FINAL DRAFT

TECHNICAL BASIS for REGULATION

pr **TBR 4**

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Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access

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Foreword

This final draft Technical Basis for Regulation (TBR) has been produced by the Business TeleCommunications (BTC) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This final draft prTBR resulted from a mandate from the Commission of the European Community (CEC) to provide harmonized standards for the support of the Council Directive 91/263/EEC ("The Terminal Equipment Directive").

The machine processable ATS

The electronic forms of the machine processable files (TTCN MP format) corresponding to the ATS for Layers 2 and 3 are contained in ASCII text files (DBV00042.MP (Layer 2) and DBV00043.MP (Layer 3)) on the diskette included as a part of this TBR.

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1 Scope

This final draft TBR specifies the technical requirements under Articles 4 (c) to 4 (f) of Council Directive 91/263/EEC ("The Terminal Equipment Directive"). or Terminal Equipment (TE) to be attached to the pan-European Integrated Services Digital Network (ISDN) at an interface at the T reference point or coincident S and T reference point for a primary rate access. These requirements are taken from ETS 300 011, ETS 300 125, ETS 300 102, ETS 300 267 and ETS 300 046. This TBR does not contain the essential requirements of Article 4 (g) for interworking via the public network, and so does not provide any guarantee of correct terminal-to-terminal operation.

NOTE 1: Under Article 4 (g), additional TBRs may apply, and may restrict options or extend requirements in this TBR.

NOTE 2: Although this TBR provides the technical attachment requirements in full text, it does not contain the full specification of the user side of the ISDN user-network interface. Important information necessary for correct working can be found only in the base standards mentioned above.

This TBR specifies these requirements for TE that:

a. is intended for participation in calls that use those on-demand circuit mode basic services and those related supplementary services that are specified in annex G; and

b. is capable of handling both incoming and outgoing calls.

This TBR applies to all TE that is intended for connection to the forms of ISDN access referred to above, irrespective of whether the TE provides additional interfaces, telecommunication services or functions. Additional TBRs or, where appropriate TBRs do not exist, national approval requirements may apply to telecommunications services or functions outside the scope of this TBR.

NOTE 3: This TBR is not applicable to TE which may be supplied in some countries for connection to an ISDN telecommunications service corresponding to, but not compatible with, the ISDN primary rate access standards.

2 Normative references

This final draft TBR incorporates by dated or undated reference, provisions from other publications. These normative 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 TBR only when incorporated into it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 046-3 (1992): "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection; Part 3: Interface I_a - protection".

[2] CCITT Recommendation G.706 (1991): "Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704".

[3] CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".

[4] ISO/IEC DIS 9646 Part 1 (1992): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General Concepts".

[5] ISO/IEC DIS 9646 Part 2 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[6] ISO/IEC DIS 9646 Part 3 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this TBR, the following definitions, together with those given in CCITT Recommendation I.411 [3] apply:

B-channel: A function that provides for the bidirectional transmission of independent B-channel signals each having a bit rate of 64 kbit/s.

bearer service: A type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.[CCITT Recommendation I.112]

NOTE 1: The ISDN connection type used to support a bearer service may be identical to that used to support other types of telecommunication service.

bit timing: A function that provides bit (signal element) timing to enable the TE or NT to recover information from the aggregate bit stream.

bonnection management entity: An entity for the purpose of management of resources that have an impact on an individual data link connection.

Cyclic Redundancy Check (CRC) procedure: A function that provides for the protection against false framing and may provide for error performance monitoring of the interface.

D-channel: A function that provides for bidirectional transmission of one D-channel signal at a bit rate of 64 kbit/s.

frame alignment: A function that provides information to enable the TE or NT to recover the time-division multiplexed channels.

High-Density Bipolar 3 (HDB3): A modified Alternate Mark Inversion (AMI) code, where binary ONEs are represented by alternate positive and negative pulses, and binary ZEROs by spaces. An exception occurs for blocks of 4 successive binary ZEROs. Each block of 4 successive ZEROs is replaced by 000V or B00V, where B represents an inserted pulse conforming to the AMI rule, and V represents and AMI violation. The choice of 000V or B00V is made so that the number of B pulses between consecutive V pulses is odd. In other words, successive V pulses are of alternate polarity so that no dc component is introduced.

Integrated Services Digital Network (ISDN): A network that provides or supports a range of different telecommunications services and provides digital connections between user-network interfaces.

interface I_a: The user side of the ISDN user-network interface for the primary rate access.

interface I_b: The network side of the ISDN user-network interface for the primary rate access.

layer management entity: An entity for the purpose of management of resources that have layer-wide impact.

maintenance: A function that provides information concerning operational or failure conditions of the interface.

Network Termination (NT): An equipment providing interface I_b.

NOTE 2: This term is used in this TBR to indicate network-terminating aspects of NT1 and NT2 functional groups where these have an I_b interface.

Network Termination type 1 (NT1): A functional group that includes functions broadly equivalent to layer 1 (physical) of the Open Systems Interconnection (OSI) reference model. These functions are associated with the proper physical and electromagnetic termination of the network. NT1 functions are:

- line transmission termination;
- layer 1 maintenance functions and performance monitoring;
- timing;
- layer 1 multiplexing;
- interface termination.

Network Termination type 2 (NT2): A functional group that includes functions broadly equivalent to layer 1 and higher layers of the CCITT Recommendation X.200 reference model. Private Automatic Branch Exchanges (PABXs), Local Area Networks (LANs) and terminal controllers are examples of equipment or combinations of equipment that provide NT2 functions. NT2 functions include:

- layer 2 and 3 protocol handling;
- layer 2 and 3 multiplexing;
- switching;
- concentration;
- maintenance functions;
- interface termination and other layer 1 functions.

octet timing: A function that provides 8 kHz timing towards TE or NT for the purpose of supporting an octet structure for voice coders and for other timing purposes as required.

outside the scope: There is no requirement within this TBR concerning the value of any parameter or the provision of any function described as being "outside the scope" of the TBR. Thus any value may occur, or the function concerned may either be provided in any form consistent with the rest of the TBR, or not be provided. However, requirements under the essential requirements of Council Directive 91/263/EEC ("The Terminal Equipment Directive") may apply to such parameters or functions under other TBRs or national approval requirements.

Point of Control and Observation (PCO): A point, defined for an abstract test method, at which the occurrence of test events is controlled and observed, as specified in test cases for that test method.

primary rate access: A user-network access arrangement that corresponds to the primary rate of 2048 kbit/s. The bit rate of the D-channel for this type of access is 64 kbit/s.

reserved: There is no requirement within this TBR concerning the use of a reserved value of any parameter provided that its use is consistent with the rest of the TBR.

NOTE 3: The objective of reserving particular values of parameters is to enable them to be used for a purpose either defined elsewhere or to be defined in the future. Therefore it is strongly recommended that manufacturers take proper account of values assigned to the parameters concerned in national, European and international standards. Terminals that use values that result in violations of the essential requirements are liable to be disconnected or required to be withdrawn from the market. Where the word "reserved" is used in this TBR, additional information may be given on the purpose of the reservation.

service, telecommunications service: That which is offered by an Administration to its customers in order to satisfy a specific telecommunications requirement [CCITT Recommendation I.112, §2.2, definition 2a].

simulator: A device that generates a stimulus signal conforming to this TBR to bring the IUT into the required operational state and monitors the receive signal from the IUT.

supplementary service: A service that modifies or supplements a basic telecommunications service. Consequently such a service cannot be offered to a customer as a stand alone service but must be offered together with or in association with a basic telecommunications service. The same supplementary service may be common to a number of telecommunications services.

Terminal Adapter (TA): An equipment with interface I_a and one or more auxiliary interfaces that allows non-ISDN terminals to be served by an ISDN user-network interface.

Terminal Equipment (TE): An equipment with an interface Ia and consisting of one or more functional blocks.

NOTE 4: This term is used in this TBR to indicate terminal-terminating aspects of TE1, TA and NT2 functional groups, where these have an I_a interface.

Terminal Equipment type 1 (TE1): A functional group that includes functions belonging to the functional group TE, and with an interface that complies with the ISDN user-network interface standard.

3.2 Abbreviations

For the purposes of this TBR, the following abbreviations apply:

ABM	Asynchronous Balanced Mode
ADPCM	Adaptive Differential Pulse Code Modulation
AFI	Authority and Format Identifier
Ai	Action indicator
AIS	Alarm Indication Signal
AMI	Alternate Mark Inversion
ARM	Asynchronous Response Mode
ASP	Assignment Source Point
BCD	Binary Coded Decimal
CES	Connection Endpoint Suffix
CRC	Cyclic Redundancy Check
C/R	Command/Response field bit
dc	direct current
DLCI	Data Link Connection Identifier
DISC	DISConnect
DM	Disconnected Mode
DSP	Domain Specific Part
DSS1	Digital Subscriber Signalling System No. one
DTE	Data Terminating Equipment
EA	Address field Extension bit
EMC	Electro-Magnetic Compatibility
ET	Equipment Termination
ETS	European Telecommunication Standard
FAS	Frame Alignment Signal
FC	Fault Condition
FCS	Frame Check Sequence
HDB3	High-Density Bipolar 3
HDLC	High level Data Link Control
I_a	Interface point a
I_b	Interface point b
IDI	Initial Domain Identifier
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
LAN	Local Area Network
LAPB	Link Access Procedure - Balanced
LAPD	Link Access Procedure on the D-channel
LLI	Logical Link Identifier
LOS	Loss Of Signal
LT	Line Termination
MFAS	Multi-Frame Alignment Signal
MHS	Message Handling System
NIC	Network Independent Clock
NOF	Normal Operational Frames
NRM	Normal Response Mode
NSAP	Network Service Access Point
NT	Network Termination
OSI	Open Systems Interconnection

PH-AI	PH-ACTIVATE INDICATION
PH-DI	PH-DEACTIVATE INDICATION
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
ppm	parts per million
PRBS	Pseudo-Random Bit Sequence
RAI	Remote Alarm Indication
RDTD	Restricted Differential Time Delay
REJ	REJect
Ri	Reference number
rms	root mean square
RNR	Receive Not Ready
RR	Receive Ready
Rx	Receive
SABME	Set Asynchronous Balanced Mode Extended
SAP	Service Access Point
SAPI	Service Access Point Identifier
SLP	Single Link Procedure
SMF	Sub-MultiFrames
TA	Terminal Adaptor
TBR	Technical Basis for Regulation
TBR-RT	TBR Requirements Table
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier
TS0	Time-Slot 0 (zero)
TTCN	Tree and Tabular Combined Notation
Tx	Transmit
UA	Unnumbered Acknowledgement
UI	Unit Interval (layer 1)
UI	Unnumbered Information (layer 2)

4 General

Each requirement in this TBR is either applicable to all TE within the scope of this TBR, or only applicable to certain TE, depending on the functions implemented within the TE. Annex A specifies the relationship between the requirements and the terminal. The supplier shall provide information on the functions implemented in the terminal and this information shall be used to determine which requirements apply and the manner in which the tests are performed. This information may be provided in the form of a complete TBR Requirements Table (TBR-RT) proforma (a blank TBR-RT proforma is provided in annex A).

This TBR contains references to communications, called primitive procedures, between adjacent layers and between layers and their associated layer management entities. These primitive procedures are conceptual and allow the description of interactions between functions dedicated to different layers within the TE. Primitive procedures do not constrain implementation, are system internal and therefore cannot be tested in isolation. However, as seen from the Point of Control and Observation (PCO), the behaviour of the TE shall be such that the sequence of events is consistent with the primitives being implemented as described in this TBR.

The user-network interface at the T reference point, or coincident S and T reference point, provides the only test access for the purpose of performing attachment tests. However, actions at other ports or interfaces of the implementation under test (e.g. at the man-machine interface, execution of higher layer processes, at the interface at the S reference point in the case of NT2s or at the R reference point in the case of terminal adaptors) shall be used as specified by the supplier to invoke actions at layer 1, and layers 2 and 3 of the Digital Subscriber Signalling System No. one (DSS1) protocol within the IUT.

Since the verification of a layer protocol depends on the proper operation of lower layer services, the tests should be performed in a sequential order beginning with the lowest layer. However, this general strategy does not preclude higher layer functions from being essential for the stimulation of lower layer

functions under test. Thus at least, basic functions of each layer in the IUT may be required in order to perform an attachment test for a particular lower layer.

This TBR does not require more than one set of tests to be made on more than one of each type of primary rate access.

5 Definitions of primitives

Reference: ETS 300 125, Part 2, subclause 4.1.

Definition: Communication between adjacent layers and between each layer and layer management, is accomplished by means of primitives.

Primitives represent, in an abstract way, the logical exchange of information and control between adjacent layers. They do not specify or constrain implementations.

Primitives consist of commands and their respective responses associated with the services requested of a lower layer. The general syntax of a primitive is:

XX-Generic name-Type: Parameters.

Where XX designates the interface across which the primitive flows. For this TBR, XX is:

- DL for communication between layer 3 and the data link layer;
- PH for communication between the data link layer and the physical layer;
- MDL for communication between the layer management and the data link layer.

5.1 Generic names

Reference: ETS 300 125, Part 2, subclause 4.1.1.

Definition: The generic name specifies the activity that is performed. Table 5.1 illustrates the primitives defined in this TBR.

NOTE: not all primitives have associated parameters.

The primitive generic names that are defined in this TBR are given in subclauses 5.1.1 to 5.1.10.

5.1.1 DL-ESTABLISH

Reference: ETS 300 125, Part 2, subclause 4.1.1.1.

Definition: The DL-ESTABLISH primitives are used to request, indicate and confirm the outcome of the procedures for establishing multiple frame operation.

5.1.2 DL-RELEASE

Reference: ETS 300 125, Part 2, subclause 4.1.1.2.

Definition: The DL-RELEASE primitives are used to request, indicate and confirm the outcome of the procedures for terminating a previously established multiple frame operation, or for reporting an unsuccessful establishment attempt.

5.1.3 DL-DATA

Reference: ETS 300 125, Part 2, subclause 4.1.1.3.

Definition: The DL-DATA primitives are used to request and indicate layer 3 messages which are to be transmitted, or have been received, by the data link layer using the acknowledged information transfer service.

5.1.4 DL-UNIT DATA

Reference: ETS 300 125, Part 2, subclause 4.1.1.4.

Definition: The DL-UNIT DATA primitives are used to request and indicate layer 3 messages which are to be transmitted, or have been received, by the data link layer using the unacknowledged information transfer service.

5.1.5 MDL-ASSIGN

Reference: ETS 300 125, Part 2, subclause 4.1.1.5.

Definition: The MDL-ASSIGN primitives are used by the layer management entity to request that the data link layer associate the Terminal Endpoint Identifier (TEI) value contained within the message portion of the primitive with the specified Connection Endpoint Suffix (CES), across all Service Access Point Identifiers (SAPIs). The MDL-ASSIGN primitive is used by the data link layer to indicate to the layer management entity the need for a TEI value to be associated with the CES specified in the primitive message unit.

5.1.6 MDL-REMOVE

Reference: ETS 300 125, Part 2, subclause 4.1.1.6.

Definition: The MDL-REMOVE primitives are used by the layer management entity to request that the data link layer remove the association of the specified TEI value with the specified CES, across all SAPIs. The TEI and CES are specified by the MDL-REMOVE primitive message unit.

5.1.7 MDL-ERROR

Reference: ETS 300 125, part 2, subclause 4.1.1.7.

Definition: The MDL-ERROR primitives are used to indicate to the connection management entity that an error has occurred, associated with a previous management function request or detected as a result of communication with the data link layer peer entity. The layer management entity may respond with an MDL-ERROR primitive if the layer management entity cannot obtain a TEI value.

5.1.8 MDL-UNIT DATA

Reference: ETS 300 125, Part 2, subclause 4.1.1.8.

Definition: The MDL-UNIT DATA primitives are used to request and indicate layer management entity messages which are to be transmitted, or have been received, by the data link layer using the unacknowledged information transfer service.

5.1.9 PH-DATA

Reference: ETS 300 125, Part 2, subclause 4.1.1.10.

Definition: The PH-DATA primitives are used to request and indicate message units containing frames used for data link layer peer-to-peer communications passed to and from the physical layer.

5.1.10 PH-ACTIVATE

Reference: ETS 300 125, Part 2, subclause 4.1.1.11.

Definition: The PH-ACTIVATE primitives are used to indicate that the physical layer connection has been activated.

5.1.11 PH-DEACTIVATE

Reference: ETS 300 125, Part 2, subclause 4.1.1.12.

Definition: The PH-DEACTIVATE primitive is used to indicate that the physical layer connection has been deactivated.

5.2 Primitive types

Reference: ETS 300 125, Part 2, subclause 4.1.2.

Definition: The primitive types defined in this TBR are given in subclauses 5.2.1 to 5.2.4.

5.2.1 REQUEST

Reference: ETS 300 125, Part 2, subclause 4.1.2.1.

Definition: The REQUEST primitive type is used when a higher layer or layer management is requesting a service from the lower layer.

5.2.2 INDICATION

Reference: ETS 300 125, Part 2, subclause 4.1.2.2.

Definition: The INDICATION primitive type is used by a layer providing a service to inform the higher layer or layer management.

5.2.3 RESPONSE

Reference: ETS 300 125, Part 2, subclause 4.1.2.3.

Definition: The RESPONSE primitive type is used by layer management as a consequence of the INDICATION primitive type.

5.2.4 CONFIRM

Reference: ETS 300 125, Part 2, subclause 4.1.2.4.

Definition: The CONFIRM primitive type is used by the layer providing the requested service to confirm that the activity has been completed.

5.3 Parameter definition

5.3.1 Priority indicator

Reference: ETS 300 125, Part 2, subclause 4.1.3.1.

Definition: Since several Service Access Points (SAPs) may exist on the network side or TE, protocol messages units sent by one SAP may contend with those of other SAPs for the physical resources available for message transfer. The priority indicator is used to determine which message unit will have greater priority when contention exists. The priority indicator is only needed at the TE for distinguishing message units sent by the SAP with a SAPI value of 0 from all other message units.

5.3.2 Message unit

Reference: ETS 300 125, Part 2, subclause 4.1.3.2.

Definition: The message unit contains additional layer-to-layer information concerning actions and results associated with requests. In the case of the DATA primitives, the message unit contains the requesting layer peer-to-peer messages. For example, the DL-DATA message unit contains layer 3 information. The PH-DATA message unit contains the data link layer frame.

NOTE: The operations across the data link layer/layer 3 boundary are such that the layer sending the DL-DATA or DL-UNIT DATA primitive can assume a temporal order of the bits within the message unit and that the layer receiving the primitive can reconstruct the message with its assumed temporal order.

