within a persistence check time period of between 10 ms and 50 ms.
I.431.3.4.2	Definitions of state tables at network and user sides	I	Modify NOTE 1 as follows Only those stable states needed for operation and maintenance of user and network side of the interface (system reactions, user and network responsible information) are defined. The transient states relative to the detection of CRC error information, AIS and RAI are not taken into account. It has to be taken into account that during state transitions error indication primitives PH and MPH are sent to higher layers. Add the following text to end of subclause, the TE and NT shall inform layer 2 (of the D-channel protocol), the management entity and the other side of the interface of the status identified by the equipment according to the state tables.

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.431.3.4.3	Layer 1 states on the user side of the interface	NA	User side only NOTE 2 is not relevant.
I.431.3.4.4	Layer 1 states at the network side of the interface	I	NOTE 2 is not relevant.
I.431.3.4.5	Definition of primitives	I	
I.431.3.4.6	State tables	--	
I.431.3.4.6.t2	Table 2/I.431:	NA	User side only NOTE b) to table 2/I.431 is not relevant
I.431.3.4.6.t3	Table 3/I.431: PRA layer 1 state matrix at network side of the interface	I	
I.431.4	Interface at 1544 kbit/s	NA	Not relevant for ETS implementation
I.431.4.1	Electrical characteristics	NA	
I.431.4.1.1	Bit rate and synchronization	NA	
I.431.4.1.1.1	Network connection characteristics	NA	
I.431.4.1.1.2	Requirements at I_a/I_b	NA	
I.431.4.1.1.2.1	Receiver bit stream synchronized to a network clock	NA	
I.431.4.1.1.2.2	TE1/TA operating behind an NT2 that is not synchronized to a network clock	NA	
I.431.4.1.1.2.3	Receive bit stream synchronized to customer provided transmitted signal clock (leased line application)	NA	
I.431.4.1.2	Specification of output ports	NA	
I.431.4.1.2.1	Test load	NA	
I.431.4.1.2.2	Pulse characteristics	NA	
I.431.4.1.2.3	Pulse imbalance	NA	
I.431.4.1.2.4	Voltage of binary ZERO	NA	
I.431.4.1.3	Specifications of input ports	NA	
I.431.4.1.3.1	Received signal characteristics	NA	
I.431.4.1.3.2	Interference test conditions	NA	
I.431.4.1.4	Interim provisions	NA	
I.431.4.1.4.1	Interim I_a/I_b alternative	NA	
I.431.4.1.4.2	Interim DSX alternative	NA	
I.431.4.2	Frame structure	NA	
I.431.4.2.3	Multi-frame structure	NA	
I.431.4.3	Timing considerations	NA	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.431.4.4	Time slot assignment	NA	
I.431.4.4.1	D-channel	NA	
I.431.4.4.2	B-channel and H-channels	NA	
I.431.4.5	Jitter, wander and phase transients	NA	
I.431.4.5.1	General	NA	
I.431.4.5.2	Jitter	NA	
I.431.4.5.2.1	Receive signal jitter	NA	
I.431.4.5.2.2	Transmit signal jitter	NA	
I.431.4.5.3	Wander	NA	
I.431.4.5.3.1	Transmit signal wander	NA	
I.431.4.5.3.2	Received bit stream wander	NA	
I.431.4.5.4	Phase transients	NA	
I.431.4.5.4.1	Received signal transients	NA	
I.431.4.5.4.2	Transmit signal transients	NA	
I.431.4.6	Interface procedures	NA	
I.431.4.6.1	Codes for idle channels and idle slots	NA	
I.431.4.6.2	Interframe (layer 2) time fill	NA	
I.431.4.6.3	Frame alignment and CRC-6 procedure	NA	
I.431.4.7	Maintenance	NA	
I.431.4.7.1	General introduction	NA	
I.431.4.7.2	Maintenance functions	NA	
I.431.4.7.3	Maintenance signals	NA	
I.431.4.7.4	The m-bits (4 kbit/s data link)	NA	
I.431.4.7.4.1	Control signals	NA	
I.431.4.7.4.1.1	Priority messages	NA	
I.431.4.7.4.1.2	Command messages	NA	
I.431.4.7.4.2	Performance report message (PRM)	NA	
I.431.4.7.4.2.1	Method of operation	NA	
I.431.4.7.4.2.2	Error performance parameters	NA	
I.431.4.7.4.2.3	Format of the performance report	NA	
I.431.4.7.5	Maintenance Loopbacks	NA	
I.431.5	Interface at 2048 kbit/s	--	
I.431.5.1	Electrical characteristics	I	
I.431.5.2	Frame structure	--	
I.431.5.2.1	Number of bits per time slot	I	
I.431.5.2.2	Number of time slots per frame	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
I.431.5.2.3	Assignment of bits in time slot 0	I	
I.431.5.2.4	Time slot assignment	--	
I.431.5.2.4.1	Frame alignment signal	I	
I.431.5.2.4.2	D-channel	I	
I.431.5.2.4.3	B-channel and H-channels	I	H-channels are not supported.
I.431.5.2.4.4	Bit sequence independence	I	
I.431.5.3	Timing considerations	NA	Add the following sentences at the end of subclause, relevant for user side: A TE which is designed to be connected to the T reference point only, shall be able to synchronise at the nominal bit rate ñ 5 ppm. A TE with free running clock frequency accuracy better than ñ 1 ppm shall be able to synchronise at the nominal bit rate ñ 1 ppm. See also Annex A.3.1.1
I.431.5.4	Jitter	--	
I.431.5.4.1	General considerations	I	
I.431.5.4.2	Minimum tolerance to jitter and wander at TE inputs	I	
I.431.5.4.3	TE and NT2 output jitter	--	
I.431.5.4.3.1	TE and NT2 with only one user-network interface	I	Replace the text of this subclause by the following one: The peak-to-peak output jitter shall meet the limits when measured with a bandpass filter having a high pass of first order (slope of 20 dB/decade) with cut-off frequencies as defined below. At the input the signal shall be provided with the tolerable input jitter specified in figure 10/I.431, subclause 5.4.2, and with tolerable frequency deviation during measurement. Tests shall be made with Normal Operational Frames as well as AIS. _(see table below)_
I.431.5.4.3.2	TE with more than one user-network interface to the same network	NA	TE and NT2 output jiiter not relevant.
I.431.5.5	Tolerable longitudinal voltage	I	The reference in the note to figure 12/I.431 shall read „see ITU-T Recommendation O.9 [5]"
I.431.5.6	Output signal balance	I	The ITU-T recommendation is implemented.
I.431.5.7	Impedance towards ground	I	
I.431.5.8	Interface procedures	--	
I.431.5.8.1	Codes for idle channels and idle	I	