Table 5.1: Primitives associated with this TBR

Generic name	Type				Parameters		Message unit contents
	Request	Indication	Response	Confirm	Priority indicator	Message unit	
L3 ⇔ L2							
DL-ESTABLISH	X	X	-	X	-	-	
DL-RELEASE	-	X	-	-	-	-	
DL-DATA	X	X	-	-	-	X	Layer 3 peer-to-peer message
DL-UNIT DATA	-	X	-	-	-	X	Layer 3 peer-to-peer message
M ⇔ L2							
MDL-ASSIGN	X	X	-	-	-	X	TEI value, CES
MDL-REMOVE	X	-	-	-	-	X	TEI value, CES
MDL-ERROR	-	X	X	-	-	X	Reason for error message
MDL-UNIT DATA	X	X	-	-	-	X	Management function peer-to-peer message
L2 ⇔ L1							
PH-DATA	X	X	-	-	X	X	Data link layer peer-to-peer message
PH-ACTIVATE	-	X	-	-	-	-	
PH-DEACTIVATE	-	X	-	-	-	-	

L3 ⇔ L2 Layer 3/data link layer boundary
L2 ⇔ L1 Data link layer/physical layer boundary
M ⇔ L2 Management entity/data link layer boundary
X existing
- not existing

6 Safety requirements

There are no safety requirements under this TBR.

NOTE: Safety requirements are imposed under Council Directive 73/23/EEC ("The Low Voltage Directive") and Articles 4 (a) and 4 (b) of Directive 91/263/EEC.

7 Electro-Magnetic Compatibility (EMC) requirements

There are no EMC requirements under this TBR.

NOTE: General EMC requirements are imposed under Council Directive 89/336/EEC ("The EMC Directive"). Requirements for conducted emissions will be added to this TBR when appropriate specifications become available if these requirements are not imposed under the EMC Directive.

8 Overvoltage protection requirements

8.1 Impulse transfer from mains, common mode

Requirement: If the TE is supplied from the mains, it shall transfer less than 1 kV common mode voltage and less than 250 V transverse voltage to the TE interface when a common mode surge of either polarity and of 2,5 kV (10/700 µs) is applied to the mains supply port.

Test: The test shall be conducted according to subclause 5.7.1 of ETS 300 046-3 [1].

8.2 Impulse transfer from mains, transverse mode

Requirement: If the TE is supplied from the mains, it shall transfer less than 1 kV common mode voltage and less than 250 V transverse voltage to the TE interface when a transverse mode surge of either polarity and of 2,5 kV (10/700 µs) is applied to the mains supply port.

Test: The test shall be conducted according to subclause 5.7.1 of ETS 300 046-3 [1].

8.3 Conversion of common mode to transverse mode

Requirement: The transverse mode voltage shall not be more than 250 V peak when 2 common mode surges of 1 kV (1,2/50 µs) (one of each polarity) are applied to the TE interface.

Test: The test shall be conducted according to subclause 5.7.3 of ETS 300 046-3 [1].

9 Layer 1 requirements

9.1 Physical characteristics

Currently no standardised connector is readily available. Consequently, the only method of connection that can be specified in this TBR is the use of solid conductors of 0,4 to 0,6 mm. This TBR contains requirements for the TE to be capable of presenting either a point for the attachment of unterminated solid conductors, or solid conductors themselves (see 9.1.1). Clause 9.1.1 contains a requirement that such a connection method be available to be provided for use with the TE if necessary.

In order to allow connection to be made using other methods (e.g. connectors), clause 9.1.2 permits the TE to be supplied with a connection method suitable for use with those methods.

NOTE 1: The following examples are arrangements that comply with the requirements. The list below is not an exhaustive list of all permitted arrangements:

a) a cord, permanently connected to the TE at one end and unterminated at the other end, with wires that are solid conductors with diameters in the range 0,4 to 0,6 mm;

b) a cord, connected via a plug and socket to the TE at one end and unterminated at the other end, with wires that are solid conductors with diameters in the range 0,4 to 0,6 mm;

c) an insulation displacement connector, designed to accept wires with solid conductors with diameters in the range 0,4 to 0,6 mm, but with no cord;

d) a screw connector, designed to accept wires with solid conductors with diameters in the range 0,4 to 0,6 mm, but with no cord;

e) the arrangement in (b) plus one or more additional alternative cords with the same plug or socket arrangement at the terminal end and any plug or socket at the other end;

f) the arrangement in (c) or (d) plus one or more cords suitable for connection to the TE at one end and any plug or socket at the other end.

The transmit pair is the output from the TE interface. The receive pair is the input to the TE interface, as shown in figure 9.1. Where the terms "output" and "input" are used without qualification in this TBR, they refer to the TE interface.

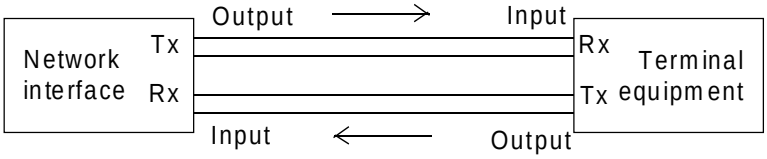


Figure 9.1: TE connection conventions

NOTE 2: The use of a shielded cord or cable may be necessary to meet radiation and immunity requirements defined in Electro-Magnetic Compatibility (EMC) standards.

9.1.1 Hardwired connection

Requirement: The TE shall provide:

a) a set of connection contacts (e.g. an insulation displacement connector or a screw terminal block) to which solid wire conductors with diameters in the range 0,4 to 0,6 mm may be connected; or

b) a wiring arrangement connected by any means to the TE, with unterminated solid wire conductors with diameters in the range 0,4 to 0,6 mm at the end distant from the TE.

Test: There is no test. All subsequent tests are carried out via the specified connection method.

9.1.2 Alternative means of connection

Any alternative means of connection may be provided in addition to the connection arrangements under 9.1.1.

NOTE: Where a wiring arrangement is provided under 9.1.1 (b), such a wiring arrangement need not be supplied where a means of connection which is the subject of this subclause is to be used.

9.2 Specification at the output port

9.2.1 Waveform shape

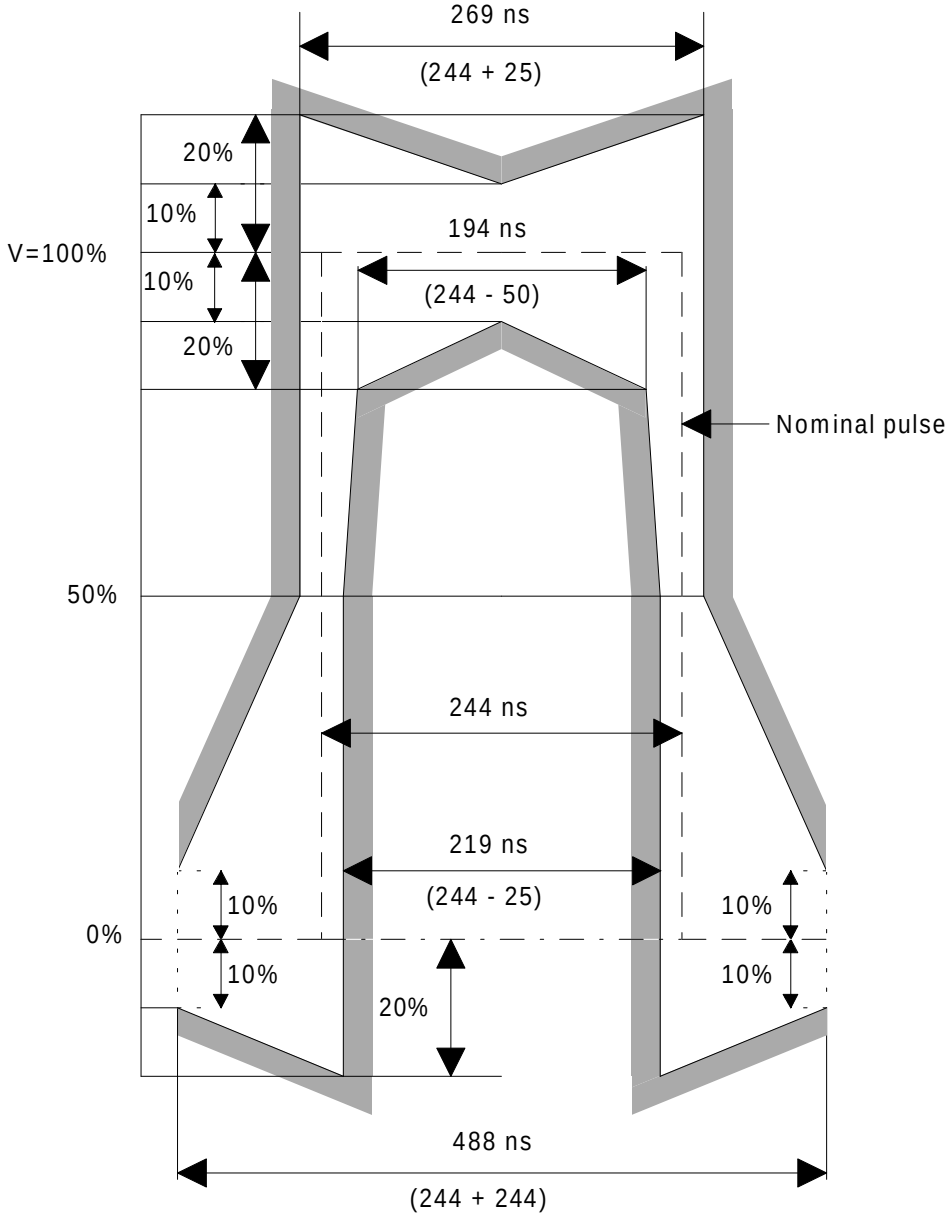
Reference: ETS 300 011, table 2, subclause 6.2.

Requirement: The output signal shall conform to table 9.1.

Table 9.1: Waveform shape at output port

Pulse shape	All marks of a valid signal shall conform with the mask of figure 9.2 irrespective of the polarity. The value V corresponds to the nominal peak voltage of a mark.
Test load impedance	120 Ω non-reactive
Nominal peak voltage V of a mark	3 V
Peak voltage of a space	0 ± 0,3 V
Nominal pulse width	244 ns
Ratio of the amplitudes of positive and negative pulses at the centre of the pulse	0,95 to 1,05
Ratio of the widths of positive and negative pulses at the nominal half amplitude	0,95 to 1,05

Test: The test shall be conducted according to annex B, subclauses B.2.1.1, B.2.1.2, B.2.1.3 and B.2.1.4.



NOTE: The figure is symmetrical.

Figure 9.2: Pulse mask for 2 048 kbit/s pulse

9.2.2 Impedance towards ground

Reference: ETS 300 011, table 1, subclause 5.7.

Requirement: The impedance towards ground of the transmitter output shall be greater than the following limit:

a) 10 Hz ≤ f ≤ 500 kHz: ≥ 1000 Ω.

b) 500 kHz ≤ f ≤ 1 MHz: minimum value shall be above a line between the points (1000 Ω, 500kHz) and (500 Ω, 1 MHz) when impedance in ohms is plotted on a linear scale against frequency on a logarithmic scale

Test: The test shall be conducted according to annex B, subclause B.2.2.

9.2.3 Clock accuracy

Reference: ETS 300 011, table 1, subclause 5.3.

Requirement: In the absence of any external reference signal timing, the output signal shall have a bit rate of 2 048 kbit/s ± 50 ppm.

Test: The test shall be conducted according to annex B, subclause B.2.3.

9.2.4 Output jitter

Reference: ETS 300 011, table 1, subclause 5.4.3.

Requirement: The peak-to-peak output jitter shall be less than the limits of table 9.2 when measured with a bandpass filter having a high pass of first order (slope of 20 dB/decade) and having a low pass of third order (slope of 60 db/decade) with cut-off frequencies as defined below.

The requirement shall be met when the TE is using the following sources of timing, where appropriate:

a) the input of the same primary rate access, with the maximum tolerable jitter at frequencies in the range 1 Hz to 100 kHz as specified in figure 9.3 and table 9.5;

b) the input of another primary rate access connected to the TE, with the maximum tolerable jitter at frequencies in the range 1 Hz to 100 kHz as specified in figure 9.3 and table 9.5;

c) the input of another 2 048 kbit/s interface connected to the TE, with the maximum tolerable jitter at frequencies in the range 1 Hz to 100 kHz as specified in figure 9.3 and table 9.3;

d) internal reference clock (free running mode);

e) the input of an interface to a dedicated external reference clock.

NOTE: An example of another 2 048 kbit/s interface is a connection to a 2 048 kbit/s leased line.

Table 9.2: Output jitter characteristics

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

Table 9.3: Input jitter at another type of 2 048 kbit/s interface

A0	A1	A2	f0	f1	f2	f3	f4
20,5 UI	1,5 UI	0,2 UI	12 μHz	20 Hz	2,4 kHz	18 kHz	100 kHz
NOTE:	Although f0 is 12 μHz, this value is only included for the purposes of correctly specifying the slope of the graph in figure 9.3. No requirement applies below 1 Hz.						

Test: The test shall be conducted according to annex B, subclause B.2.4.

9.2.5 Line coding

Reference: ETS 300 011, table 2, subclause 6.1.

Requirement: The signal shall be High-Density Bipolar 3 (HDB3) coded.

Test: The test shall be conducted according to annex B, subclause B.2.5.

9.3 Specification at the input port

9.3.1 Return loss

Reference: ETS 300 011, table 2, subclause 6.3.3.

Requirement: The return loss at the input port with respect to the nominal input impedance of 120 Ω shall be greater than the values of table 9.4.

Test: The test shall be conducted according to annex B, subclause B.3.1.

Table 9.4: Input return loss limits

Frequency range (kHz)	Return loss (dB)
51 to 102	12
102 to 2 048	18
2 048 to 3 072	14

9.3.2 Immunity to attenuation and reflections

Reference: ETS 300 011, table 2, subclauses 6.3.1 and 6.3.4.

Requirement: A nominal aggregate signal, encoded into HDB3 and having a pulse shape as defined in the pulse mask, has added to it an interfering signal with the same pulse shape as the wanted signal. The interfering signal has a bit rate within the limits specified in this TBR, but is not synchronous with the wanted signal. The interfering signal is combined with the wanted signal in a combining network, with an overall zero loss in the signal path and with the nominal impedance of 120 Ω to give a signal-to-interference ratio of 18 dB. The binary content of the interfering signal is a Pseudo-Random Bit Sequence (PRBS) 2^{15}-1.

No errors shall result when the combined signal, attenuated by a cable simulator circuit following a $\sqrt{f}$ law and with a loss at a frequency of 1 024 kHz in the range 0 dB to 6 dB, is applied to the input port.

Test: The test shall be conducted according to annex B, subclause B.3.2.

9.3.3 Jitter tolerance

Reference: ETS 300 011, table 1, subclause 5.4.2.

Requirement: The receiver shall operate without errors with the maximum input jitter in the range 20 Hz to 100 kHz as described in figure 9.3 and table 9.5.

Test: The test shall be conducted according to annex B, subclause B.3.3.

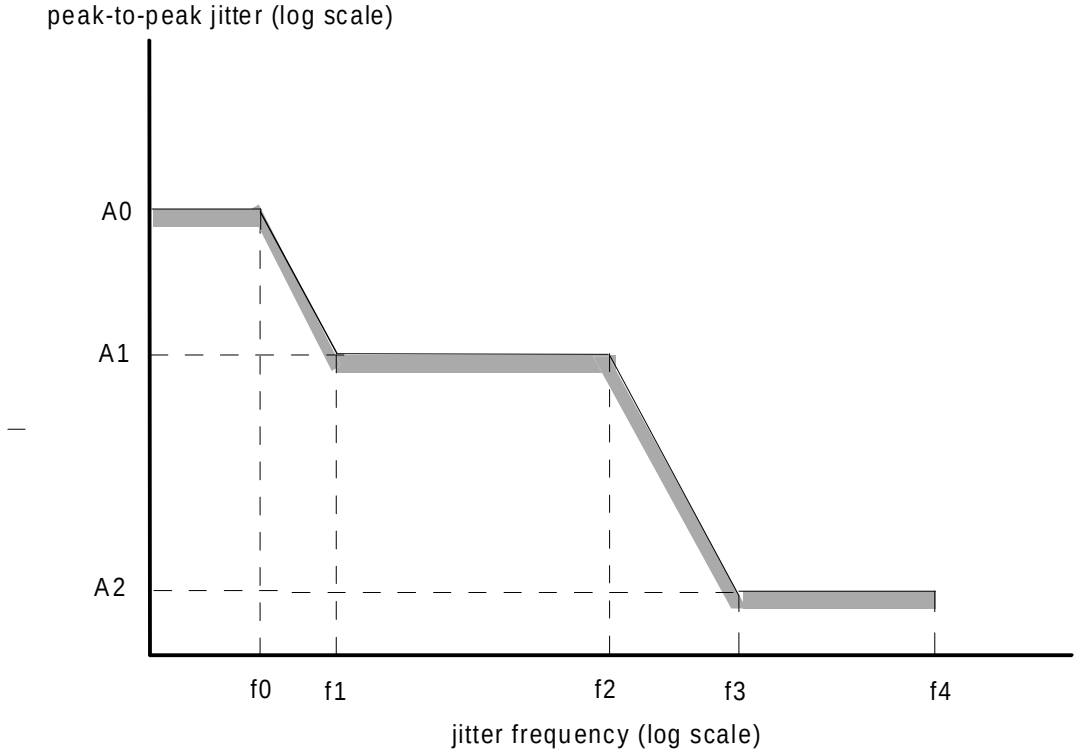


Figure 9.3: Input jitter tolerance

Table 9.5: Input jitter tolerance

A0	A1	A2	f0	f1	f2	f3	f4
20,5 UI	1,0 UI	0,2 UI	12 µHz	20 Hz	3,6 kHz	18 kHz	100 kHz
NOTE:	Although f0 is 12 µHz, this value is only included for the purposes of correctly specifying the slope of the graph in figure 9.3. No requirement applies below 20 Hz for tolerance to input jitter, and no requirement applies below 1 Hz for the application of input jitter for the test of maximum output jitter.						

9.3.4 Tolerable longitudinal voltage

Reference: ETS 300 011, table 1, subclause 5.5.

Requirement: The receiver shall operate without errors with any valid input signal in the presence of a longitudinal voltage V_L of 2 Vrms over the frequency range 10 Hz to 150 kHz.

Test: The test shall be conducted according to annex B, subclause B.3.4.

9.3.5 Impedance towards ground

Reference: ETS 300 011, table 1, subclause 5.7.

Requirement: The impedance towards ground of the receiver input shall be greater than the following limit:

a. 10 Hz ≤ f ≤ 500 kHz: ≥ 1000 Ω.

b. 500 kHz ≤ f ≤ 1 MHz: minimum value shall be above a line between the points (1000 Ω, 500kHz) and (500 Ω, 1 MHz) when impedance in ohms is plotted on a linear scale against frequency on a logarithmic scale.

Test: The test shall be conducted according to annex B, subclause B.3.5.

9.4 Frame structure

9.4.1 Frame length

Reference: ETS 300 011, table 3, subclause 2.3.1.

Definition: 256 bits, numbered 1 to 256.

9.4.2 Number of bits per timeslot

Reference: ETS 300 011, table 1, subclause 5.2.1.

Definition: Eight, numbered 1 to 8.

9.4.3 Number of timeslots per frame

Reference: ETS 300 011, table 1, subclause 5.2.2.

Definition: Thirty-two, numbered 0 to 31. The number of bits per frame is 256 and the frame repetition rate is 8 000 Hz.

9.4.4 Assignment of bits in Time-Slot 0 (TS0)

Reference: ETS 300 011, table 3, subclause 2.3.2.

Requirement: Bits 1 to 8 of the frame (timeslot 0) shall be as shown in table 9.6. The S_a bits shall be set to binary ONE by the TE.

Test: The test shall be conducted according to annex B, subclause B.4.1.

Table 9.6: Allocation of bits 1 to 8 of the frame

Bit number **Alternate frames**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Frame containing the	S_i	0	0	1	1	0	1	1
frame alignment signal	(note 1)	Frame alignment signal						
Frame not containing the	S_i	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
frame alignment signal	(note 1)	(note 2)	(note 3)	(note 4)				

NOTE 1: S_i bits used for Cyclic Redundancy Check (CRC) multiframe alignment, see table 9.7.
NOTE 2: This bit is fixed at 1 to assist in avoiding simulations of the frame alignment signal.
NOTE 3: A = Remote alarm indication. In undisturbed operation, set to 0; in alarm condition, set to 1.
NOTE 4: Bits S_{a4} to S_{a8} shall be set to 1 by the TE.

9.4.5 Allocation of bits 1 to 8 of the frame for a complete multiframe

Reference: ETS 300 011, table 3, subclause 2.3.3.2.

Definition: The allocation of bits 1 to 8 of the frame is shown in table 9.7 for a complete CRC-4 multiframe.

Table 9.7: CRC-4 multiframe structure

	Sub-Multiframe (SMF)	Frame number	Bits 1 to 8 of the frame							
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Multiframe	I	0	C_1	0	0	1	1	0	1	1
		1	0	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		2	C_2	0	0	1	1	0	1	1
		3	0	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		4	C_3	0	0	1	1	0	1	1
		5	1	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		6	C_4	0	0	1	1	0	1	1
		7	0	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
	II	8	C_1	0	0	1	1	0	1	1
		9	1	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		10	C_2	0	0	1	1	0	1	1
		11	1	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		12	C_3	0	0	1	1	0	1	1
		13	E	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}
		14	C_4	0	0	1	1	0	1	1
		15	E	1	A	S_{a4}	S_{a5}	S_{a6}	S_{a7}	S_{a8}

S_{a4} to S_{a8} = Spare bits (see note 4 to table 9.6).
A = Remote alarm indication (see table 9.6).
C_1 to C_4 = CRC-4 bits (see subclauses 9.4.8 and 9.4.7.2).
E = CRC-4 error indication bits (see subclause 9.4.8).

9.4.6 Sub-Multiframes (SMF)

Reference: ETS 300 011, table 3, subclause 2.3.3.3.

Definition: Each CRC-4 multiframe, which is composed of 16 frames numbered 0 to 15, is divided into two 8-frame sub-multiframes, designated SMF I and SMF II which signifies their respective order of occurrence within the CRC-4 multiframe structure. The SMF is the CRC-4 block size (i.e. 2 048 bits).

9.4.7 Cyclic Redundancy Check (CRC)

9.4.7.1 Multiplication/division process

Reference: ETS 300 011, table 3, subclause 2.3.3.5.1.

Definition: A particular CRC-4 word, located in sub-multiframe N, is the remainder after multiplication by x^4 and then division (modulo 2) by the generator polynomial $x^4 + x + 1$, of the polynomial representation of sub-multiframe N - 1.

NOTE: When representing the contents of the check block as a polynomial, the first bit in the block, i.e. frame 0, bit 1 or frame 8, bit 1, is the most significant bit. Similarly, C_1 is defined to be the most significant bit of the remainder and C_4 the least significant bit of the remainder.

9.4.7.2 Encoding procedure

Reference: ETS 300 011, table 3, subclause 2.3.3.5.2.

Definition:

a) The CRC-4 bits in the SMF are replaced by binary ZEROs.

b) The SMF is then acted upon by the multiplication/division process referred to in subclause 9.4.7.1.

c) The remainder resulting from the multiplication/division process is stored, ready for insertion into the respective CRC-4 locations of the next SMF.

NOTE: The CRC-4 bits thus generated do not affect the result of the multiplication/division process in the next SMF because, as indicated in a) above, the CRC-4 bit positions in an SMF are initially set to 0 during the multiplication/division process.

9.4.7.3 Decoding procedure

Reference: ETS 300 011, table 3, subclause 2.3.3.5.3.

Definition:

a) A received SMF is acted upon by the multiplication/division process referred to in subclause 9.4.7.1, after having its CRC-4 bits extracted and replaced by ZEROs.

b) The remainder resulting from this division process is then stored and subsequently compared on a bit-by-bit basis with the CRC bits received in the next SMF.

c) If the remainder calculated in the decoder exactly corresponds to the CRC-4 bits received in the next SMF, it is assumed that the checked SMF is error free.

9.4.8 Use of bit 1 in 2 048 kbit/s CRC-4 multiframe

Reference: ETS 300 011, table 3, subclause 2.3.3.4.

Requirement: In those frames containing the frame alignment signal, bit 1 shall be used to transmit the CRC-4 bits encoded as described in subclauses 9.4.7.1 and 9.4.7.2. There are four CRC-4 bits, designated C_1, C_2, C_3 and C_4 in each SMF.

In those frames not containing the frame alignment signal, bit 1 shall be used to transmit the 6-bit CRC-4 multiframe alignment signal 001011 and two CRC-4 error indication bits (E).

Test: The test shall be conducted according to annex B, subclauses B.4.1 and B.5.3.

9.4.9 Timeslot assignment

Reference: ETS 300 011, table 1, subclause 5.2.4.2.

Requirement: Timeslot 16 shall be assigned to the D-channel.

Test: This requirement is tested indirectly by the layer 2 and 3 tests.

9.5 Operational functions

Reference: ETS 300 011, table 1, subclause 3.4.

Definition: In the layer 1 requirements the term network is used to indicate NT1, LT and ET functional groups.

The term TE (or "user side") is used to indicate terminal terminating layer 1 aspects of TE1, TA, and NT2 functional groups.

9.5.1 Definition of signals at the interface

Reference: ETS 300 011, table 1, subclause 3.4.1.

Definition: Signals exchanged between the network and TEs under normal and fault conditions are listed in table 9.8.

Table 9.8: Signals between the network and TE under normal and fault conditions

Name	List of the signals
Normal operational frame	Operational frame with: - active associated CRC bits; - CRC error information if applicable (note); - no defect indication.
Remote Alarm Indication (RAI)	Operational frame with: - active associated CRC bits; - CRC error information if applicable (note); - with remote alarm indication.
Loss Of Signal (LOS)	Incoming signal more than 20 dB below the nominal value for more than 1 ms.
Alarm Indication Signal (AIS)	Continuous stream of ONEs.
NOTE: Contiguous CRC blocks with errors result in contiguous CRC error information, i.e. E bit set to ZERO if CRC block is received with error.	

9.5.2 Layer 1 states at the TE

Reference: ETS 300 011, table 1, subclause 3.4.3.

Definition:

F0 state: Loss of power at the TE

- In general, the TE can neither transmit nor receive signals.

F1 state: Operational state

- Network timing and layer 1 service is available.
- The TE transmits and receives operational frames with associated CRC bits and with CRC error information as appropriate.
- The TE checks the received frames and the associated CRC bits, and transmits to the network side operational frames containing the CRC error information, if a CRC error is detected.

F2 state: Fault condition No. 1 (note 1)

- This fault state corresponds to the fault condition FC1.
- Network timing is available at the TE.
- The TE receives operational frames with associated CRC bits and with temporary CRC error information.
- The received frames contain RAI.
- The TE transmits operational frames with associated CRC bits.
- The TE checks the received frames and the associated CRC bit and transmits to the network side operational frames containing the CRC error information, if a CRC error is detected.

F3 state: Fault Condition No. 2 (note 2)

- This fault state corresponds to the fault condition FC2.
- Network timing is not available at the TE.
- The TE detects loss of incoming signal (this will involve loss of frame alignment).
- The TE transmits operational frames with associated CRC bits and RAI.

F4 state: Fault condition No. 3 (note 2)

- This fault state corresponds to fault condition FC3.
- Network timing is not available at the TE.
- The TE detects AIS.
- The TE transmits to the network side operational frames with associated CRC bits and RAI.

F5 state: Fault condition No. 4 (note 1)

- This fault state corresponds to the fault condition FC4.
- Network timing is available at the TE.
- The TE receives operational frames with continuous CRC error information (note 3).
- The received frames contain RAI.
- The TE transmits operational frames with associated CRC bits.
- The TE checks the received frames and the associated CRC bits and transmits to the network side operational frames containing the CRC error information, if a CRC error is detected.

F6 state: Power on state

- This is a transient state and the TE may change the state after detection of the signal received.

NOTE 1: In this TBR, there is no requirement for any difference in behaviour of the TE between states F2 and F5.

NOTE 2: In this TBR, there is no requirement for any difference in behaviour of the TE between states F3 and F4.

NOTE 3: The condition of "continuous CRC error information" corresponds to loss of incoming signal or loss of frame alignment on the network side.

9.5.3 State tables

Reference: ETS 300 011, table 1, subclause 3.4.6.

Definition: Operational functions are defined in table 9.9 for the layer 1 states at the TE.

NOTE: The exact reaction in case of double faults may depend on the type of double fault condition and the sequence in which they occur.

Table 9.9: Primary rate layer 1 state matrix at TE

	Initial state	F0	F1	F2	F3	F4	F5	F6
Definition of the states	**Operational condition or failure condition**	Power off at TE	Operational	FC1	FC2	FC3	FC4	Power on at TE
	Signal transmitted towards interface	No signal	Normal operational frames	Normal operational frames	Frames with RAI	Frames with RAI	Normal operational frames	No signal
New event, detected at the receiving side	**Loss of TE power**	/	PH—DI F0	F0	F0	F0	F0	F0
	Return of TE power	F6	/	/	/	/	/	/
	Normal operational frames from network side	/	–	PH—AI F1	PH—AI F1	PH—AI F1	PH—AI F1	/
	Reception of RAI	/	PH-DI F2	–	F2	F2	F2	F2
	Loss of signal or frame alignment	/	PH–DI F3	F3	–	F3	F3	F3
	Reception of AIS	/	PH-DI F4	F4	F4	–	F4	F4
	Reception of RAI and continuous CRC error report	/	PH-DI F5	F5	F5	F5	–	F5

—	No state change
/	Impossible situation
PH-x Fz	Issue primitive x Go to state Fz
PH-AI	PH ACTIVATE INDICATION
PH-DI	PH DEATIVATE INDICATION

9.5.4 Maintenance at the interface

9.5.4.1 Definitions of maintenance signals

Reference: ETS 300 011, table 1, subclause 5.9.1.

Definition: The RAI signal indicates loss of layer 1 service at the user-network interface. RAI propagates towards the network if layer 1 service is lost in the direction of the user, and RAI propagates toward the user if layer 1 service is lost in the direction of the network. RAI is coded in bit A, i.e. bit 3 of timeslot 0 of the operational frame which does not contain the frame alignment signal (see table 9.7):

- RAI present: A-bit set to 1;
- RAI not present: A-bit set to 0.

The AIS is used to indicate loss of layer 1 service in the NT-to-TE direction on the network side of the user-network interface. A characteristic of AIS is that its presence indicates that the timing provided to the TE may not be the network clock. AIS is coded as a binary all ONEs, 2 048 kbit/s bit stream.

- CRC error report: E bit in operational frames.

9.5.4.2 Maintenance functions

9.5.4.2.1 Anomalies and defect detection

Reference: ETS 300 011, table 1, subclause 5.9.3.2.1.

Requirement: The TE shall detect the following defects or anomalies:

- loss of power on the TE;
- loss of incoming signal at interface (see note);
- loss of frame alignment;
- CRC error.

NOTE: The detection of this defect is required only when it does not have the effect of a loss of frame alignment indication.

Test: The test shall be conducted implicitly according to annex B, subclause B.5.1.

9.5.4.2.2 Detection of defect indication signals

Reference: ETS 300 011, table 1, subclause 5.9.3.2.2.

Requirement:
The following defect indications received at interface shall be detected by the TE:

- remote alarm indication (note);
- alarm indication signal.

NOTE: The RAI signal is used to indicate loss of layer 1 service. It may be used to indicate:

- loss of signal or loss of framing;
- excessive CRC errors;
- loopbacks applied in the network.

Test: The test shall be conducted implicitly according to annex B, subclause B.5.1.

9.5.4.2.3 Consequent actions

Reference: ETS 300 011, table 1, subclause 5.9.3.2.3.

Requirement: The TE shall take the actions described in table 9.10 after detection of a defect or of a defect indication signal.

On the occurrence of a defect or defect indication signal where the required response includes the sending of RAI, RAI shall appear within 30 ms. When the defect conditions have disappeared or when the defect indication signals are no longer received, the defect indication RAI shall disappear within 6 ms of the time it appeared following the occurrence of the defect or defect indication signal.

The following items are required to ensure that an equipment is not removed from service or put into service due to short breaks in transmission or on detection of normal operational frames by layer 1, respectively.

a) The persistent receipt of signals other than normal operational frames shall be verified by a timer T1 of 100 ms to 1 000 ms before PH-DI is issued.

b) The persistent receipt of normal operational frames shall be verified by a timer T2 of 10 ms to 100 ms before PH-AI is issued.

c) T1 shall be suspended when T2 is started. T1 shall resume running when T2 is reset.

d) T1 shall be reset when T2 expires.

e) T2 shall be reset on receipt of signals other than normal operational frames.

Test: The test shall be conducted according to annex B, subclause B.5.1.

Table 9.10: Defect conditions and defect indication signals detected by the TE and consequent actions

Defect conditions and defect indications detected by the TE	Consequent actions	
	Defect indications at the interface	
	Generation of RAI	Generation of CRC error information
Loss of power at the TE	Not applicable	Not applicable
Loss of signal	Yes	Yes (note 1)
Loss of frame alignment	Yes	No (note 2)
Reception of RAI	No	No note 4)
Reception of AIS	Yes	No (note 3)
Detection by NT2 of CRC errors	No	Yes

NOTE 1: Only when loss of frame alignment has not yet occurred.
NOTE 2: The loss of frame alignment inhibits the process associated with the CRC procedure.
NOTE 3: The AIS is detected only after the fault "loss of frame alignment", thus the process associated with the CRC procedure is inhibited.
NOTE 4: If CRC errors are detected in frames carrying the RAI signal, then CRC error information shall be generated.

9.5.5 Frame alignment and CRC procedures at 2 048 kbit/s interface

9.5.5.1 Loss of frame alignment

Reference: ETS 300 011, table 4, subclause 4.1.1.

Requirement: Frame alignment shall be lost and RAI shall be sent within 30 ms of three consecutive incorrect frame alignment signals having been received.

In addition, frame alignment may be assumed to have been lost, when bit 2 in timeslot 0 in frames not containing the frame alignment signal has been received with the value 0 on three consecutive occasions.

Test: The test shall be conducted according to annex B, subclause B.5.2.

9.5.5.2 Strategy for frame alignment recovery

Reference: ETS 300 011, table 4, subclause 4.1.2.

Requirement: Frame alignment shall be achieved when the following sequence is detected:

- for the first time, the presence of a correct frame alignment signal,
- the absence of the frame alignment signal in the following frame detected by verifying that bit 2 in the basic frame is 1 (frame n+1)
- the presence of a correct frame alignment signal in the next frame (frame n+2)

The default indication RAI shall be removed within 30 ms after frame alignment has been achieved.

The time between receiving the sequence described above and sending the NOF shall be not greater than 6 ms of the time between losing frame alignment and sending RAI as described in subclause 9.5.5.1.

Test: The test shall be conducted according to annex B, subclause B.5.2.

9.5.5.3 CRC multiframe alignment using information in bit 1 of the basic frame

Reference: ETS 300 011, table 4, subclause 4.2.

Requirement: If a valid frame alignment signal as described in subclause 9.5.5.2 has been received, a search for the CRC multiframe alignment signal shall be made in basic frames not containing the frame alignment signal. CRC multiframe alignment shall be deemed to have occurred if, the time separating two CRC multiframe alignment signals being 2 ms or a multiple of 2 ms.

If at least two valid CRC multiframe alignment signals are not received within 8 ms, then a re-search for frame alignment shall be initiated. The TE shall send RAI within 30 ms after detecting the missing multiframe alignment.

The time between receiving the sequence described above and sending RAI shall be within 6 ms of the time between losing frame alignment and sending RAI as described in subclause 9.5.5.1.

NOTE: The re-search for frame alignment should be started at a point just after the location of the assumed spurious frame alignment signal. This will usually avoid realignment onto the spurious frame alignment signal.

If CRC multiframe alignment cannot be achieved within a time limit in the range of 100 ms to 500 ms, RAI shall continue to be sent on receipt of a valid frame alignment signal, and NOF shall only be sent when both frame alignment and CRC multiframe alignment have been achieved.

Test: The test shall be conducted according to annex B, subclause B.5.3.

9.5.5.4 CRC bit monitoring

Reference: ETS 300 011, table 4, subclauses 4.3 and 4.3.1.

Requirement: If frame and CRC multiframe alignment have been achieved, the monitoring of the CRC bits in each sub-multiframe shall commence as described below:

a) a received CRC SMF is acted upon by the multiplication/division process defined in subclause 9.4.7.1 after having its CRC bits extracted and replaced by 0 s;

b) the remainder resulting from the division process is then stored and subsequently compared on a bit-by-bit basis with the CRC bits received in the next SMF;

c) if the remainder exactly corresponds to the CRC bits contained in the next SMF of the received signal, it is assumed that the checked SMF is error-free.

If a received SMF is error-free, an E-bit as described in table 9.7 shall be set to ONE. If a received SMF contains an error, an E-bit as described in table 9.7 shall be set to ZERO. The E-bit shall be transmitted within 1 s of the received SMF.

Test: The test shall be conducted according to annex B, subclause B.4.2.

9.5.5.5 Monitoring for false frame alignment

Reference: ETS 300 011, table 4, subclause 4.3.2.

Requirement: If 915 or more errored CRC blocks are received out of 1000, then a re-search for frame alignment shall be initiated. The TE shall send RAI within 30 ms after detecting the errored CRC blocks.

Test: The test shall be conducted according to annex B, subclause B.4.2.

10 Layer 2 requirements

The following clauses contain elements of procedure that are expressed in the form of definitions. These elements of procedure do not form requirements in their own right and therefore do not have associated conformance tests. However these elements are used as components for procedures that are requirements. To ensure that the requirements are satisfied, it is necessary for a TE to implement these elements of procedure in the manner specified within the associated definition. The tests for requirements implicitly test the elements of procedure.

10.1 Frame structure for peer-to-peer communication

10.1.1 General

Reference: ETS 300 125, Part 2, subclause 2.1.

NOTE: All data link layer peer-to-peer exchanges are in frames conforming to one of the two formats shown in figure 10.1: format A for frames where there is no information field and format B for frames containing an information field.