Table within I.431.5.4.3.1 comment:

Measurement filter bandwidth		Output jitter
Lower cut-off (high pass)	Upper cut-off (low pass)	UI peak-to-peak (maximum)
20 Hz	100 kHz	1,1 UI
400 Hz	100 kHz	0,11 UI

ITU-T Rec. Paragraph	Title	Compliance	Comment
	slots		
I.431.5.8.2	Interframe (layer 2) time fill	I	
I.431.5.8.3	Frame alignment and CRC-4 procedures	I	
I.431.5.9	Maintenance at the interface	I	
I.431.5.9.1	Use of CRC procedure	--	
I.431.5.9.1.1	Introduction	I	
I.431.5.9.1.2	Localization of the CRC functions in the subscriber access from the user point of view	--	
I.431.5.9.1.2.1	No CRC processing in the transmission link	NU	This detection is not supported, because CRC processing is provided in NT1.
I.431.5.9.1.2.2	CRC processing in the digital transmission link	I	According to ITU-T I.604 A.2 (option 2). Clarification: 1. No CRC error information (E-bits) generated in ET. 2. CRC generation and remote CRC error information in the NT1 toward TE can be switched off.
I.431.5.9.2	Maintenance functions	--	
I.431.5.9.2.1	General requirements	I	
I.431.5.9.2.2	Maintenance functions on the user side	NA	Maintenance functions at user side not relevant.
I.431.5.9.2.2.1	Anomalies and defect detection	NA	user side only.
I.431.5.9.2.2.2	Detection of defect indication signals	NA	user side only.
I.431.5.9.2.2.3	Consequent actions	NA	user side only.
I.431.5.9.2.3	Maintenance functions on the network side	--	
I.431.5.9.2.3.1	Defect detection	I	
I.431.5.9.2.3.2	Detection of defect indication signals	I	
I.431.5.9.2.3.3	Consequent actions	I	Table 12/I.431: Options are implemented as follows: 1. Defect condition: Loss of frame alignment Consequent action: Generation of CRC error information Option 1 - no 2. Defect condition: Excessive CRC error ratio Consequent action: Optional generation of RAI not implemented.
I.431.6	Connector	I	Replace the text of this subclause by the following one: Interface connector and contact assignment are specified in ISO/IEC 10173 [12] and ENV 41001 [13]. However, permanent wiring connection of TEs to NTs is also