Format A

8	7	6	5	4	3	2	1	
Flag								Octet 1
0	1	1	1	1	1	1	0	
Address (high order octet)								2
Address (low order octet)								3
Control (note 2)								4
								5
Control (note 2)								
FCS (first octet)								N-2
FCS (second octet)								N-1
Flag								N
0	1	1	1	1	1	1	0	

Format B

8	7	6	5	4	3	2	1	
Flag								Octet 1
0	1	1	1	1	1	1	0	
Address (high order octet)								2
Address (low order octet)								3
Control (notes 1 and 2)								4
Control (notes 1 and 2)								5
Information								
FCS (first octet)								N-2
FCS (second octet)								N-1
Flag								N
0	1	1	1	1	1	1	0	

NOTE 1: For unacknowledged operation, format B applies and one octet control field is used.

NOTE 2: For multiple frame operation, frames with sequence numbers contain a two octet control field and frames without sequence numbers contain a one octet control field. Connection management information transfer frames contain a one octet control field.

Figure 10.1: Frame formats

10.1.2 Flag sequence

Reference: ETS 300 125, Part 2, subclause 2.2.

Definition: All frames start and end with the flag sequence consisting of one 0 bit followed by six contiguous 1 bits and one 0 bit. The flag preceding the address field is defined as the opening flag. The flag following the Frame Check Sequence (FCS) field is defined as the closing flag. The closing flag may also serve as the opening flag of the next frame.

10.1.3 Address field

Reference: ETS 300 125, Part 2, subclause 2.3.

Definition: The address field consists of two octets as illustrated in figure 10.1. The address field identifies the intended receiver of a command frame and the transmitter of a response frame. The format of the address field is defined in subclause 10.2.2.

10.1.4 Control field

Reference: ETS 300 125, Part 2, subclause 2.4.

Definition: The control field consists of one or two octets. Figure 10.1 illustrates the two frame formats (A and B), each with a control field of one or two octets, depending upon the type of operation being used.

The format of the control field is defined in subclause 10.2.4.

10.1.5 Information field

Reference: ETS 300 125, Part 2, subclause 2.5.

Definition: The information field of a frame, when present, follows the control field (see subclause 10.1.4) and precedes the frame check sequence (see subclause 10.1.7). The contents of the information field consists of an integer number of octets.

The maximum number of octets in the information field is defined in subclause 10.10.3.

10.1.6 Transparency

Reference: ETS 300 125, Part 2, subclause 2.6.

Definition: Prior to transmission over the D-channel a 0 bit is inserted after all sequences of five contiguous 1 bits (including the last five bits of the FCS) to ensure that a flag or an abort sequence is not simulated within the frame. The frame contents between the opening and closing flag sequences are examined on reception of a frame and any 0 bit which directly follows five contiguous 1 bits is discarded.

10.1.7 Frame Check Sequence (FCS) field

Reference: ETS 300 125, Part 2, subclause 2.7.

Definition: The FCS field is a sixteen-bit sequence. It is the ones complement of the sum (modulo 2) of:

a) the remainder of (x raised to k power) ($x^{15}+x^{14}+x^{13}+x^{12}+x^{11}+x^{10}+x^9+x^8+x^7+x^6+x^5+x^4+x^3+x^2+x^1+1$) divided (modulo 2) by the generator polynomial $x^{16}+x^{12}+x^5+1$, where k is the number of bits in the frame existing between, but not including, the final bit of the opening flag and the first bit of the FCS, excluding bits inserted for transparency; and

b) the remainder of the division (modulo 2) by the generator polynomial $x^{16}+x^{12}+x^5+1$, of the product of x^{16} by the content of the frame existing between, but not including, the final bit of the opening flag and the first bit of the FCS, excluding bits inserted for transparency.

As a typical implementation at the transmitter, the initial content of the register of the device computing the remainder of the division is preset to all ONEs and is then modified by division by the generator polynomial (as described above) on the address, control, and information fields; the ones complement of the resulting remainder is transmitted as the sixteen-bit FCS sequence.

As a typical implementation at the receiver, the initial content of the register of the device computing the remainder is preset to all ONEs. The final remainder after multiplication by x^{16} and then division (modulo 2) by the generator polynomial $x^{16}+x^{12}+x^5+1$ of the serial incoming protected bits and the FCS, will be "0001 1101 0000 1111" (x^{15} through x^0, respectively) in the absence of transmission errors.

10.1.8 Format convention

10.1.8.1 Numbering convention

Reference: ETS 300 125, Part 2, subclause 2.8.1.

Definition: The basic convention used in the layer 2 requirements of this TBR is illustrated in figure 10.2. The bits are grouped into octets. The bits of an octet are shown horizontally and are numbered from 1 to 8. Multiple octets are shown vertically and are numbered from 1 to n.

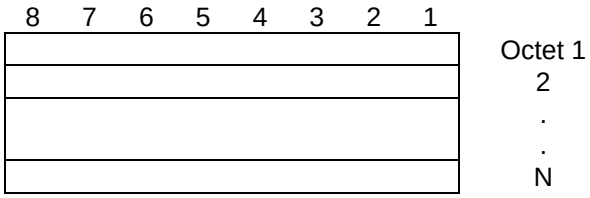


Figure 10.2: Format convention

10.1.8.2 Order of bit transmission

Reference: ETS 300 125, Part 2, subclause 2.8.2.

Definition: The octets are transmitted in ascending numerical order; inside an octet bit 1 is the first bit to be transmitted.

10.1.8.3 Field mapping convention

Reference: ETS 300 125, Part 2, subclause 2.8.3.

Definition: When a field is contained within a single octet, the lowest bit number of the field represents the lowest order value.

When a field spans more than one octet, the order of bit values within each octet progressively decreases as the octet number increases. The lowest bit number associated with the field represents the lowest order value.

For example, a bit number can be identified as a couple (o,b) where o is the octet number and b is the relative bit number within the octet. Figure 10.3 illustrates a field that spans from bit (1,3) to bit (2,7). The high order bit of the field is mapped on bit (1,3) and the low order bit is mapped on bit (2,7).

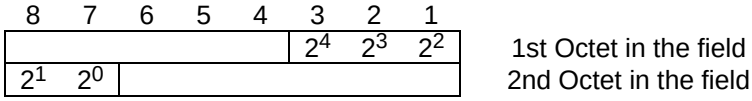


Figure 10.3: Field mapping convention

An exception to the preceding field mapping convention is the data link layer FCS field, which spans two octets. In this case, bit 1 of the first octet is the high order bit and bit 8 of the second octet is the low order bit (see figure 10.4).

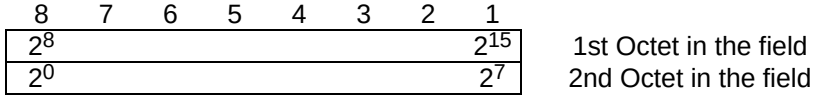


Figure 10.4: FCS mapping convention

10.1.9 Invalid or incompatible frames

Reference: ETS 300 125, Part 2, subclause 2.9.

Definition: An invalid or incompatible frame is a frame which:

a) is not properly bounded by two flags; or

b) contains a frame check sequence error; or

c) contains a single octet address field; or

d) contains a service access point identifier (see subclause 10.2.3.3) which is not supported by the receiver; or

e) contains a TEI not assigned to the TE.

10.2 Elements of procedures and formats of fields for data link layer peer-to-peer communication

10.2.1 General

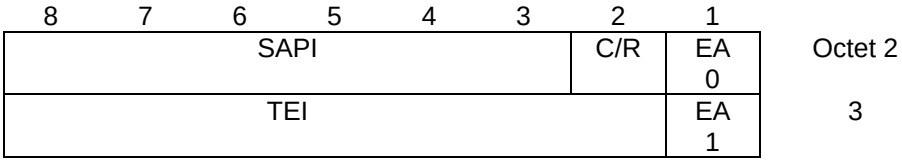
Reference: ETS 300 125, Part 2, subclause 3.1.

NOTE: The elements of procedures define the commands and responses that are used on the data link connections carried on the D-channel.

10.2.2 Address field format

Reference: ETS 300 125, Part 2, subclause 3.2.

Definition: The address field format shown in figure 10.5 contains the address field extension bits, a command/response indication bit, a data link layer Service Access Point Identifier (SAPI) subfield and a Terminal Endpoint Identifier (TEI) subfield.



EA = Address field extension bit
C/R = Command/response field bit
SAPI = Service access point identifier
TEI = Terminal endpoint identifier

Figure 10.5: Address field format

10.2.3 Address field variables

10.2.3.1 Address field Extension bit (EA)

Reference: ETS 300 125, Part 2, subclause 3.3.1.

Definition: The address field range is extended by reserving the first transmitted bit of the address field octets to indicate the final octet of the address field. The presence of a 1 in the first bit of an address field octet signals that it is the final octet of the address field. The double octet address field for Link Access Procedure on the D-channel (LAPD) operation has bit 1 of the first octet set to 0 and bit 1 of the second octet set to 1.

10.2.3.2 Command/Response field bit (C/R)

Reference: ETS 300 125, Part 2, subclause 3.3.2.

Definition: The C/R bit identifies a frame as either a command or a response. The TE sends commands with the C/R bit set to 0, and responses with the C/R bit set to 1. The NT does the opposite; that is commands are sent with C/R set to 1, and responses are sent with C/R set to 0. The combinations for the NT and TE are shown in table 10.1.

Table 10.1: C/R field bit usage

Command/Response	Direction			C/R value
Command	NT	→	TE	1
	TE	→	NT	0
Response	NT	→	TE	0
	TE	→	NT	1

In conformance with High level Data Link Control (HDLC) rules, commands use the address of the peer data link layer entity while responses use the address of the own data link layer entity. According to these rules, both peer entities on a point-to-point data link connection use the same Data Link Connection Identifier (DLCI) composed of a SAPI-TEI where SAPI and TEI conform to the definitions contained in subclauses 10.2.3.3 and 10.2.3.4.

10.2.3.3 Service Access Point Identifier (SAPI)

Reference: ETS 300 125, Part 2, subclause 3.3.3.

Definition: The SAPI identifies a point at which data link layer services are provided by a data link layer entity to a layer 3 or management entity. Consequently, the SAPI specifies a data link layer entity that should process a data link layer frame and also a layer 3 or management entity which is to receive information carried by the data link layer frame. The SAPI allows 64 service access points to be specified, where bit 3 of the address field octet containing the SAPI is the least significant binary digit and bit 8 is the most significant. The SAPI values are allocated as shown in table 10.2.

Table 10.2: SAPI values

SAPI value	Related layer 3 or layer management entity
0	Call control procedures
63	Layer 2 management procedures
All others	Reserved for future standardization

10.2.3.4 Terminal Endpoint Identifier (TEI)

Reference: ETS 300 125, Part 2, subclause 3.3.4.

Definition: The TEI for a point-to-point data link connection is associated with a single TE. A TE may contain one or more point-to-point TEIs. The TEI for a broadcast data link connection is associated with all TE data link layer entities containing the same SAPI. The TEI subfield allows 128 values where bit 2 of the address field octet containing the TEI is the least significant binary digit and bit 8 is the most significant binary digit. The following conventions apply in the assignment of these values.

10.2.3.4.1 TEI for broadcast data link connection

Reference: ETS 300 125, Part 2, subclause 3.3.4.1.

Definition: The TEI subfield bit pattern 111 1111 (= 127) is defined as the group TEI. The group TEI is assigned to the broadcast data link connection associated with the addressed SAP.

10.2.3.4.2 TEI for point-to-point data link connection

Reference: ETS 300 125, Part 2, subclause 3.3.4.2.

Definition: The remaining TEI values are used for the point-to-point data link connections associated with the addressed SAP. The range of TEI values are allocated as shown in table 10.3.

Table 10.3: TEI values

TEI value	User type
0 - 63	Non-automatic TEI assignment TE
64 - 126	Automatic TEI assignment TE

Non-automatic TEI values are selected by the user, and their allocation is the responsibility of the user.

Automatic TEI values are selected by the network, and their allocation is the responsibility of the network.

10.2.4 Control field formats

Reference: ETS 300 125, Part 2, subclause 3.4.

Definition: The control field identifies the type of frame, which will be either a command or response. The control field contains sequence numbers, where applicable.

Three types of control field formats are defined: numbered information transfer (I format), supervisory functions (S format), and unnumbered information transfers and control functions (U format). The control field formats are shown in table 10.4.

Table 10.4: Control field formats

Control field bits (modulo 128)	8	7	6	5	4	3	2	1	
I format	N(S)							O	Octet 4
	N(R)							P	5
S format	X	X	X	X	S	S	0	1	Octet 4
	N(R)							P/F	5
U format	M	M	M	P/F	M	M	1	1	Octet 4

N(S)	Transmitter send sequence number
M	Modifier function bit
N(R)	Transmitter receive sequence number
P/F	Poll bit when issued as a command, final bit when issued as a response
S	Supervisory function bit
X	Reserved and set to 0

10.2.4.1 Information transfer (I) format

Reference: ETS 300 125, Part 2, subclause 3.4.1.

Definition: The I format is used to perform an information transfer between layer 3 entities. The functions of N(S), N(R) and P (defined in subclause 10.2.5) are independent; that is, each I-frame has an N(S) sequence number, an N(R) sequence number which may or may not acknowledge additional I-frames received by the data link layer entity, and a P bit that may be set to 0 or 1.

10.2.4.2 Supervisory (S) format

Reference: ETS 300 125, Part 2, subclause 3.4.2.

Definition: The S format is used to perform data link supervisory control functions such as; acknowledge I-frames, request retransmission of I-frames, and request a temporary suspension of transmission of I-frames. The functions of N(R) and P/F are independent, that is, each supervisory frame has an N(R) sequence number which may or may not acknowledge additional I-frames received by the data link layer entity, and a P/F bit that may be set to 0 or 1.

10.2.4.3 Unnumbered (U) format

Reference: ETS 300 125, Part 2, subclause 3.4.3.

Definition: The U format is used to provide additional data link control functions and unnumbered information transfers for unacknowledged information transfer. This format does not contain sequence numbers. It does include a P/F bit that may be set to 0 or 1.

10.2.5 Control field parameters and associated state variables

10.2.5.1 Poll/Final bit

Reference: ETS 300 125, Part 2, subclause 3.5.1.

Definition: All frames contain the Poll/Final (P/F) bit. The P/F bit serves a function in both command frames and response frames. In command frames the P/F bit is referred to as the P bit. In response frames it is referred to as the F bit. The P bit set to 1 is used by a data link layer entity to solicit (poll) a response frame from the peer data link layer entity. The F bit set to 1 is used by a data link layer entity to indicate the response frame transmitted as a result of a soliciting (poll) command.

10.2.5.2 Multiple frame operation - variables and sequence numbers

10.2.5.2.1 Modulus

Reference: ETS 300 125, Part 2, subclause 3.5.2.1.

Definition: Each I-frame is sequentially numbered and may have the value 0 through n minus 1 (where n is the modulus of the sequence numbers). The modulus equals 128 and the sequence numbers cycle through the entire range, 0 through 127.

NOTE: All arithmetic operations on state variables and sequence numbers contained in this TBR are affected by the modulus operation.

10.2.5.2.2 Send state variable V(S)

Reference: ETS 300 125, Part 2, subclause 3.5.2.2.

Definition: Each point-to-point data link connection endpoint has an associated V(S) when using I-frame commands. V(S) denotes the sequence number of the next I-frame to be transmitted. V(S) can take on the value 0 through n minus 1. The value of V(S) is incremented by 1 with each successive I-frame transmission, and does not exceed V(A) by more that the maximum number of outstanding I-frames, k (see subclause 10.10.5). The value of k may be in the range $1 \leq k \leq 127$.

10.2.5.2.3 Acknowledge state variable V(A)

Reference: ETS 300 125, Part 2, subclause 3.5.2.3.

Definition: Each point-to-point data link connection endpoint has an associated V(A) when using I-frame commands and supervisory frame commands/responses. V(A) identifies the last frame that has been acknowledged by its peer (V(A)-1 equals the N(S) of the last acknowledged I-frame). V(A) can take on the value 0 through n minus 1. The value of the acknowledge state variable is updated by the valid N(R) values received from its peer (see subclause 10.2.5.2.6). A valid N(R) value is one that is in the range $V(A) \leq N(R) \leq V(S)$.

10.2.5.2.4 Send sequence number N(S)

Reference: ETS 300 125, Part 2, subclause 3.5.2.4.

Definition: Only I-frames contain N(S), the send sequence number of transmitted I-frames. At the time that an in-sequence I-frame is designated for transmission, the value of N(S) is set equal to V(S).

10.2.5.2.5 Receive state variable V(R)

Reference: ETS 300 125, Part 2, subclause 3.5.2.5.

Definition: Each point-to-point data link connection endpoint has an associated V(R) when using I-frame commands and supervisory frame command/responses. V(R) denotes the sequence number of the next in-sequence I-frame expected to be received. V(R) can take on the value 0 through n minus 1. The value of V(R) is incremented by one with the receipt of an error free, in-sequence I-frame whose N(S) equals V(R).

10.2.5.2.6 Receive sequence number N(R)

Reference: ETS 300 125, Part 2, subclause 3.5.2.6.

Definition: All I-frames and supervisory frames contain N(R), the expected send sequence number of the next received I-frame. At the time that a frame of the above types is designated for transmission, the value of N(R) is set equal to V(R). N(R) indicates that the data link layer entity transmitting the N(R) has correctly received all I-frames numbered up to and including N(R) - 1.

10.2.6 Frame types

10.2.6.1 Commands and responses

Reference: ETS 300 125, Part 2, subclause 3.6.1.

Definition: The following commands and responses are used by either the user or the network data link layer entities and are represented in table 10.5. Each data link connection supports the full set of commands and responses for each application implemented. The frame types associated with each of the two applications are identified in table 10.5.

For purposes of the LAPD procedures in each application, those frame types not identified in table 10.5 are identified as undefined command and/or response control fields.

Table 10.5: Commands and responses - modulo 128

Application	Format	Commands	Responses	Encoding 8	7	6	5	4	3	2	1	Octet
Unacknowledged and Multiple Frame acknowledged Information Transfer	Information transfer	I (information)		N(S)							0	4
				N(R)							P	5
	Supervisory	RR (receive ready)	RR (receive ready)	0	0	0	0	0	0	0	1	4
				N(R)							P/F	5
		RNR (receive not ready)	RNR (receive not ready)	0	0	0	0	0	1	0	1	4
				N(R)							P/F	5
		REJ (reject)	REJ (reject)	0	0	0	0	1	0	0	1	4
				N(R)							P/F	5
	Unnumbered	SABME (set asynchronous balanced mode extended)		0	1	1	P	1	1	1	1	4
			DM (disconnected mode)	0	0	0	F	1	1	1	1	4
		UI (unnumbered information)		0	0	0	P	0	0	1	1	4
		DISC (disconnect)		0	1	0	P	0	0	1	1	4
			UA (unnumbered acknowledgement)	0	1	1	F	0	0	1	1	4

The commands and responses in table 10.5 are defined in subclauses 10.2.6.2 to 10.2.6.10.

10.2.6.2 Information (I) command

Reference: ETS 300 125, Part 2, subclause 3.6.2.

Definition: The function of the information command is to transfer, across a data link connection, sequentially numbered frames containing information fields provided by layer 3. This command is used in the multiple frame operation on point-to-point data link connections.

10.2.6.3 Set Asynchronous Balanced Mode Extended (SABME) command

Reference: ETS 300 125, Part 2, subclause 3.6.3.

Definition: The SABME unnumbered command is used to place the addressed TE or NT into modulo 128 multiple frame acknowledged operation.

No information field is contained within the SABME command.

10.2.6.4 DISConnect (DISC) command

Reference: ETS 300 125, Part 2, subclause 3.6.4.

Definition: The DISC unnumbered command is used to terminate the multiple frame operation.

No information field is contained within the DISC command.

10.2.6.5 Unnumbered Information (UI) command

Reference: ETS 300 125, Part 2, subclause 3.6.5.

Definition: When a layer 3 or management entity requests unacknowledged information transfer, the UI unnumbered command is used to send information to its peer without affecting data link layer variables. UI command frames do not carry a sequence number and therefore, the UI-frame may be lost without notification.

10.2.6.6 Receive Ready (RR) command/response

Reference: ETS 300 125, Part 2, subclause 3.6.6.

Definition: The RR supervisory frame is used by a data link layer entity to:

a) indicate it is ready to receive an I-frame;

b) acknowledge previously received I-frames numbered up to and including N(R)-1 (as defined in subclause 10.2.5.2.6); and

c) clear a busy condition that was indicated by the earlier transmission of an RNR frame by that same data link layer entity.

In addition to indicating the status of a data link layer entity, the RR command with the P bit set to 1 may be used by the data link layer entity to ask for the status of its peer data link layer entity.

10.2.6.7 REJect (REJ) command/response

Reference: ETS 300 125, Part 2, subclause 3.6.7.

Definition: The REJ supervisory frame is used by a data link layer entity to request retransmission of I-frames starting with the frame numbered N(R). The value of N(R) in the REJ frame acknowledges I-frames numbered up to and including N(R)-1.

The transmission of an REJ frame also indicates the clearance of any busy condition within the sending data link layer entity that was reported by the earlier transmission of an RNR frame by that same data link layer entity.

In addition to indicating the status of a data link layer entity, the REJ command with the P bit set to 1 may be used by the data link layer entity to ask for the status of its peer data link layer entity.

10.2.6.8 Receive Not Ready (RNR) command/response

Reference: ETS 300 125, Part 2, subclause 3.6.8.

Definition: The RNR supervisory frame is used by a data link layer entity to indicate a busy condition; that is, a temporary inability to accept additional incoming I-frames. The value of N(R) in the RNR frame acknowledges I-frames numbered up to and including N(R)-1.

In addition to indicating the status of a data link layer entity, the RNR command with the P bit set to 1 may be used by the data link layer entity to ask for the status of its peer data link layer entity.

10.2.6.9 Unnumbered Acknowledgement (UA) response

Reference: ETS 300 125, Part 2, subclause 3.6.9.

Definition: The UA unnumbered response is used by a data link layer entity to acknowledge the receipt and acceptance of the mode-setting commands (SABME or DISC). Received mode-setting commands are not processed until the UA response is transmitted. No information field is contained within the UA response. The transmission of the UA response indicates the clearance of any busy condition that was reported by the earlier transmission of an RNR frame by that same data link layer entity.

10.2.6.10 Disconnected Mode (DM) response

Reference: ETS 300 125, Part 2, subclause 3.6.10.

Definition: The DM unnumbered response is used by a data link layer entity to report to its peer that the data link layer is in a state such that multiple frame operation cannot be performed. No information field is contained within the DM response.

10.3 Provision of point-to-point signalling connections

Reference: ETS 300 125, Part 2, annex A.

Requirement: If a point-to-point configuration exists and the TE can only use a single TEI value for all implemented SAPIs then:

- layer 2 management procedures defined in 10.5 shall not be used, and

- the value 0 shall be used for the TEI.

Test: No direct testing is required. The first item is covered by appropriate test suite selection. The second item is covered by remaining layer 2 testing using the appropriate layer 2 test suite parameter.

10.4 Procedures for unacknowledged information transfer

10.4.1 Transmission of unacknowledged information

Reference: ETS 300 125, Part 2, subclause 5.2.2.

Requirement: Unacknowledged information shall be passed to the data link layer by the management entity using the primitive MDL-UNIT DATA-REQUEST. The message unit shall be transmitted in a UI command frame.

For broadcast operation, the TEI value in the UI command address field shall be set to 127 (binary 111 1111, the group value).

The P bit shall be set to 0.

In the case of persistent layer 1 deactivation, the data link layer is informed by the receipt of the PH-DEACTIVATE INDICATION primitive. Upon receipt of this primitive, all UI transmission queues shall be discarded.

Test: The test shall be conducted according to annex C, TTCN test case TC14001.

10.4.2 Receipt of unacknowledged information

Reference: ETS 300 125, Part 2, subclause 5.2.3.

Requirement: On receipt of a UI command frame with a SAPI and TEI which are supported by the receiver, the contents of the information field shall be passed to the management entity using the data link layer to management primitive MDL-UNIT DATA-INDICATION, respectively. Otherwise, the UI command frame shall be discarded.

Test: The test shall be conducted according to annex C, TTCN test cases TC11013, TC14001, and test preamble PR37004.

10.5 Terminal Endpoint Identifier (TEI) management procedures

10.5.1 General

Reference: ETS 300 125, Part 2, subclause 5.3.1.

TEI management is based on the following procedural means:

- TEI assignment procedures (see subclause 10.5.2);
- TEI check procedures (see subclause 10.5.3);
- TEI removal procedures (see subclause 10.5.4);
- optional TE initiated TEI identity verify procedures (see subclause 10.5.5).

A TE in the TEI-*unassigned* state shall use the TEI assignment procedures to enter the TEI-*assigned* state. Conceptually, these procedures exist in the layer management entity.

NOTE: The layer management entity on the network side is referred to as the Assignment Source Point (ASP) in this TBR.

The purpose of these procedures is to:

a) allow automatic TEI equipment to request the network to assign a TEI value that the data link layer entities within the requesting TE will use in their subsequent communications;

b) allow a network to remove a previously assigned TEI value from specific or all TEs;

c) allow a network to check:

- whether or not a TEI value is in use; or
- whether multiple-TEI assignment has occurred,

d) allow a TE the option to request that the network invoke TEI check procedures.

The initiation of TEI assignment procedures occurs on the receipt of a request for establishment or unacknowledged information transfer while in the TEI-unassigned state.

The data link layer entity transmits management entity messages in UI command frames. The SAPI value shall be 63. The TEI value shall be 127.

10.5.2 TEI assignment procedure

Reference: ETS 300 125, Part 2, subclause 5.3.2.

Requirement: If the TE is of the non-automatic TEI assignment category, the TE layer management entity shall deliver the TEI value to be used to the data link layer entity(s) via the MDL-ASSIGN-REQUEST primitive.

If the TE is of the automatic TEI assignment category, upon initiation of the TEI assignment procedure, the TE layer management entity shall transmit to its peer an ID request message.

The coding of the Action indicator (Ai) shall be Ai = Group address TEI = 127. This Ai value requests the ASP to assign any TEI value.

Timer T202 shall be started.

The TE layer management entity receiving an identity assigned message shall compare the TEI value in the Ai field to its own TEI value(s) (if any) to see if it is already allocated, if an identity request message is outstanding.

If there is a match, the management entity shall either:

- initiate TEI removal; or

- initiate the TEI identity verify procedure.

If there is no match, the TE layer management entity receiving the identity assigned message shall:

- compare the Reference number (Ri) value with any outstanding identity request message and if it matches, consider the TEI value assigned to the TE, discard the value of Ri, inform the TE data link layer entities by means of the MDL-ASSIGN-REQUEST primitive and stop timer T202;

- compare the Ri value with any outstanding identity request message and if there is no match, do nothing;

- if there is no outstanding identity request message, do nothing.

When the data link layer receives the MDL-ASSIGN-REQUEST primitive from the layer management entity, the data link layer entity shall:

- enter the TEI-assigned state; and

- proceed with data link establishment procedures if a DL-ESTABLISH-REQUEST primitive is outstanding.

Test: The test shall be conducted according to annex C, TTCN test case TC13014 and test preamble PR37004.

10.5.2.1 Expiry of timer T202

Reference: ETS 300 125, Part 2, subclause 5.3.2.1.

Requirement: If the user receives either no response or an identity denied message to its identity request message, then on expiry of timer T202, the timer shall be restarted and the identity request message shall be retransmitted with a new value of Ri.

After N202 unsuccessful attempts to acquire a TEI value, the layer management entity shall inform the data link layer entity using the MDL-ERROR-RESPONSE primitive. The data link layer entity receiving the MDL-ERROR-RESPONSE primitive shall respond with the DL-RELEASE-INDICATION primitive if a request for establishment had previously occurred, and shall discard all unserviced DL-UNIT DATA-REQUEST primitives.

Test: The test shall be conducted according to annex C, TTCN test cases TC13008 and TC13010.

10.5.3 TEI check procedure

Reference: ETS 300 125, Part 2, subclause 5.3.3.2.

Requirement: If any TE has been assigned the TEI value specified in an identity check request message received, it shall respond by transmitting one or more identity check response messages.

Test: The test shall be conducted according to annex C, TTCN test cases TC14001 and TC14002.

10.5.4 TEI removal procedure

10.5.4.1 Action taken by the data link layer entity receiving the MDL-REMOVE-REQUEST primitive

Reference: ETS 300 125, Part 2, subclause 5.3.4.1.

Requirement: A data link layer entity receiving an MDL-REMOVE-REQUEST primitive shall issue a DL-RELEASE-INDICATION primitive.

The data link layer entity shall then enter the TEI-*unassigned* state after discarding the contents of the I queue.

Test: The test shall be conducted according to annex C, TTCN test preamble PR31401.

10.5.4.2 Conditions for TEI removal

Reference: ETS 300 125, Part 2, subclause 5.3.4.2.

Requirement: At the TE, automatic TEI values shall be removed by sending an MDL-REMOVE-REQUEST primitive to the data link layer entity under the following conditions:

- on receipt from the ASP of an identity remove message;

- on receipt of an MDL-ERROR-INDICATION primitive indicating that the data link layer entity has assumed possible multiple-assignment of a TEI value, rather than requesting a TEI check procedure by the transmission of an identity verify request message.

Test: The test shall be conducted according to annex C, TTCN test cases TC14021, TC14022 and test preamble PR31401.

10.5.5 TEI identity verify procedure

10.5.5.1 General

Reference: ETS 300 125, Part 2, subclause 5.3.5.1.

Definition: The TEI identity verify procedure allows the TE layer management entity to have the capability to request that the network invoke the identity check procedure for verification of multiple-TEI assignment.

10.5.5.2 Operation of the TEI identity verify procedure

Reference: ETS 300 125, Part 2, subclause 5.3.5.2.

Requirement: The TE shall transmit an identity verify request message.

Timer T202 shall be started.

Test: The test shall be conducted according to annex C, TTCN test case TC14019.

10.5.5.3 Expiry of timer T202

Reference: ETS 300 125, Part 2, subclause 5.3.5.3.

Requirement: If the TE receives no identity check request message with an Ai equal to its TEI or an Ai equal to 127 before the expiry of timer T202, the TE layer management entity shall restart the timer and the TEI identity verify message shall be retransmitted. If no identity check request message is received from the ASP after the second TEI identity verify request message, the TEI shall be removed.

Test: The test shall be conducted according to annex C, TTCN test case TC14019.

10.5.6 Formats and codes

10.5.6.1 General

Reference: ETS 300 125, Part 2, subclause 5.3.6.1.

Definition: All messages used for TEI management procedures are carried in the information field of UI command frames with a SAPI value set to 63 (binary 11 1111) and TEI value set to 127 (binary 111 1111).

All messages have the structure shown in figure 10.6.

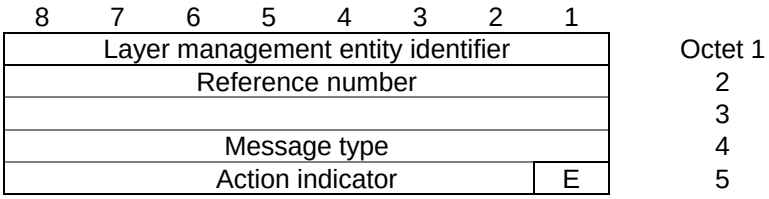


Figure 10.6: Messages used for TEI management procedures

Fields that are not used in a specific message are coded all ZEROs, and are not processed by either side.

The coding of each field for the various messages is specified in table 10.6.

Bit E is the Action indicator field extension bit (see subclause 10.5.6.5).

Table 10.6: Codes for messages concerning TEI management procedures

Message name	Layer management entity identifier	Reference number (Ri)	Message type	Action indicator (Ai)
Identity request (user to network)	0000 1111	0 - 65535	0000 0001	Ai = 127 Any TEI value acceptable
Identity assigned (network to user)	0000 1111	0 - 65535	0000 0010	Ai = 64 - 126 Assigned TEI value
Identity denied (network to user)	0000 1111	0 - 65535	0000 0011	Ai = 64 - 126 denied TEI value Ai = 127 No TEI value available
Identity check request (network to user)	0000 1111	Not used (code 0)	0000 0100	Ai = 127 Check all TEI values Ai = 0 - 126 TEI value to be checked
dentity check response (user to network)	0000 1111	0 - 65535	0000 0101	Ai = 0 - 126 TEI value in use
Identity remove (network to user)	0000 1111	Not used (code 0)	0000 0110	Ai = 127 Request for removal of all TEI values Ai = 0 - 126 TEI value to be removed
Identity verify (user to network)	0000 1111	Not used (code 0)	0000 0111	Ai = 0 - 126 TEI value to be checked

10.5.6.2 Layer management entity identifier

Reference: ETS 300 125, Part 2, subclause 5.3.6.2.

Definition: For TEI administration procedures, the layer management entity identifier octet is 0000 1111. Other values are reserved for further standardization.

10.5.6.3 Reference number (Ri)

Reference: ETS 300 125, Part 2, subclause 5.3.6.3.

Definition: Octets 2 and 3 contain Ri. When used, it can assume any value between 0 and 65535.

NOTE: Ri should be randomly generated on each occasion that a new value is required. The design of the random number generator should minimize the probability of identical reference numbers being generated by terminals which initiate their TEI assignment procedures simultaneously.

10.5.6.4 Message type

Reference: ETS 300 125, Part 2, subclause 5.3.6.4.

Definition: Octet 4 contains the message type. The purpose of the message type is to identify the function of the message being sent.

10.5.6.5 Action indicator (Ai)

Reference: ETS 300 125, Part 2, subclause 5.3.6.5.

Definition: The Ai field is extended by reserving the first transmitted bit of the Ai field octets to indicate the final octet of the Ai field.

Ai variables in the Ai field are coded as follows:

a) bit 1 is the extension bit and is coded as follows:

- 0 to indicate an extension; and
- 1 to indicate the final octet;

b) bits 2 to 8 contain the Action indicator.

The purpose of the Action indicator is to identify the concerned TEI value(s).

NOTE: The use of the extension mechanism is confined to the identity check response when all of the TEI values in use within a TE are to be reported in a single identity check response upon receipt of an identity check request with an Ai equal to 127 (see subclause 10.5.3).

10.6 Procedures for establishment and release of multiple frame operation

10.6.1 Establishment of multiple frame operation

10.6.1.1 General

Reference: ETS 300 125, Part 2, subclause 5.5.1.1.

Requirement: These procedures shall be used to establish multiple frame operation between the network and a designated user entity.

The data link layer entity shall initiate establishment of multiple frame operation on receipt of the DL-ESTABLISH-REQUEST primitive from layer 3. All frames other than unnumbered frame formats received during the establishment procedures shall be ignored.

Test: The test shall be conducted according to annex C, TTCN test case TC25013 and test preamble PR37004.

10.6.1.2 Establishment procedures

Reference: ETS 300 125, Part 2, subclause 5.5.1.2.

Requirement: A data link layer entity shall initiate a request for the multiple frame operation to be set by transmitting the SABME command. All existing exception conditions shall be cleared, the retransmission counter shall be reset, and timer T200 shall then be started. All mode setting commands shall be transmitted with the P bit set to 1.

NOTE 1: Layer 3 initiated establishment procedures imply the discard of all outstanding DL-DATA-REQUEST primitives and all I-frames in queue.

A data link layer entity receiving an SABME command, if it is able to enter the *multiple-frame-established* state, shall:

- respond with an UA response with the F bit set to the same binary value as the P bit in the received SABME command;
- set V(S), V(R) and V(A) to 0;
- enter the *multiple-frame-established* state and inform layer 3 using the DL-ESTABLISH-INDICATION primitive;
- clear all existing exception conditions; and
- clear any existing peer receiver busy condition.

Upon reception of the UA response with the F bit set to 1, the originator of the SABME command shall:

- reset timer T200;

- set V(S), V(R), and V(A) to 0; and

- enter the *multiple-frame-established* state and inform layer 3 using the DL-ESTABLISH CONFIRM primitive.

Upon reception of a DM response with the F bit set to 1, the originator of the SABME command shall indicate this to layer 3 by means of the DL-RELEASE-INDICATION primitive, and reset timer T200. It shall then enter the TEI-*assigned* state.

NOTE 2: No test is specified in this version of the TBR for the establishment of multiple frame operation by terminals which are not stable in the *TEI-assigned* state because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

NOTE 3: No test is specified in this version of the TBR for the network-initiated establishment of multiple frame operation by terminals which operate according to clause 10.3 because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

Test: The test shall be conducted according to annex C, TTCN test cases TC24004 and TC25002.

10.6.1.3 Procedure on expiry of timer T200

Reference: ETS 300 125, Part 2, subclause 5.5.1.3.

Requirement: If timer T200 expires before the UA or DM response with the F bit set to 1 is received, the data link layer entity shall:

- retransmit the SABME command as above;

- restart timer T200; and

- increment the retransmission counter.

After retransmission of the SABME command N200 times, the data link layer entity shall indicate this to layer 3 by means of the DL-RELEASE-INDICATION primitive, and enter the TEI-*assigned* state, after discarding all outstanding DL-DATA-REQUEST primitives and all I-frames in queue.

Test: The test shall be conducted according to annex C, TTCN test case TC25005.

10.6.2 Termination of multiple frame operation

Reference: ETS 300 125, Part 2, subclause 5.5.3.2.

Requirement: A data link layer entity receiving a DISC command while in the *multiple-frame-established* or *timer recovery* state shall transmit a UA response with the F bit set to the same binary value as the P bit in the received DISC command. A DL-RELEASE-INDICATION primitive shall be passed to layer 3, and the TEI-*assigned* state shall be entered.

Test: The test shall be conducted according to annex C, TTCN test case TC27012.

10.6.3 Collision of unnumbered commands and responses

10.6.3.1 Identical transmitted and received commands

Reference: ETS 300 125, Part 2, subclause 5.5.5.1.

Requirement: If the transmitted and received unnumbered commands (SABME) are the same, the data link layer entity shall send the UA response at the within a time less than the limit specified in subclause 10.10.7. The indicated state shall be entered after receiving the UA response. The data link layer entity shall notify layer 3 by means of the DL-ESTABLISH CONFIRM primitive.