ITU-T Rec. Paragraph	Title	Compliance	Comment
			permitted. Siemens uses Connector IEC 603-2.
I.431.7	Interface wiring	I	Replace the text of this subclause by the following one: The magnitude of the characteristic impedance of "symmetrical type" interface cable shall be 120 ohm ñ 20% in a frequency range from 200 kHz to 1 MHz and 120 ohm ñ 10% at 1 MHz. The use of shielded interface cables may be required to meet radiation limitation and immunity requirements defined in the EMC standards (prEN 50096 [7]). Therefore the TE and the NT shall provide a point at the equipment where a shield of the interface cable can, and if provided shall be connected to. This point shall be designed respecting EMC requirements providing access to the signal reference for the transmitter and receiver of the equipment interface. Application of interface cable with individually shielded pairs or with a common shield for both pairs shall be possible.
I.431.8	Power feeding	I	Add the text of this subclause by the following one: The power feeding requirements of this standard are based on a single access NT1. A power source able to feed more than one NT1 (via a common pair of wires in the installation) shall meet the requirements at each individual power feeding interface at the same point in time. Customer access arrangements not using individual NT1 (e.g. higher order multiplexer system with multiplexed primary rate accesses) are outside the scope of this ITU-T and therefore subject for individual power feeding arrangements between customer and network provider.
I.431.8.1	Provision of power	I	Replace the text of this subclause by the following one: The provision of power to the NT1 via the user network interface is mandatory. The power is provided by using a separate pair of wires to those used for transmission. Mandatory in this respect refers either to – the ability of the NT to be fed under the responsibility of the user when requested by the network provider. – the ability of the NT to be fed by a power supply unit under the responsibility of the network provider connected to the mains electric supply in the customer premises. In the case when the power is supplied by the user then the following two options are available to the user to provide the power supply – as an integral part of the TE, or

ITU-T Rec. Paragraph	Title	Compliance	Comment
			− physically separated from the TE as an individual power supply unit. Selected option: − The power supply is under the responsibility of the user.
I.431.8.2	Power Consumption	I	
I.431.8.2.1	Power Available from the TE	I	
I.431.8.2.2	NT power consumption	I	Selected option: − The power consumption of the Siemens NTPM2M is less than 3W.
I.431.8.3	Voltage range	I	ITU-T: -32 .. -57V ETSI: -20 .. -57V SIEMENS: Range -20 .. -75V
I.431.8.3.1	Feeding voltage from TE	I	
I.431.8.3.2	NT input voltage	I	

I.431.8.4	Protection	I	In principle, safety requirements are outside the scope of this ITU-T. However, in order to harmonise power source and sink requirements the following is required:
			  i) the power source shall be protected against short circuits and overload
			
			  ii) The power sink of NT1 shall not be damaged by an interchange of wires.
			
			With respect to the feeding interface of the power source, which is regarded as a touchable part in the sense of EN 60950 [19], the requirements are defined in ITU-T 300 046 [8].

I.431.8.4.1	Power Source (TE)	I	
I.431.8.4.2	Power Sink (NT)	I	
I.431.A	Time slot assignment for interfaces having only H0-channels	NU	
I.431.A.1	1544 kbit/s interface	NU	Delete subparagraph A.1
I.431.A.2	2048 kbit/s interface	NU	
I.431.B	Time slot assignment for 2048 kbit/s interfaces having an H11-channel	NU	
G.703.	General aspects of digital transmission systems. Terminal equipments. Physical/electrical characteristics of hierarchical digital interfaces	--	
G.703.1	Interface at 64 kbit/s	NA	Not relevant in ETSI.
G.703.1.1	Functional requirements	NA	Not relevant in ETSI.
G.703.1.1.4	Three types of envisaged interfaces	NA	Not relevant in ETSI.

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.703.1.1.4.1	Codirectional interface	NA	Not relevant in ETSI.
G.703.1.1.4.2	Centralized clock interface	NA	Not relevant in ETSI.
G.703.1.1.4.3	Contradirectional interface	NA	Not relevant in ETSI.
G.703.1.2	Electrical characteristics	NA	Not relevant in ETSI.
G.703.1.2.1	Electrical characteristics of 64 kbit/s codirectional interface	NA	Not relevant in ETSI.
G.703.1.2.1.1	General	NA	Not relevant in ETSI.
G.703.1.2.1.1.5	Code conversion rules	NA	Not relevant in ETSI.
G.703.1.2.1.1.6	Overvoltage protection requirement	NA	Not relevant in ETSI.
G.703.1.2.1.2	Specifications at the output ports	NA	Not relevant in ETSI.
G.703.1.2.1.3	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.1.2.2	Electrical characteristics of the 64 kbit/s centralized clock interface	NA	Not relevant in ETSI.
G.703.1.2.2.1	General	NA	Not relevant in ETSI.
G.703.1.2.2.1.3	Overvoltage protection requirement	NA	Not relevant in ETSI.
G.703.1.2.2.1.4	Code conversion rules	NA	Not relevant in ETSI.
G.703.1.2.2.2	Characteristics at the output ports	NA	Not relevant in ETSI.
G.703.1.2.2.3	Characteristics at the input ports	NA	Not relevant in ETSI.
G.703.1.2.2.4	Cable characteristics	NA	Not relevant in ETSI.
G.703.1.2.3	Electrical characteristics of 64 kbit/s contradirectional interface	NA	Not relevant in ETSI.
G.703.1.2.3.1	General	NA	Not relevant in ETSI.
G.703.1.2.3.1.4	Code conversion rules	NA	Not relevant in ETSI.
G.703.1.2.3.1.5	Specifications at the output ports	NA	Not relevant in ETSI.
G.703.1.2.3.1.6	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.1.2.3.1.7	Overvoltage protection requirement	NA	Not relevant in ETSI.
G.703.2	Interface at 1544 kbit/s	NA	Not relevant in ETSI.
G.703.3	Interface at 6312 kbit/s	NA	Not relevant in ETSI.
G.703.4	Interface at 32 064 kbit/s	NA	Not relevant in ETSI.
G.703.5	Interface at 44 736 kbit/s	NA	Not relevant in ETSI.
G.703.6	Interface at 2048 kbit/s	--	
G.703.6.1	General characteristics	I	
G.703.6.2	Specifications at the output ports	I	Delete column "one coaxial pair", the interface for the symmetrical pair shall be applied. „Maximum peak-to-peak jitter at the output port" is not relevant, refer to I.431.5.4.3 The clause is implemented according to ETSI (symmetrical pair only).
G.703.6.3	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.6.3.1	The digital signal ...	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.703.6.3.2	For the jitter to be ...	NA	Please refer to I.431.5.4.2.
G.703.6.3.3	The return loss ...	I	
G.703.6.3.4	To ensure adequate ...	I	
G.703.6.4	Earthing of outer conductor or screen	NA	See prETS 300 046 [8] and table 1, Clause 7
G.703.7	Interface at 8448 kbit/s	NA	Not relevant in ETSI.
G.703.7.1	General characteristics	NA	Not relevant in ETSI.
G.703.7.2	Specification at the output ports	NA	Not relevant in ETSI.
G.703.7.3	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.7.4	Earthing of outer conductor or screen	NA	Not relevant in ETSI.
G.703.8	Interface at 34 368 kbit/s	NA	Not relevant in ETSI.
G.703.8.1	General characteristics	NA	Not relevant in ETSI.
G.703.8.2	Specification at the output ports	NA	Not relevant in ETSI.
G.703.8.4	Earthing of outer conductor or screen	NA	Not relevant in ETSI.
G.703.9	Interface at 139 264 kbit/s	NA	Not relevant in ETSI.
G.703.9.1	General characteristics	NA	Not relevant in ETSI.
G.703.9.2	Specifications at the output ports	NA	Not relevant in ETSI.
G.703.9.4	Earthing of outer conductor or screen	NA	Not relevant in ETSI.
G.703.10	2048 kHz synchronization interface	NA	Not relevant in ETSI.
G.703.10.1	General	NA	Not relevant in ETSI.
G.703.10.2	Specifications at the output port	NA	Not relevant in ETSI.
G.703.10.3	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.11	Interface at 97 728 kbit/s	NA	Not relevant in ETSI.
G.703.12	Interface at 155 520 kbit/s	NA	Not relevant in ETSI.
G.703.12.1	General characteristics	NA	Not relevant in ETSI.
G.703.12.2	Specifications at the output ports	NA	Not relevant in ETSI.
G.703.12.3	Specifications at the input ports	NA	Not relevant in ETSI.
G.703.12.4	Specifications at the cross-connect points	NA	Not relevant in ETSI.
G.703.12.5	Earthing of outer conductor or screen	NA	Not relevant in ETSI.
G.703.A	Definition of codes	--	
G.703.A.1	Definition of B3ZS (also designated HDB2) and HDB3	I	
G.703.A.2	Definition of B6ZS and B8ZS	NA	Not relevant in ETSI.