Test: The test shall be conducted according to annex C, TTCN test case TC25007.

10.7 Procedures for information transfer in multiple frame operation

Reference: ETS 300 125, Part 2, subclause 5.6.

The procedures which apply to the transmission of I-frames are defined below.

NOTE: The term "transmission of an I-frame" refers to the delivery of an I-frame by the data link layer to the physical layer.

10.7.1 Transmitting I-frames

Reference: ETS 300 125, Part 2, subclause 5.6.1.

Requirement: Information received by the data link layer entity from layer 3 by means of a DL-DATA-REQUEST primitive shall be transmitted in an I-frame with the P bit set to 0. The control field parameters N(S) and N(R) shall be assigned the values V(S) and V(R), respectively. V(S) shall be incremented by 1 at the end of the transmission of the I-frame.

If timer T200 is not running at the time of transmission of an I-frame, it shall be started. If V(S) is equal to V(A) plus k (where k is the maximum number of outstanding I-frames, see subclause 10.10.5), the data link layer entity shall not transmit any new I-frames, but may retransmit an I-frame as a result of the error recovery procedures as described in subclauses 10.7.4 and 10.7.6.

Test: The test shall be conducted according to annex C, TTCN test cases TC27003 and TC27076.

10.7.2 Receiving I-frames

Reference: ETS 300 125, Part 2, subclause 5.6.2.

Requirement: Independent of a timer recovery condition, when a data link layer entity is not in an own receiver busy condition and receives a valid I-frame whose N(S) is equal to the current V(R), the data link layer entity shall:

- pass the information field of this frame to layer 3 using the DL-DATA-INDICATION primitive;

- increment by 1 its V(R), and act as indicated below.

Test: The test shall be conducted according to annex C, TTCN test cases TC27003, TC28012 and TC28406.

10.7.2.1 P bit set to 1

Reference: ETS 300 125, Part 2, subclause 5.6.2.1.

Requirement: If the P bit of the received I-frame was set to 1, the data link layer entity shall respond to its peer in one of the following ways:

- if the data link layer entity receiving the I-frame is still not in an own receiver busy condition, it shall send an RR response with the F bit set to 1;

- if the data link layer entity receiving the I-frame enters the own receiver busy condition upon receipt of the I-frame, it shall send an RNR response frame with the F bit set to 1.

The second bullet item is not testable.

Test: The test shall be conducted according to annex C, TTCN test step CS57101.

10.7.2.2 P bit set to 0

Reference: ETS 300 125, Part 2, subclause 5.6.2.2.

Requirement: If the P bit of the received I-frame was set to 0 and:

a) if the data link layer entity is still not in an own receiver busy condition:

- if no frame is available for transmission or if an I-frame is available for transmission but a peer receiver busy condition exists, the data link layer entity shall transmit an RR response with the F bit set to 0; or

- if an I-frame is available for transmission and no peer receiver busy condition exists, the data link layer entity shall transmit the I-frame with the value of N(R) set to the current value of V(R) as defined in subclause 10.7.1.

b) if, on receipt of this I-frame, the data link layer entity is now in an own receiver busy condition, it shall transmit an RNR response with the F bit set to 0.

The second bullet item is not testable.

Test: The test shall be conducted according to annex C, TTCN test case TC27003.

NOTE: No test for the second bullet of paragraph a) is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

10.7.3 Receiving acknowledgements

Reference: ETS 300 125, Part 2, subclause 5.6.3.2.

Requirement: On receipt of a valid I-frame or supervisory frame (RR, RNR, or REJ), even in the own receiver busy, or timer recovery conditions, the data link layer entity shall treat the N(R) contained in this frame as an acknowledgement for all the I-frames it has transmitted with an N(S) up to and including the received N(R)-1. V(A) shall be set to N(R). The data link layer entity shall reset the timer T200 on receipt of a valid I-frame or supervisory frame with the N(R) higher than V(A) (actually acknowledging some I-frames), or an REJ frame with an N(R) equal to V(A).

If a supervisory frame with the P bit set to 1 has been transmitted and not acknowledged, timer T200 shall not be reset.

Upon receipt of a valid I-frame, timer T200 shall not be reset if the data link layer entity is in the peer receiver busy condition.

If timer T200 has been reset by the receipt of an I, RR, or RNR frame, and if there are outstanding I-frames still unacknowledged, the data link layer entity shall restart timer T200. If timer T200 then expires, the data link layer entity shall follow the recovery procedure as defined in subclause 10.7.6 with respect to the unacknowledged I-frames.

Test: The test shall be conducted according to annex C, TTCN test cases TC27003, TC27004, TC27061, TC27074 and TC27075.

10.7.4 Receiving REJ frames

Reference: ETS 300 125, Part 2, subclause 5.6.4.

Requirement: On receipt of a valid REJ frame, the data link layer entity shall act as follows:

a) if it is not in the timer recovery condition:

- clear an existing peer receiver busy condition;
- set its V(S) and its V(A) to the value of N(R) contained in the REJ frame control field;
- stop timer T200;
- if it was an REJ command frame with the P bit set to 1, transmit an appropriate supervisory response frame with the F bit set to 1 (see subclause 10.7.5.5);
- transmit the corresponding I-frame as soon as possible, as defined in subclause 10.7.1;

b) if it is in the timer recovery condition and it was an REJ response frame with the F bit set to 1:

- clear an existing peer receiver busy condition;
- set its V(S) and its V(A) to the value of N(R) contained in the REJ frame control field;
- stop timer T200;
- enter the multiple-frame-established state; and
- transmit the corresponding I-frame as soon as possible, as defined in subclause 10.2.6.2.

c) if it is in the timer recovery condition and it was an REJ frame other than an REJ response frame with the F bit set to 1:

- clear an existing peer receiver busy condition;
- set its V(A) to the value of the N(R) contained in the REJ frame control field; and
- if it was an REJ command frame with the P bit set to 1, transmit an appropriate supervisory response frame with the F bit set to 1 (see subclause 10.7.5.5).

All outstanding unacknowledged I-frames, commencing with the I-frame identified in the received REJ frame shall be transmitted.

Test: The test shall be conducted according to annex C, TTCN test cases TC27011, TC28005, TC28407 and TC28424.

10.7.5 Receiving RNR frames

Reference: ETS 300 125, Part 2, subclause 5.6.5.

10.7.5.1 Receiving a valid RNR command or response

Requirement: After receiving a valid RNR command or response, if the data link layer entity is not engaged in a mode-setting operation, it shall set a peer receiver busy condition and then:

- if it was an RNR command with the P bit set to 1, it shall transmit an appropriate supervisory response (see 10.7.5.5) with the F bit set to 1; and
- if it was an RNR response with the F bit set to 1, an existing timer recovery condition shall be cleared.

The data link layer entity shall take note of the peer receiver busy condition and not transmit any I-frames to the peer which has indicated the busy condition.

Test: The test shall be conducted according to annex C, TTCN test case TC27404.

10.7.5.2 Expiry of timer T200 during "peer receiver busy"

Requirement: If timer T200 expires, the data link layer entity shall:

- if it is not yet in a timer recovery condition, enter the timer recovery condition and reset the retransmission count variable; or

- if it is already in a timer recovery condition, add one to its retransmission count variable.

The data link layer entity shall then:

a) if the value of the retransmission count variable is less than N200:

   - transmit an appropriate supervisory command (see 10.7.5.5) with a P bit set to 1;

   - restart timer T200; and

b) if the value of the retransmission count variable is equal to N200, initiate a re-establishment procedure as defined in subclause 10.8, and indicate this by means of the MDL-ERROR-INDICATION primitive to the connection management entity.

Test: The test shall be conducted according to annex C test cases TC27411 and TC27417.

10.7.5.3 Receiving a valid RNR command or response during "peer receiver busy"

Requirement: The data link layer entity receiving an RNR supervisory frame shall retain the peer receiver busy condition, and if the supervisory frame received was an RNR command with the P bit set to 1, transmit the appropriate supervisory response frame with the F bit set to 1.

Test: The test shall be conducted according to annex C, TTCN test cases TC27414 and TC27416.

10.7.5.4 Receiving a valid RR or REJ command or response during "peer receiver busy"

Requirement: The data link layer entity receiving and RR or REJ supervisory command frame with the P bit set to 1 shall respond, within a time less than the limit specified in subclause 10.10.7, with an appropriate supervisory response frame (see 10.7.5.5) with the F bit set to 1 and clear the peer receiver busy condition.

Upon receipt of an RR or REJ response with the F bit set to 1, the data link layer entity shall reset timer T200, and clear the peer receiver busy condition.

Test: The test shall be conducted according to annex C, TTCN test cases TC27404, TC27405 and TC27412.

Requirement: The data link layer entity receiving an RR or REJ supervisory frame with the P/F bit set to 0 shall clear the peer receiver busy condition.

After clearing the peer receiver busy condition the data link layer entity may transmit new I-frames or retransmit I-frames as defined in subclause 10.7.1 or subclause 10.7.4 respectively.

Test: The test shall be conducted according to annex C, TTCN test cases TC27407 and TC27413.

10.7.5.5 Appropriate supervisory response frame

Requirement: If the data link layer entity is not in an own receiver busy condition and is in a reject exception condition (that is, an N(S) sequence error has been received, and an REJ frame has been transmitted, but the requested I-frame has not been received), the appropriate supervisory frame is the RR frame.

If the data link layer entity is not in an own receiver busy condition but is in an N(S) sequence error exception condition (that is, an N(S) sequence error has been received but an REJ frame has not been transmitted), the appropriate supervisory frame is the REJ frame.

If the data link layer entity is in its own receiver busy condition, the appropriate supervisory frame is the RNR frame.

Otherwise, the appropriate supervisory frame is the RR frame.

10.7.6 Waiting acknowledgement

Reference: ETS 300 125, Part 2, subclause 5.6.7.

Requirement: The data link layer entity shall maintain an internal retransmission count variable.

If timer T200 expires, the data link layer entity shall:

- if it is not yet in the timer recovery condition, enter the timer recovery condition and reset the retransmission count variable; or

- if it is already in the timer recovery condition, add one to its retransmission count variable.

The data link layer entity shall then:

a) if the value of the retransmission count variable is less than N200:

   - restart timer T200; and either

   - transmit an appropriate supervisory command (see subclause 10.7.5.5) with the P bit set to 1; or

   - retransmit the last transmitted I-frame (V(S)-1) with the P bit set to 1; or

b) if the value of the retransmission count variable is equal to N200, initiate a re-establishment procedure as defined in subclause 10.8.

The timer recovery condition is cleared when the data link layer entity receives a valid supervisory frame response with the F bit set to 1. If the received supervisory frame N(R) is within the range from its current V(A) to its current V(S) inclusive, it shall set its V(S) to the value of the received N(R). Timer T200 shall be reset if the received supervisory frame response is an RR or REJ response, and then the data link layer entity shall resume with I-frame transmission or retransmission, as appropriate. Timer T200 shall be reset and restarted if the received supervisory response is an RNR response, to proceed with the enquiry process according to subclause 10.7.5.

Test: The test shall be conducted according to annex C, TTCN test cases TC27015, TC27019, TC27411, TC27417 and TC28005.

10.8 Re-establishment of multiple frame operation

Reference: ETS 300 125, Part 2, subclause 5.7.2.

Requirement: In all re-establishment situations, the data link layer entity shall follow the procedures defined in subclause 10.6.1. All locally generated conditions for re-establishment shall cause the transmission of the SABME.

In the case of data link layer and peer initiated re-establishment, the data link layer entity shall also:

- if V(S) > V(A) prior to re-establishment discard all I queues.

Test: The test shall be conducted according to annex C, TTCN test cases TC27022 and TC28408.

10.9 Exception condition reporting and recovery

10.9.1 N(S) sequence error

Reference: ETS 300 125, Part 2, subclause 5.8.1.

Requirement: An N(S) sequence error exception condition occurs in the receiver when a valid frame is received which contains an N(S) value which is not equal to the V(R) at the receiver. The information field of all I-frames whose N(S) does not equal the V(R) shall be discarded.

The receiver shall not acknowledge (nor increment its V(R)) the I-frame causing the sequence error, nor any I-frames which may follow, until an I-frame with the correct N(S) is received.

A data link layer entity which receives one or more I-frames having sequence errors but otherwise error-free, or subsequent supervisory frames (RR, RNR, and REJ), shall use the control field information contained in the N(R) field and the P or F bit to perform data link control functions; for example, to receive acknowledgement of previously transmitted I-frames and to cause the data link layer entity to respond if the P bit is set to 1. Therefore, the retransmitted I-frame may contain an N(R) field value and P bit that are updated from, and therefore different from, the ones contained in the originally transmitted I-frame.

Following the detection of an N(S) sequence error, the receiving data link layer entity shall send a REJ frame to indicate an exception condition recovery (retransmission).

Test: The test shall be conducted according to annex C, TTCN test cases TC27027 and TC27028.

10.9.2 Invalid frame condition

Reference: ETS 300 125, Part 2, subclause 5.8.4.

Requirement: Any frame received which is invalid or incompatible (as defined in subclause 10.1.9) shall be discarded, and no action shall be taken as a result of that frame.

Test: The test shall be conducted according to annex C, TTCN test cases TC27058 and TC24020.

10.9.3 Frame rejection condition

Reference: ETS 300 125, Part 2, subclause 5.8.5.

Requirement: A frame rejection condition results from the receipt of an invalid N(R).

Upon occurrence of a frame rejection condition whilst in the multiple frame operation, the data link layer entity shall initiate re-establishment (see subclause 10.8).

Test: The test shall be conducted according to annex C, TTCN test cases TC27040, TC27043 and TC27046.

10.9.4 Multiple-assignment of TEI value

Reference: ETS 300 125, Part 2, subclause 5.8.8.

Requirement: A data link layer entity shall assume multiple-assignment of a TEI value and initiate recovery as specified below by:

a) the receipt of a UA response frame whilst in the *multiple-frame-established* state;

b) the receipt of a UA response frame whilst in the *timer recovery* state;

c) the receipt of a UA response frame whilst in the TEI-*assigned* state.

A data link layer entity, after assuming multiple-assignment of a TEI value shall inform the connection management entity by means of the MDL-ERROR-INDICATION primitive.

NOTE: No test is specified in this version of the TBR for the establishment of multiple frame operation by terminals which are not stable in the *TEI-assigned* state because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

Test: The test shall be conducted according to annex C, TTCN test cases TC24007, TC27031 and TC28019.

10.10 List of system parameters

Reference: ETS 300 125, Part 2, subclause 5.9.

Definition: The system parameters listed below are associated with each individual SAP.

10.10.1 Timer T200

Reference: ETS 300 125, Part 2, subclause 5.9.1.

Definition: The value for timer T200 at the end of which transmission of a frame may be initiated according to the procedures described in subclause 10.6 is in the range 0,95 s to 3 s.

NOTE: A value of 1 s is recommended.

10.10.2 Maximum number of retransmissions (N200)

Reference: ETS 300 125, Part 2, subclause 5.9.2.

Definition: The maximum number of retransmissions of a frame (N200) is a system parameter. The value of N200 is 3.

NOTE: This means that the total number of transmissions of a frame is 4, including the original transmission.

10.10.3 Maximum number of octets in an information field (N201)

Reference: ETS 300 125, Part 2, subclause 5.9.3.

Definition: The maximum number of octets in an information field (N201) is a system parameter:

- for a SAP supporting signalling, the value is 260 octets.

10.10.4 Maximum number of transmission of the TEI identity request message (N202)

Reference: ETS 300 125, Part 2, subclause 5.9.4.

Definition: The maximum number of transmission of a TEI identity request message (when the user requests a TEI) is a system parameter. The value of N202 is 3.

10.10.5 Maximum number of outstanding I-frames (k)

Reference: ETS 300 125, Part 2, subclause 5.9.5.

Definition: The maximum number (k) of sequentially numbered I-frames that may be outstanding (that is, unacknowledged) at any given time is a system parameter which shall not exceed 127, for extended (modulo 128) operation:

- for a SAP supporting primary rate (64 kbit/s) signalling, the value is 7.

10.10.6 Timer T202

Reference: ETS 300 125, Part 2, subclause 5.9.7.

Definition: The time between the transmission of TEI identity request or TEI identity verify messages is a system parameter (T202) which is in the range 1,9 s to 5 s. A value of 2 s is recommended.

10.10.7 Layer 2 response time

Reference: ETS 300 153, subclause 9.4.

Requirement: The maximum time between receipt of an incoming frame, and the generation of a response, where this is required immediately, shall not exceed:

- 500 ms for TEs operating as described in subclause 10.3;

- 200 ms for TEs not operating as described in subclause 10.3.

  NOTE: This limit applies only under test conditions as described in annex C. In conditions of actual use, the layer 2 response time may be greater, because of queuing of outgoing frames, and contention for use of the D-channel.

Test: The requirement is tested implicitly by all the test cases in the layer 2 test suite.

11 Layer 3 requirements

The following clauses contain elements of procedure that are expressed in the form of definitions. These elements of procedure do not form requirements in their own right and therefore do not have associated conformance tests. However these elements are used as components for procedures that are requirements. To ensure that the requirements are satisfied, it is necessary for a TE to implement these elements of procedure in the manner specified within the associated definition. The tests for requirements will implicitly test the elements of procedure.

The requirements of the various subclauses of clause 11 (excluding 11.4.6) apply only to messages that carry the protocol discriminator coded as "Q.931 (I.451) user-network call control message" and that pass the requirements defined in subclause 11.4.6.

11.1 Overview of call control

11.1.1 Call states at the user side of the interface

11.1.1.1 Null state (U0)

Reference: ETS 300 102-1, subclause 2.1.1.1.

Definition: No call exists.

11.1.1.2 Call initiated (U1)

Reference: ETS 300 102-1, subclause 2.1.1.2.

Definition: This state exists for an outgoing call, when the user requests call establishment from the network.

11.1.1.3 Overlap sending (U2)

Reference: ETS 300 102-1, subclause 2.1.1.3.

Definition: This state exists for an outgoing call when the user has received acknowledgement of the call establishment request which permits the user to send additional call information to the network in overlap mode.

11.1.1.4 Outgoing call proceeding (U3)

Reference: ETS 300 102-1, subclause 2.1.1.4.

Definition: This state exists for an outgoing call when the user has received acknowledgement that the network has received all call information necessary to effect call establishment.

11.1.1.5 Call delivered (U4)

Reference: ETS 300 102-1, subclause 2.1.1.5.

Definition: This state exists for an outgoing call, when the calling user has received an indication that remote user alerting has been initiated.

11.1.1.6 Call present (U6)

Reference: ETS 300 102-1, subclause 2.1.1.6.

Definition: This state exists for an incoming call when the user has received a call establishment request but has not yet responded.

11.1.1.7 Call received (U7)

Reference: ETS 300 102-1, subclause 2.1.1.7.

Definition: This state exists for an incoming call when the user has indicated alerting but has not yet answered.

11.1.1.8 Connect request (U8)

Reference: ETS 300 102-1, subclause 2.1.1.8.

Definition: This state exists for an incoming call when the user has answered the call and is waiting to be awarded the call.

11.1.1.9 Incoming call proceeding (U9)

Reference: ETS 300 102-1, subclause 2.1.1.9.