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.703.B	Specification of the overvoltage protection requirement	I	Covered by ETS 300 046.
G.703.C	Abbreviation	--	
G.704.	General aspects of digital transmission systems. Terminal equipments. Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 kbit/s hierarchical levels.	--	
G.704.1	Scope	NA	Not relevant in ETSI.
G.704.2	Basic frame structures	--	
G.704.2.1	Basic frame structure at 1544 kbit/s	NA	Not relevant in ETSI.
G.704.2.1.1	Frame length	NA	Not relevant in ETSI.
G.704.2.1.2	F-bit	NA	Not relevant in ETSI.
G.704.2.1.3	Allocation of F-bit	NA	Not relevant in ETSI.
G.704.2.1.3.1	Method 1: Twenty-four-frame multiframe	NA	Not relevant in ETSI.
G.704.2.1.3.1.1	Multiframe alignment signal	NA	Not relevant in ETSI.
G.704.2.1.3.1.2	Cyclic Redundancy Check (CRC)	NA	Not relevant in ETSI.
G.704.2.1.3.1.3	4 kbit/s data link	NA	Not relevant in ETSI.
G.704.2.1.3.1.3.1	Priority operations messages	NA	Not relevant in ETSI.
G.704.2.1.3.1.3.2	Other maintenance or operations messages	NA	Not relevant in ETSI.
G.704.2.1.3.1.3.3	Performance report from a primary hierarchical level terminal	NA	Not relevant in ETSI.
G.704.2.1.3.2	Method 2: Twelve-frame multiframe	NA	Not relevant in ETSI.
G.704.2.2	Basic frame structure at 6312 kbit/s	NA	Not relevant in ETSI.
G.704.2.2.1	Frame length	NA	Not relevant in ETSI.
G.704.2.2.2	F-bits	NA	Not relevant in ETSI.
G.704.2.2.3	Allocation of F-bits	NA	Not relevant in ETSI.
G.704.2.2.3.1	Frame alignment signal	NA	Not relevant in ETSI.
G.704.2.2.3.2	Cyclic redundancy check	NA	Not relevant in ETSI.
G.704.2.2.3.3	4 kbit/s data link	NA	Not relevant in ETSI.
G.704.2.2.3.4	Remote end alarm indication	NA	Not relevant in ETSI.
G.704.2.3	Basic frame structure at 2048 kbit/s	--	
G.704.2.3.1	Frame length	I	
G.704.2.3.2	Allocation of bits number 1 to 8 of the frame	I	In table 5/G.704, NOTE 1 Not Applicable: Please refer to I.431.2.3.3 and Please refer to I.431.5.2.3 and Please refer to I.431.5.9.2.1

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ITU-T Rec. Paragraph	Title	Compliance	Comment
			NOTE 4 Not Applicable: Please refer to I.431.5.2.3
G.704.2.3.3	Description of the CRC-4 procedure in bit 1 of the frame	--	
G.704.2.3.3.1	Special use of bit 1 of the frame	I	
G.704.2.3.3.4	Use of bit 1 in 2048 kbit/s CRC-4 multiframe	I	For ET Note 2 is relevant. ET sets E-bits to ONE always.
G.704.2.3.3.5	Cyclic Redundancy Check (CRC)	I	
G.704.2.3.3.5.1	Multiplication/division process	I	
G.704.2.3.3.5.2	Encoding procedure	I	
G.704.2.3.3.5.3	Decoding procedure	I	
G.704.2.3.3.5.4	Updating procedure at intermediate path points in a message-based data-link application	I	
G.704.2.3.4	Synchronization Status: S_{an}	NA	Not relevant in ETSI.
G.704.2.4	Basic frame structure at 8448 kbit/s	NA	Not relevant in ETSI.
G.704.2.4.1	Frame length	NA	Not relevant in ETSI.
G.704.2.4.2	Frame alignment signal	NA	Not relevant in ETSI.
G.704.2.4.3	Service digits	NA	Not relevant in ETSI.
G.704.2.5	Basic frame structure at 44 736 kbit/s	NA	Not relevant in ETSI.
G.704.2.5.1	Multiframe length	NA	Not relevant in ETSI.
G.704.2.5.2	Multiframe overhead bits	NA	Not relevant in ETSI.
G.704.2.5.3	Allocation of the multiframe overhead bits	NA	Not relevant in ETSI.
G.704.2.5.3.1	X-bits (X1, X2)	NA	Not relevant in ETSI.
G.704.2.5.3.2	P-bits (P1, P2)	NA	Not relevant in ETSI.
G.704.2.5.3.3	Multiframe alignment signal (M1, M2, M3)	NA	Not relevant in ETSI.
G.704.2.5.3.4	M-subframe alignment signal (F1, F2, F3, F4)	NA	Not relevant in ETSI.
G.704.2.5.3.5	C-bits (C11, C12, C13, C21, ... Cij, ... C73)	NA	Not relevant in ETSI.
G.704.2.5.3.5.1	Allocation of C-bits for C-bit Parity application	NA	Not relevant in ETSI.
G.704.2.5.3.6	Special patterns used at 44 736 kbit/s	NA	Not relevant in ETSI.
G.704.2.5.3.6.1	Alarm Indication Signal (AIS)	NA	Not relevant in ETSI.
G.704.2.5.3.6.2	Idle Signal (Idle)	NA	Not relevant in ETSI.

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.704.3	Characteristics of frame structure carrying channels at various bit rates in 1544 kbit/s	NA	Not relevant in ETSI.
G.704.3.1	Interface at 1544 kbit/s carrying 64 kbit/s channels	NA	Not relevant in ETSI.
G.704.3.1.1	Frame structure	NA	Not relevant in ETSI.
G.704.3.1.1.1	Number of bits per 64 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.3.1.1.2	Number of 64 kbit/s channel time slots per frame	NA	Not relevant in ETSI.
G.704.3.1.1.3	Allocation of F-bit	NA	Not relevant in ETSI.
G.704.3.1.2	Use of 64 kbit/s channel time slots	NA	Not relevant in ETSI.
G.704.3.1.3	Signalling	NA	Not relevant in ETSI.
G.704.3.1.3.1	Common channel signalling	NA	Not relevant in ETSI.
G.704.3.1.3.2	Channel associated signalling	NA	Not relevant in ETSI.
G.704.3.1.3.2.1	Allocation of signalling bits for the 24-frame multiframe	NA	Not relevant in ETSI.
G.704.3.1.3.2.2	Allocation of signalling bits for the 12-frame multiframe	NA	Not relevant in ETSI.
G.704.3.2	Interface at 1544 kbit/s carrying 32 kbit/s channel time slots (see Note)	NA	Not relevant in ETSI.
G.704.3.2.1	Frame structure	NA	Not relevant in ETSI.
G.704.3.2.1.1	Number of bits per 32 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.3.2.1.2	Number of 32 kbit/s channel time slots per frame	NA	Not relevant in ETSI.
G.704.3.2.1.3	Allocation of F-bits	NA	Not relevant in ETSI.
G.704.3.2.2	Use of 32 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.3.2.3	384 kbit/s 12-channel time slot grouping	NA	Not relevant in ETSI.
G.704.3.2.3.1	Structure of 12-channel time slot grouping	NA	Not relevant in ETSI.
G.704.3.2.3.1.1	Use of a 384 kbit/s time slot grouping	NA	Not relevant in ETSI.
G.704.3.2.3.1.2	Use of a signalling grouping channel	NA	Not relevant in ETSI.
G.704.3.2.4	32 kbit/s signalling grouping channel multiframe structure	NA	Not relevant in ETSI.
G.704.3.2.4.1	Number of bits per 32 kbit/s signalling grouping channel time slot	NA	Not relevant in ETSI.