Definition: This state exists for an incoming call when the user has sent acknowledgement that the user has received all call information necessary to effect call establishment.

11.1.1.10 Active (U10)

Reference: ETS 300 102-1, subclause 2.1.1.10.

Definition: This state exists for an incoming call when the user has received an acknowledgement from the network that the user has been awarded the call. This state exists for an outgoing call when the user has received an indication that the remote user has answered the call.

11.1.1.11 Disconnect request (U11)

Reference: ETS 300 102-1, subclause 2.1.1.11.

Definition: This state exists when the user has requested the network to clear the end-to-end connection (if any) and is waiting for a response.

11.1.1.12 Disconnect indication (U12)

Reference: ETS 300 102-1, subclause 2.1.1.12.

Definition: This state exists when the user has received an invitation to disconnect because the network has disconnected the end-to-end connection (if any).

11.1.1.13 Suspend request (U15)

This is not applicable to primary rate access.

11.1.1.14 Resume request (U17)

This is not applicable to primary rate access.

11.1.1.15 Release request (U19)

Reference: ETS 300 102-1, subclause 2.1.1.15.

Definition: This state exists when the user has requested the network to release and is waiting for a response.

11.1.1.16 Overlap receiving (U25)

Reference: ETS 300 102-1, subclause 2.1.1.16.

Definition: This state exists for an incoming call when the user has acknowledged the call establishment request from the network and is prepared to receive additional call information (if any) in overlap mode.

11.1.2 Network call states

11.1.2.1 Null state (N0)

Reference: ETS 300 102-1, subclause 2.1.2.1.

Definition: No call exists.

11.1.2.2 Call initiated (N1)

Reference: ETS 300 102-1, subclause 2.1.2.2.

Definition: This state exists for an outgoing call when the network has received a call establishment request but has not yet responded.

11.1.2.3 Overlap sending (N2)

Reference: ETS 300 102-1, subclause 2.1.2.3.

Definition: This state exists for an outgoing call when the network has acknowledged the call establishment request and is prepared to receive additional call information (if any) in overlap mode.

11.1.2.4 Outgoing call proceeding (N3)

Reference: ETS 300 102-1, subclause 2.1.2.4.

Definition: This state exists for an outgoing call when the network has sent acknowledgement that the network has received all call information necessary to effect call establishment.

11.1.2.5 Call delivered (N4)

Reference: ETS 300 102-1, subclause 2.1.2.5.

Definition: This state exists for an outgoing call when the network has indicated that remote user alerting has been initiated.

11.1.2.6 Call present (N6)

Reference: ETS 300 102-1, subclause 2.1.2.6.

Definition: This state exists for an incoming call when the network has sent a call establishment request but has not yet received a satisfactory response.

11.1.2.7 Call received (N7)

Reference: ETS 300 102-1, subclause 2.1.2.7.

Definition: This state exists for an incoming call when the network has received an indication that the user is alerting but has not yet received an answer.

11.1.2.8 Connect request (N8)

Reference: ETS 300 102-1, subclause 2.1.2.8.

Definition: This state exists for an incoming call when the network has received an answer but the network has not yet awarded the call.

11.1.2.9 Incoming call proceeding (N9)

Reference: ETS 300 102-1, subclause 2.1.2.9.

Definition: This state exists for an incoming call when the network has received acknowledgement that the user has received all call information necessary to effect call establishment.

11.1.2.10 Active (N10)

Reference: ETS 300 102-1, subclause 2.1.2.10.

Definition: This state exists for an incoming call when the network has awarded the call to the called user. This state exists for an outgoing call when the network has indicated that the remote user has answered the call.

11.1.2.11 Disconnect request (N11)

Reference: ETS 300 102-1, subclause 2.1.2.11.

Definition: This state exists when the network has received a request from the user to clear the end-to-end connection (if any).

11.1.2.12 Disconnect indication (N12)

Reference: ETS 300 102-1, subclause 2.1.2.12.

Definition: This state exists when the network has disconnected the end-to-end connection (if any) and has sent an invitation to disconnect the user-network connection.

11.1.2.13 Suspend request (N15)

This is not applicable to primary rate access.

11.1.2.14 Resume request (N17)

This is not applicable to primary rate access.

11.1.2.15 Release request (N19)

Reference: ETS 300 102-1, subclause 2.1.2.15.

Definition: This state exists when the network has requested the user to release and is waiting for a response.

11.1.2.16 Call abort (N22)

This is not applicable to primary rate access.

11.1.2.17 Overlap receiving (N25)

Reference: ETS 300 102-1, subclause 2.1.2.17.

Definition: This state exists for an incoming call when the network has received acknowledgement of the call establishment request which permits the network to send additional call information (if any) in the overlap mode.

11.1.3 States associated with the global call reference

11.1.3.1 Call states at the user side of the interface

11.1.3.1.1 Null (Rest 0)

Reference: ETS 300 102-1, subclause 2.4.1.1.

Definition: No transaction exists.

11.1.3.1.2 Restart (Rest 2)

Reference: ETS 300 102-1, subclause 2.4.1.3.

Definition: This state exists when a request for a restart has been received from the network and responses have not yet been received from all locally active Call references.

11.1.3.2 Call states at the network side of the interface

11.1.3.2.1 Null (Rest 0)

Reference: ETS 300 102-1, subclause 2.4.2.1.

No transaction exists.

11.1.3.2.2 Restart request (Rest 1)

Reference: ETS 300 102-1, subclause 2.4.2.2.

This state exists for a restart transaction when the network has sent a restart but has not yet received an acknowledgement response from the user.

11.2 Message functional definitions and content

Reference: ETS 300 102-1, clause 3.

This paragraph provides an overview of the layer 3 message structure. Each definition includes:

a) a brief description of the message direction and use, including whether the message has:

   1) local significance, i.e. relevant only in the originating or terminating access;
   2) access significance, i.e. relevant in the originating and terminating access, but not in the network;
   3) dual significance, i.e. relevant in either the originating or the terminating access and in the network; or,
   4) global significance, i.e. relevant in the originating and terminating access and in the network.

b) a table listing the codeset 0 information elements in the order of their appearance in the message (same relative order for all message types). For each information element the table indicates:

   1) the direction which it may be sent; i.e. user-to-network ("u $\rightarrow$ n"), network-to-user ("n $\rightarrow$ u"), or both;

2) whether inclusion is mandatory ("M") or optional ("O") with a reference to notes explaining the circumstances under which the information element is included;
3) the length of the information element (or permissible range of lengths), in octets, where "*" denotes an undefined maximum length, which may be network or service dependent.

NOTE 1: All messages may contain information elements from codesets 5, 6 and 7 and corresponding locking and non-locking shift information elements which comply with the coding rules specified in subclauses 11.3.5.2 to 11.3.5.4. None of these information elements, however, are listed in any of the tables in subclause 11.2.

c) further explanatory notes, as necessary.

NOTE 2: Table 11.1 summarizes the messages for circuit mode connection control that are part of the requirements of this TBR.

NOTE 3: It is strongly recommended that manufacturers use other messages or information elements only in accordance with definitions and procedures in national, European and international standards. Terminals that use messages or information elements that result in violations of the essential requirements are liable to be disconnected or required to be withdrawn from the market. The use of certain other messages or information elements may be the subject of specific requirements in other TBRs or national approval requirements.

Table 11.1: Messages for circuit mode connection control

Message type	Reference
Call establishment messages:	
ALERTING	11.2.1
CALL PROCEEDING	11.2.2
CONNECT	11.2.3
CONNECT ACKNOWLEDGE	11.2.4
PROGRESS	11.2.8
SETUP	11.2.14
SETUP ACKNOWLEDGE	11.2.15
Call clearing messages:	
DISCONNECT	11.2.5
RELEASE	11.2.9
RELEASE COMPLETE	11.2.10
Miscellaneous messages	
INFORMATION	11.2.6
NOTIFY	11.2.7
STATUS	11.2.16
STATUS ENQUIRY	11.2.17

11.2.1 Alerting

Reference: ETS 300 102-1, subclause 3.1.1.

Definition: This message is sent by the called user to the network and by the network to the calling user to indicate that called user alerting has been initiated. See table 11.2.

Table 11.2: ALERTING message content

Message type: ALERTING
Significance: global
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Bearer capability	both	O	4 - 13
Channel identification	both	O (note 1)	2 - *
Progress indicator	both	O (note 2)	2 - 4
High layer compatibility	both	O	2 - 4

NOTE 1: Mandatory if this message is the first message in response to SETUP, unless the user accepts the B-channel indicated in the SETUP message.

NOTE 2: Included in the event of interworking. Included in the network-to-user direction in connection with the provision of in-band information/patterns. Included in the user-to-network direction in connection with the provision of in-band information/patterns. If the Bearer capability information element is included, then the Progress indicator information element shall be coded #5 "interworking has occurred and resulted in a telecommunication service change".

11.2.2 Call proceeding

Reference: ETS 300 102-1, subclause 3.1.2.

Definition: This message is sent by the called user to the network or by the network to the calling user to indicate that the requested call establishment has been initiated and no more call establishment information will be accepted. See table 11.3.

Table 11.3: Call proceeding message content

Message type: CALL PROCEEDING
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Bearer capability	both	O	4 - 13
Channel identification	both	O (note 1)	2 - *
Progress indicator	both	O (note 2)	2 - 4
High layer compatibility	both	O	2 - 4

NOTE 1: Mandatory in the network-to-user direction if this message is the first message in response to SETUP. Mandatory in the user-to-network direction if this message is the first message in response to SETUP, unless the user accepts the B-channel indicated in the SETUP message.

NOTE 2: Included in the event of interworking. Included in the network-to-user direction in connection with the provision of in-band information/patterns. Included in the user-to-network direction in connection with the provision of in-band information/patterns. If the Bearer capability information element is included, then the Progress indicator information element shall be coded #5 "interworking has occurred and resulted in a telecommunication service change".

11.2.3 Connect

Reference: ETS 300 102-1, subclause 3.1.4.

Definition: This message is sent by the called user to the network and by the network to the calling user to indicate call acceptance by the called user. See table 11.4.

Table 11.4: Connect message content

Message type: CONNECT
Significance: global
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Bearer capability	both	O	4 - 13
Channel identification	both	O (note 1)	2 - *
Progress indicator	both	O (note 2)	2 - 4
Low layer compatibility	both	O (note 3)	2 - 16

NOTE 1: Mandatory if this message is the first message in response to SETUP, unless the user accepts the B-channel indicated in the SETUP message.

NOTE 2: Included in the event of interworking or in connection with the provision of in-band information/patterns. If the Bearer capability information element is included, then the Progress indicator information element shall be coded #5 "interworking has occurred and resulted in a telecommunication service change".

NOTE 3: Included in the user-to-network direction when the answering user wants to return Low layer compatibility information to the calling user. Included in the network-to-user direction if the user awarded the call included a Low layer compatibility information element in the CONNECT message. Optionally included for Low layer compatibility negotiation, but some networks may not transport this information element to the calling user.

11.2.4 Connect acknowledge

Reference: ETS 300 102-1, subclause 3.1.5.

Definition: This message is sent by the network to the called user to indicate the user has been awarded the call. It may also be sent by the calling user to the network to allow symmetrical call control procedures. See table 11.5.

Table 11.5: Connect acknowledge message content

Message type: CONNECT ACKNOWLEDGE
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Channel identification	n → u	O (note)	2 - *
NOTE: Available for use by supplementary services (e.g. call waiting).			

11.2.5 Disconnect

Reference: ETS 300 102-1, subclause 3.1.6.

Definition: This message is sent by the user to request the network to clear an end-to-end connection or is sent by the network to indicate that the end-to-end connection is cleared. See table 11.6.

Table 11.6: Disconnect message content

Message type: DISCONNECT
Significance: global
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Cause	both	M	4 - 32
Progress indicator	note	O (note)	2 - 4
NOTE: Included by the network if in-band tones are provided. However, the user may include the Progress indicator and provide in-band tones. But in this case the network ignores this information element and does not convey the in-band tones.			

11.2.6 Information

Reference: ETS 300 102-1, subclause 3.1.8.

Definition: This message is sent by the user or the network to provide additional information. It may be used to provide information for call establishment (e.g. overlap sending and receiving) or miscellaneous call-related information. See table 11.7.

Table 11.7: Information message content

Message type: INFORMATION
Significance: local (note 1)
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Sending complete	both	O (note 2)	1
Cause	n → u	O (note 1)	2 - 32
Called party number	both	O (note 3)	2 - 23

NOTE 1: This message has local significance, but may carry information of global significance.
NOTE 2: Included if the user optionally indicates completion of overlap sending to the network, or if the network optionally indicates completion of overlap receiving to the user.
NOTE 3: The Called party number information element is included by the user to convey Called party number information to the network during overlap sending. The Called party number information element is included by the network to transfer Called party number information to the user during overlap receiving.

11.2.7 Notify

Reference: ETS 300 102-1, subclause 3.1.9.

Definition: This message is sent by the user or the network to indicate information pertaining to a call, such as user suspended. See table 11.8.

Table 11.8: Notify message content

Message type: NOTIFY
Significance: access
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Notification indicator	both	M	3

11.2.8 Progress

Reference: ETS 300 102-1, subclause 3.1.10.

Definition: This message is sent by the user or the network to indicate the progress of a call in the event of interworking or in relation with the provision of in-band information/patterns. See table 11.9.

Table 11.9: Progress message content

Message type: PROGRESS
Significance: global
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Bearer capability	both	O	4 - 13
Cause	both	O (note 1)	2 - 32
Progress indicator	both	M	4
High layer compatibility	both	O	2 - 4
NOTE 1: Included by the user or the network to provide additional information concerning the provision of in-band information/patterns. NOTE 2: If the Bearer capability information element is included, then the Progress indicator information element shall be coded #5 "interworking has occurred and resulted in a telecommunication service change".			

11.2.9 Release

Reference: ETS 300 102-1, subclause 3.1.11.

Definition: This message is sent by the user or the network to indicate that the equipment sending the message has disconnected the channel (if any) and intends to release the channel and the Call reference, and that the receiving equipment should release the channel and prepare to release the Call reference after sending RELEASE COMPLETE message. See table 11.10.

Table 11.10: Release message content

Message type: RELEASE
Significance: local (see note 1)
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Cause	both	O (note 2)	2 - 32
NOTE 1: This message has a local significance; however, it may carry information of global significance when used as the first call clearing message.			
NOTE 2: Mandatory in the first call clearing message, including when the RELEASE message is sent as a result of an error handling condition.			

11.2.10 Release complete

Reference: ETS 300 102-1, subclause 3.1.12.

Definition: This message is sent by the user or the network to indicate that the equipment sending the message has released the channel (if any) and Call reference. See table 11.11.

Table 11.11: Release complete message content

Message type: RELEASE COMPLETE
Significance: local (note 1)
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Cause	both	O (note 2)	2 - 32
NOTE 1: This message has a local significance; however, it may carry information of global significance when used as the first call clearing message.			
NOTE 2: Mandatory in the first call clearing message, including when the RELEASE COMPLETE message is sent as a result of an error handling condition.			

11.2.11 Resume

This message is not applicable to primary rate access.

Table 11.12: Resume message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.12 Resume acknowledge

This message is not applicable to primary rate access.

Table 11.13: Resume acknowledge message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.13 Resume reject

This message is not applicable to primary rate access.

Table 11.14: Resume reject message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.14 Setup

Reference: ETS 300 102-1, subclause 3.1.16.

Definition: This message is sent by the calling user to the network and by the network to the called user to initiate call establishment. See table 11.15.

Table 11.15: Setup message content

Message type: SETUP
Significance: global
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Sending complete	both	O (note 1)	1
Bearer capability	both	M (note 8)	4 - 13
Channel identification	both	O (note 2)	2 - *
Progress indicator	both	O (note 3)	2 - 4
Called party number	both	O (note 4)	2 - 23
Called party subaddress	both	O (note 5)	2 - 23
Low layer compatibility	both	O (note 6)	2 - 16
High layer compatibility	both	O (note 7, 8)	2 - 4

NOTE 1: Included if the user or the network optionally indicates that all information necessary for call establishment is included in the SETUP message.

NOTE 2: Mandatory in the network-to-user direction. Included in the user-to-network direction when the user wants to indicate a channel. If not included, its absence is interpreted as "any channel acceptable".

NOTE 3: Included in the event of interworking or in connection with the provision of in-band information/patterns.

NOTE 4: The Called party number information element is included by the user to convey Called party number information to the network. The Called party number information element is included by the network when Called party number information is conveyed to the user.

NOTE 5: Included in the user-to-network direction when the calling user wants to indicate the Called party subaddress. Included in the network-to-user direction if the calling user included a Called party subaddress information element in the SETUP message.

NOTE 6: Included in the user-to-network direction when the calling user wants to pass Low layer compatibility information to the called user. Included in the network-to-user direction if the calling user included a Low layer compatibility information element in the SETUP message.

NOTE 7: Included in the user-to-network direction when the calling user wants to pass High layer compatibility information to the called user. Included in the network-to-user direction if the calling user included a High layer compatibility information element in the SETUP message.

NOTE 8: The Bearer capability information element and the High layer compatibility information element may be repeated in the SETUP message, not preceded by a Repeat indicator information element. If the bearer capability information element is repeated in the SETUP message, the Low layer compatibility information element shall not be included.

11.2.15 Setup acknowledge

Reference: ETS 300 102-1, subclause 3.1.17.

Definition: This message is sent by the network to the calling user or by the called user to the network to indicate that call establishment has been initiated, but additional information may be required. See table 11.16.

Table 11.16: Setup acknowledge message content

Message type: SETUP ACKNOWLEDGE
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Channel identification	both	O (note 1)	2 - *
Progress indicator	both	O (note 2)	2 - 4
NOTE 1: Mandatory in all cases, except when the user accepts the specific B-channel indicated in the SETUP message.			
NOTE 2: Included in the event of interworking or in connection with the provision of in-band information/patterns.			

11.2.16 Status

Reference: ETS 300 102-1, subclause 3.1.18.

Definition: This message is sent by the user or the network in response to a STATUS ENQUIRY message or at any time during a call to report certain error conditions. See table 11.17.

Table 11.17: Status message content

Message type: STATUS
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1
Cause	both	M	4 - 32
Call state	both	M	3

11.2.17 Status enquiry

Reference: ETS 300 102-1, subclause 3.1.19.

Definition: This message is sent by the user or the network at any time to solicit a STATUS message from the peer layer 3 entity. See table 11.18.

Table 11.18: Status enquiry message content

Message type: STATUS ENQUIRY
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M	3
Message type	both	M	1

11.2.18 Suspend

This message is not applicable to primary rate access.

Table 11.19: Suspend message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.19 Suspend acknowledge

This message is not applicable to primary rate access.

Table 11.20: Suspend acknowledge message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.20 Suspend reject

This message is not applicable to primary rate access.

Table 11.21: Suspend reject message content

Information Element	Direction	Type	Length
This message is not applicable to primary rate access.			

11.2.21 Messages used with the global call reference

Reference: ETS 300 102-1, subclause 3.4.

Table 11.22 summarizes the messages which may use the global call reference defined in subclause 11.3.3.