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.704.3.2.4.2	Bit allocation of 32 kbit/s signalling grouping channel time slot	NA	Not relevant in ETSI.
G.704.3.2.4.3	Multiframe structure	NA	Not relevant in ETSI.
G.704.3.2.4.4	Signalling grouping channel multiframe alignment signal	NA	Not relevant in ETSI.
G.704.3.2.4.5	CRC-6 error detection information for the time slot grouping	NA	Not relevant in ETSI.
G.704.3.2.4.6	Signalling	NA	Not relevant in ETSI.
G.704.3.2.4.6.1	Common channel signalling	NA	Not relevant in ETSI.
G.704.3.2.4.6.2	Channel associated signalling	NA	Not relevant in ETSI.
G.704.3.2.4.7	Signalling grouping channel alarm indication signals	NA	Not relevant in ETSI.
G.704.3.2.5	Signal grouping channel unused bits	NA	Not relevant in ETSI.
G.704.3.2.6	Loss and recovery of signalling channel multiframe alignment	NA	Not relevant in ETSI.
G.704.3.3	Interface at 1544 kbit/s carrying n × 64 kbit/s	NA	Not relevant in ETSI.
G.704.4	Characteristics of frame structures carrying channels at various bit rates in 6312 kbit/s interfaces	NA	Not relevant in ETSI.
G.704.4.1	Interface at 6312 kbit/s carrying 64 kbit/s channels	NA	Not relevant in ETSI.
G.704.4.1.1	Frame structure	NA	Not relevant in ETSI.
G.704.4.1.1.1	Number of bits per 64 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.4.1.1.2	Number of 64 kbit/s channel time slots per frame	NA	Not relevant in ETSI.
G.704.4.1.1.3	Allocation of the F-bits	NA	Not relevant in ETSI.
G.704.4.1.2	Use of 64 kbit/s channel time slots	NA	Not relevant in ETSI.
G.704.4.1.3	Signalling	NA	Not relevant in ETSI.
G.704.4.1.3.1	Common channel signalling	NA	Not relevant in ETSI.
G.704.4.1.3.2	Channel-associated signalling	NA	Not relevant in ETSI.
G.704.4.1.3.2.1	Allocation of signalling bit	NA	Not relevant in ETSI.
G.704.4.1.3.2.2	Signalling multiframe structure	NA	Not relevant in ETSI.
G.704.4.2	Interfaces at 6312 kbit/s carrying other channels than 64 kbit/s	NA	Not relevant in ETSI.
G.704.5	Characteristics of frame structures carrying channels at various bit rates in 2048 kbit/s interfaces	NA	Please refer to Table 1/I.431 and paragraph I.431.5.2.4

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.704.5.1	Interface at 2048 kbit/s carrying 64 kbit/s channels	NA	Not relevant in ETSI.
G.704.5.1.1	Frame structure	NA	Not relevant in ETSI.
G.704.5.1.1.1	Number of bits per 64 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.5.1.1.2	Number of 64 kbit/s channel time slots per frame	NA	Not relevant in ETSI.
G.704.5.1.1.3	Allocation of the bits of 64 kbit/s channel time slot 0	NA	Not relevant in ETSI.
G.704.5.1.2	Use of other 64 kbit/s channel time slots	NA	Not relevant in ETSI.
G.704.5.1.3	Signalling	NA	Not relevant in ETSI.
G.704.5.1.3.1	Common channel signalling	NA	Not relevant in ETSI.
G.704.5.1.3.2	Channel-associated signalling	NA	Not relevant in ETSI.
G.704.5.1.3.2.1	Multiframe structure	NA	Not relevant in ETSI.
G.704.5.1.3.2.2	Allocation of 64-kbit/s channel time slot 16	NA	Not relevant in ETSI.
G.704.5.2	Interface at 2048 kbit/s carrying n × 64 kbit/s	NA	Not relevant in ETSI.
G.704.5.2.1	One n × 64 kbit/s signal on the tributary side of a multiplex equipment	NA	Not relevant in ETSI.
G.704.5.2.2	One or more n × 64 kbit/s signal on the multiplexed signal side of a multiplexing equipment	NA	Not relevant in ETSI.
G.704.6	Characteristics of frame structures carrying channels at various bit rates in 8448 kbit/s interface	NA	Not relevant in ETSI.
G.704.6.1	Interface at 8448 kbit/s carrying 64 kbit/s channels	NA	Not relevant in ETSI.
G.704.6.1.1	Frame structure	NA	Not relevant in ETSI.
G.704.6.1.1.1	Number of bits per 64 kbit/s channel time slot	NA	Not relevant in ETSI.
G.704.6.1.1.2	Number of 64 kbit/s channel time time slots per frame	NA	Not relevant in ETSI.
G.704.6.1.2	Use of 64 kbit/s channel time slots	NA	Not relevant in ETSI.
G.704.6.1.2.1	64 kbit/s channel time slot assignment in case of channel-associated signalling	NA	Not relevant in ETSI.

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.704.6.1.2.2	64 kbit/s channel time slot assignment in case of common channel signalling	NA	Not relevant in ETSI.
G.704.6.1.3	Description of the CRC procedure in 64 kbit/s channel time slot 99	NA	Not relevant in ETSI.
G.704.6.1.3.1	Multiplication/division process	NA	Not relevant in ETSI.
G.704.6.1.3.2	Encoding procedure	NA	Not relevant in ETSI.
G.704.6.1.3.3	Decoding procedure	NA	Not relevant in ETSI.
G.704.6.1.3.4	Action on bit-E	NA	Not relevant in ETSI.
G.704.6.1.4	Signalling	NA	Not relevant in ETSI.
G.704.6.1.4.1	Common channel signalling	NA	Not relevant in ETSI.
G.704.6.1.4.2	Channel-associated signalling	NA	Not relevant in ETSI.
G.704.6.1.4.2.1	Multiframe structure	NA	Not relevant in ETSI.
G.704.6.1.4.2.2	Allocation of 64 kbit/s channel time slots 67 to 70	NA	Not relevant in ETSI.
G.704.6.2	Interface at 8448 kbit/s carrying other channels than 64 kbit/s	NA	Not relevant in ETSI.
G.704.A	Annex A Examples of CRC implementations using shift registers	--	
G.704.A.1	CRC-6 procedure for interface at 1544 kbit/s (see 2.1.3.1.2)	--	
G.704.A.2	CRC-5 procedure for interface at 6312 kbit/s (see 2.2.3.2)	--	
G.704.A.3	CRC-4 procedure for interface at 2048kbit/s (see 2.3.3.5)	--	
G.704.B	Annex B Alphabetical list of abbreviations used in this Recommendation	--	
G.706.	General aspects of digital transmission systems. Terminal equipments. Frame alignment and Cyclic Redundancy Check (CRC) procedures relating to basic frame structures defined in recommendation G.704	--	
G.706.1	General	NU	
G.706.2	Frame alignment and CRC procedures at l544 kbit/s interface	NU	
G.706.2.1	Loss and recovery of frame	NU	

ITU-T Rec. Paragraph	Title	Compliance	Comment
	alignment		
G.706.2.1.1	Loss of frame alignment	NU	
G.706.2.1.2	Recovery of frame alignment	NU	
G.706.2.1.2.1	Frame alignment recovery time	NU	
G.706.2.1.2.2	Strategy for frame alignment recovery	NU	
G.706.2.2	CRC bit monitoring	NU	
G.706.2.2.1	Monitoring procedure	NU	
G.706.2.2.3	Error performance monitoring using CRC-6 (see § A.1.2)	NU	
G.706.3	Frame alignment and CRC procedures at 6312 kbit/s interface	NU	
G.706.3.1	Loss and recovery of frame alignment	NU	
G.706.3.1.1	Loss of frame alignment	NU	
G.706.3.1.2	Recovery of frame alignment	NU	
G.706.3.1.2.1	Frame alignment recovery time	NU	
G.706.3.1.2.2	Strategy for frame alignment recovery	NU	
G.706.3.2	CRC bit monitoring	NU	
G.706.3.2.1	Monitoring procedure	NU	
G.706.3.2.2	Monitoring for false frame alignment (see § A.1.1)	NU	
G.706.3.2.3	Error performance monitoring using CRC-5 (see § A.1.2)	NU	
G.706.4	Frame alignment and CRC procedures at 2048 kbit/s interface	--	
G.706.4.1	Loss and recovery of frame alignment	--	
G.706.4.1.1	Loss of frame alignment	I	
G.706.4.1.2	Strategy for frame alignment recovery	I	
G.706.4.2	CRC multiframe alignment using information in bit 1 of the basic frame	I	
G.706.4.3	CRC bit monitoring	I	
G.706.4.3.1	Monitoring procedure	I	
G.706.4.3.2	Monitoring for false frame alignment (see § A.1.1)	I	

ITU-T Rec. Paragraph	Title	Compliance	Comment
G.706.4.3.3	Error performance monitoring using CRC-4 (see § A.1.2)	--	This function is optional, please refer also I.431.5.9.3.2.2 and I.431.5.9.3.3.3
G.706.5	Frame alignment and CRC procedures at 8448 kbit/s interface	NA	
G.706.A.1	Reasons for application of CRC	--	
G.706.A.1.1	Protection against false frame alignment	--	
G.706.A.1.2	Bit error monitoring	--	
G.706.A.2	Limitations of CRC procedures	--	
G.706.A.2.1	Probability of undetected bit errors	--	
G.706.A.2.2	Limitation of application to bit error ratio measurement	--	
G.706.B.1	General	--	
G.706.B.2	Modified CRC-4 multiframe alignment algorithm	--	
G.706.B.2.1	Overview of algorithm	--	
G.706.B.2.2	Consequent actions for CRC-4-to-Non-CRC-4 equipment interworking	--	
G.706.B.2.3	Details of the alignment algorithm	--	
G.706.B.2.4	Setting of the "E" bits during and after alignment	--	
G.706.B.2.5	Detection of CRC-4 multiframe generator/detector failure (basic framing correct) in equipments using the modified CRC-4 multiframe algorithm	--	
G.706.C.1	General	--	
G.706.C.2	Mathematical proof of validity of updating procedure	--	
G.706.C.3	An example of a conceptual basis for implementing the updating process	--	

History

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