Table 11.22: Messages with the global call reference

Messages	Reference
RESTART	11.2.21.1
RESTART ACKNOWLEDGE	11.2.21.2

11.2.21.1 Restart

Reference: ETS 300 102-1, subclause 3.4.1.

Definition: This message is sent by the user or the network to request the recipient to restart (i.e. return to an idle condition) the indicated channel(s) or interface. See table 11.23.

Table 11.23: Restart message content

Message type: RESTART
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M (note 1)	3
Message type	both	M	1
Channel identification	both	O (note 2)	2 - *
Restart indicator	both	M	3
NOTE 1: This message is sent with the global call reference defined in subclause 11.3.3.			
NOTE 2: Included when necessary to indicate the particular channel(s) to be restarted.			

11.2.21.2 Restart acknowledge

Reference: ETS 300 102-1, subclause 3.4.2.

Definition: This message is sent to acknowledge the receipt of a RESTART message and to indicate that the requested restart is complete. See table 11.24.

Table 11.24: Restart acknowledge message content

Message type: RESTART ACKNOWLEDGE
Significance: local
Direction: both

Information Element	Direction	Type	Length
Protocol discriminator	both	M	1
Call reference	both	M (note 1)	3
Message type	both	M	1
Channel identification	both	O (note 2)	2 - *
Restart indicator	both	M	3
NOTE 1: This message is sent with the global call reference defined in subclause 11.3.3.			
NOTE 2: Included when necessary to indicate the particular channel(s) which has been restarted.			

11.3 General message format and information elements coding

The figures and text in this subclause describe message contents. Within each octet, the bit designated "bit 1" is transmitted first, followed by bits 2, 3, 4, etc. Similarly, the octet shown at the top of each figure is sent first.

11.3.1 Overview

Reference: ETS 300 102-1, subclause 4.1.

Definition: Within this protocol, every message consists of the following parts:

a) Protocol discriminator;
b) Call reference;
c) Message type;
d) other information elements, as required.

Information elements a), b) and c) are common to all the messages and are always present, while information elements d) are specific to each Message type.

This organization is illustrated in the example shown in figure 11.1.

8	7	6	5	4	3	2	1	Octet
Protocol discriminator								1
0	0	0	0	Length of Call reference value (in octets)				2
Call reference value								3
0	Message type							etc.
Other information elements as required								

Figure 11.1: General message organization example

A particular message may contain more information than a particular (user or network) equipment needs or can understand. All equipment should be able to ignore any extra information, present in a message, which is not required for the proper operation of that equipment. For example, a user may ignore the calling party number if that number is of no interest to the user when a SETUP message is received.

Unless specified otherwise, a particular information element may be present only once in a given message.

The term "default" implies that the value defined should be used in the absence of any assignment, or the negotiation of alternative values.

When a field, such as the Call reference value, extends over more than one octet, the order of bit values progressively decreases as the octet number increases. The least significant bit of the field is represented by the lowest numbered bit of the highest numbered octet of the field.

11.3.2 Protocol discriminator

Reference: ETS 300 102-1, subclause 4.2.

Definition: The purpose of the Protocol discriminator is to distinguish messages for user-network call control from other messages. It also distinguishes messages of this TBR from those OSI network layer protocol units which are coded to other CCITT Recommendations and other standards.

The Protocol discriminator is the first part of every message. The Protocol discriminator is coded according to table 11.25.

8	7	6	5	4	3	2	1	Octet
Q.931(I.451) user-network call control messages								
0	0	0	0	1	0	0	0	1
Protocol discriminator								

Figure 11.2: Protocol discriminator

Table 11.25: Protocol discriminator

8	7	6	5	4	3	2	1	
0	0	0	0	1	0	0	0	} Q.931 user-network call control messages
All other values are reserved.								
NOTE: These values are reserved to discriminate these Protocol discriminators from the first octet of an X.25 packet including general format identifier.								

11.3.3 Call reference

Reference: ETS 300 102-1, subclause 4.3.

Definition: The purpose of the Call reference is to identify the call or facility registration/cancellation request at the local user-network interface to which the particular message applies. The Call reference does not have end-to-end significance across ISDNs.

The Call reference is the second part of every message. The Call reference is coded as shown in figure 11.3. The length of the Call reference value is indicated in octet 1, bits 1 to 4.

The length of the Call reference value for primary rate access is two octets.

The Call reference information element includes the Call reference value and the Call reference flag.

Call reference values are assigned by the originating side of the interface for a call. These values are unique to the originating side only within a particular D-channel layer two logical link connection. The Call reference value is assigned at the beginning of a call and remains fixed for the lifetime of the call. After a call ends, the associated Call reference value may be reassigned to a later call. Two identical Call reference values on the same D-channel layer two logical link connection may be used when each value pertains to a call originated at opposite ends of the link.

The Call reference flag can take the values "0" or "1". The Call reference flag is used to identify which end of the layer two logical link originated a Call reference. The origination side always sets the Call reference flag to "0". The destination side always sets the Call reference flag to a "1".

Hence the Call reference flag identifies who allocated the Call reference value and the only purpose of the Call reference flag is to resolve simultaneous attempts to allocate the same Call reference value. The Call reference flag also applies to functions which use the global Call reference (e.g. restart procedures).

NOTE 1: The Call reference information element containing a dummy call reference is one octet long and is coded "0000 0000".

The dummy call reference is not used in association with the basic call.

NOTE 2: The numerical value of the global call reference is zero. The equipment receiving a message containing the global call reference should interpret the message as pertaining to all call references associated with the appropriate data link connection identifier. See figure 11.4.

For the use of the global call reference value see the restart procedure described in subclause 11.4.8.

8	7	6	5	4	3	2	1	Octet
0	0	0	0	Length of the Call reference value (in octets)				1
Flag	Call reference value							2
								etc.

Call reference flag (octet 2)
bit 8
0 the message is sent **from** the side that originates the Call reference.
1 the message is sent **to** the side that originates the Call reference.

Figure 11.3: Call reference information element

8	7	6	5	4	3	2	1	Octet
0	0	0	0	Length of call reference value				1
0/1 Flag	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	3

Figure 11.4: Encoding for global call reference

11.3.4 Message type

Reference: ETS 300 102-1, subclause 4.4.

Definition: The purpose of the Message type is to identify the function of the message being sent.

The Message type is the third part of every message. The Message type is coded as shown in figure 11.5 and table 11.26.

Bit 8 is reserved for possible future use as an extension bit.

8	7	6	5	4	3	2	1	Octet
0	Message type							1

Figure 11.5: Message type

Table 11.26: Message types

8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Escape to nationally specific Message type; see note.
0	0	0	-	-	-	-	-	**Call establishment messages:**
			0	0	0	0	1	ALERTING
			0	0	0	1	0	CALL PROCEEDING
			0	0	1	1	1	CONNECT
			0	1	1	1	1	CONNECT ACKNOWLEDGE
			0	0	0	1	1	PROGRESS
			0	0	1	0	1	SETUP
			0	1	1	0	1	SETUP ACKNOWLEDGE
0	1	0	-	-	-	-	-	**Call clearing messages:**
			0	0	1	0	1	DISCONNECT
			0	1	1	0	1	RELEASE
			1	1	0	1	0	RELEASE COMPLETE
			0	0	1	1	0	RESTART
			0	1	1	1	0	RESTART ACKNOWLEDGE
0	1	1	-	-	-	-	-	**Miscellaneous messages:**
			1	1	0	1	1	INFORMATION
			0	1	1	1	0	NOTIFY
			1	1	1	0	1	STATUS
			1	0	1	0	1	STATUS ENQUIRY

NOTE: When allocating codes for national Message types the following principle is applied for the first octet following the escape to nationally specific type:
1 0 X X XXXX: National standard
1 1 X X XXXX: ETSI standard

11.3.5 Other information elements

11.3.5.1 Coding rules

Reference: ETS 300 102-1, subclause 4.5.1.

Definition: The coding of other information elements follows the coding rules defined below. These rules are formulated to allow each equipment which processes a message to find information elements important to it, and yet remain ignorant of information elements not important to that equipment.

Two categories of information elements are defined:

- single octet information elements (see figure 11.6 a) and b));
- variable length information elements (see figure 11.6 c)).

For the information elements listed below, the coding of the information element identifier bits is summarized in table 11.27.

The descriptions of the information elements below are organized in alphabetical order. However, there is a particular order of appearance for each information element in a message within each codeset (see subclause 11.3.5.2). The code values of the information element identifier for the variable length formats are assigned in ascending numerical order, according to the actual order of appearance of each information element in a message. This allows the receiving equipment to detect the presence or absence of a particular information element without scanning through an entire message.

Single octet information elements may appear at any point in the message. Two types of single octet information elements have been defined. Type 1 elements provide the information element identification in bit positions 7, 6 and 5. The value "0 1 0" in these bit positions is reserved for Type 2 single octet information elements.

Where the description of information elements in this TBR contains spare bits, these bits are indicated as being set to "0". In order to allow compatibility with future implementations, messages should not be rejected simply because a spare bit is set to "1".

The second octet of variable length information element indicates the total length of the contents of that information element regardless of the coding of the first octet (i.e. the length starting with octet 3). It is the binary coding of the number of octets of the contents, with bit 1 as the least significant bit (2^0).

An optional variable length information element may be present, but empty. For example, a SETUP message may contain a Called party number information element, the content of which is of zero length. This should be interpreted by the receiver as equivalent to that information element being absent. Similarly, an absent information element should be interpreted by the receiver as equivalent to that information element being empty.

The following rules apply for the coding of variable length information elements (octet 3, etc.):

a) the first digit in the octet number identifies one octet or a group of octets;

b) each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways;

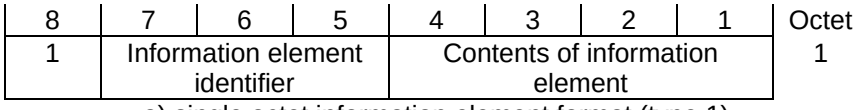
c) an octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bit 8 in each octet as an extension bit. The bit value "0" indicates that the octet continues through the next octet. The bit value "1" indicates that this octet is the last octet. If one octet (Nb) is present, also the preceding octets (N and Na) shall be present.

   In the format descriptions appearing in subclause 11.3.5.5 etc., bit 8 is marked "0/1 ext" if another octet follows. Bit 8 is marked "1 ext" if this is the last octet in the extension domain. Additional octets may be defined later ("1 ext" changed to "0/1 ext");

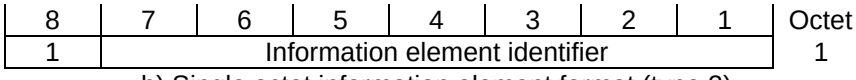
d) in addition to the extension mechanism defined above, an octet (N) may be extended through the next octet(s) (N.1, N.2 etc) by indications in bits 7 to 1 (of octet N);

e) the mechanisms in c) and d) may be combined;

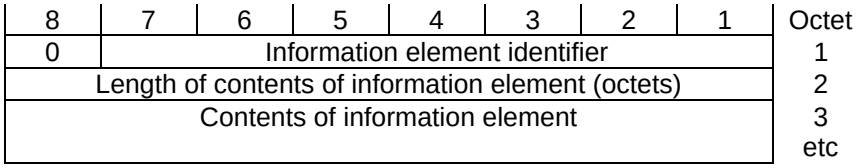
f) optional octets are marked with asterisks (*).



a) single octet information element format (type 1)



b) Single octet information element format (type 2)



c) Variable length information element format

Figure 11.6: Formats of information elements

NOTE: One of the single octet formats is specified for shift operations described in subclause 11.3.5.2. This allows for the definition of eight codesets of 133 information element identifier values in each. Codeset 0 is used for these information elements that have been specified in CCITT Recommendation Q.931. Codeset 5 is used for information elements that are specified by ETSI.

11.3.5.1.1 Codeset 0

Reference: ETS 300 102-1, subclause 4.5.1.1.

Definition: The information elements belonging to codeset 0 are listed in table 11.27, which also gives the coding of the information identifier bits.

Table 11.27: Information element identifier coding

8	7	6	5	4	3	2	1		Maximum length octets (note 1)
1	:	:	:	-	-	-	-	**Single octet information elements:**	
	0	0	0	-	-	-	-	Reserved	
	0	0	1	-	-	-	-	Shift (note 2)	1
	0	1	0	0	0	0	1	Sending complete	1
0	:	:	:	:	:	:	:	**Variable length information elements:**	
	0	0	0	0	1	0	0	Bearer capability	13
	0	0	0	1	0	0	0	Cause (note 2)	32
	0	0	1	0	0	0	0	Call identity	10
	0	0	1	0	1	0	0	Call state	3
	0	0	1	1	0	0	0	Channel identification (note 2)	(note 3)
	0	0	1	1	1	1	0	Progress indicator (note 2)	4
	0	1	0	0	1	1	1	Notification indicator	3
	1	1	1	0	0	0	0	Called party number	23
	1	1	1	0	0	0	1	Called party subaddress	23
	1	1	1	1	0	0	1	Restart indicator	3
	1	1	1	1	1	0	0	Low layer compatibility	16
	1	1	1	1	1	0	1	High layer compatibility	5

All other values are reserved (note 4).

NOTE 1: The length limits described for the variable length information elements below take into account only the present CCITT standardized coding values. Future enhancements and expansions to this TBR will not be restricted to these limits.
NOTE 2: This information element may be repeated.
NOTE 3: The maximum length is network dependent.
NOTE 4: The reserved values with bits 5 to 8 coded "0 0 0 0" are for future information elements for which comprehension by the receiver is required (see subclause 11.4.6.6.1).

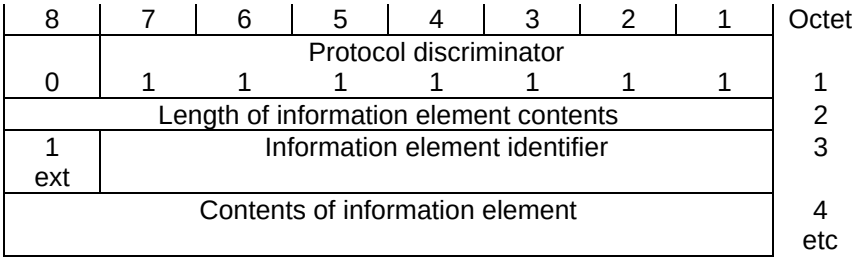


Figure 11.7: Information element format using escape for extension

11.3.5.2 Extensions of codesets

Reference: ETS 300 102-1, subclause 4.5.2.

Definition: There is a certain number of possible information element identifier values using the formatting rules described in subclause 11.3.5.1; 128 from the variable length information element format and at least 8 from the single octet information element format.

One value in the single octet format is specified for shift operations described below. One other value in both the single octet and variable format is reserved. This leaves at least 133 information element identifier values available for assignment.

It is possible to expand this structure to eight codesets of at least 133 information element identifier values each. One common value in the single octet format is employed in each codeset to facilitate shifting from one codeset to another. The contents of this Shift information element identifies the codeset to be used for the next information element or elements. The codeset in use at any given time is referred to as the "active codeset". By convention, codeset 0 is the initially active codeset.

Two codeset shifting procedures are supported: locking shift and non-locking shift.

Codeset 5 is reserved for information elements defined by ETSI.

Codeset 6 is reserved for information elements specific to a national network (either public or private).

Codeset 7 is reserved for user-specific information elements.

The coding rules specified in subclause 11.3.5.1 apply for information elements belonging to any active codeset.

Transitions from one active codeset to another (i.e. by means of the locking shift procedure) may only be made to a codeset with a higher numerical value than the codeset being left.

An information element belonging to codesets 5, 6 or 7, may appear together with information elements belonging to codeset 0 (being the active codeset) by using the non-locking shift procedure (see subclause 11.3.5.4).

The information element identifier code points with bits 5 to 8 coded "0 0 0 0" in each of the codesets are reserved for information elements for which comprehension by the receiver is required (see subclause 11.4.6.6.1 for specific error handling procedures).

11.3.5.3 Locking shift procedure

Reference: ETS 300 102-1, subclause 4.5.3.

Definition: The locking shift procedure employs an information element to indicate the new active codeset. The specified codeset remains active until another locking shift information element is encountered which specifies the use of another codeset. For example, codeset 0 is active at the start of message content analysis. If a locking shift to codeset 5 is encountered, the next information elements are interpreted according to the information element identifiers assigned in codeset 5, until another shift information element is encountered.

This procedure is used only to shift to a higher order codeset than the one being left.

The locking shift is valid only within that message which contains the locking Shift information element. At the start of every message content analysis, the active codeset is codeset 0.

The locking Shift information element uses the single octet information element format and coding shown in figure 11.8 and table 11.28.

8	7	6	5	4	3	2	1	Octet
1	0	Shift 0 identifier	1	0 *	New codeset identification			1

*: "0" in this position indicates locking shift

Figure 11.8: Locking Shift information element

Table 11.28: Locking Shift information element

3	2	1	Codeset identification
0	0	0	not applicable
0	0	1	}
	to		} reserved
1	0	0	}
1	0	1	reserved, codeset 5: information elements defined by ETSI
1	1	0	reserved, codeset 6: information elements specific to a national network (either public or private)
1	1	1	reserved, codeset 7: user-specific information elements

11.3.5.4 Non-locking shift procedure

Reference: ETS 300 102-1, subclause 4.5.4.

Definition: The non-locking shift procedure provides a temporary shift to the specified lower or higher codeset. The non-locking shift procedure uses a single octet information element to indicate the codeset to be used to interpret the next single information element. After the interpretation of the next single information element, the active codeset is again used for interpreting any following information elements. For example, codeset 0 is active at the beginning of message content analysis. If a non-locking shift to codeset 6 is encountered, only the next information element is interpreted according to the information element identifiers assigned in codeset 6. After this information element is interpreted, codeset 0 is used again to interpret the following information elements. A non-locking Shift information element indicating the current codeset shall not be regarded as an error.

A locking Shift information element does not directly follow a non-locking Shift information element. If this combination is received it is interpreted as though a locking Shift information element only had been received.

The non-locking Shift information element uses the single octet information element format and coding shown in figure 11.9 and table 11.29.

8	7	6	5	4	3	2	1	Octet
1	0	Shift 0 identifier	1	1 *	Temporary codeset identification			1

*: "1" in this position indicates non-locking shift

Figure 11.9: Non-locking Shift information element

Table 11.29: Non-locking Shift information element

3	2	1	Codeset identification
0	0	0	codeset 0 (initially active): Q.931 information elements
0	0	1	}
	to		} reserved
1	0	0	}
1	0	1	reserved, codeset 5: information elements defined by ETSI
1	1	0	reserved, codeset 6: information elements specific to a national network (either public or private)
1	1	1	reserved, codeset 7: user-specific information elements

11.3.5.5 Bearer capability

Reference: ETS 300 102-1, subclause 4.5.5.

Definition: The purpose of the Bearer capability information element is to indicate a requested CCITT Recommendation I.231 bearer service to be provided by the network. It contains only information which may be used by the network.

The Bearer capability information element is coded as shown in figure 11.10 and table 11.30.

No default Bearer capability may be assumed by the absence of this information element.

The maximum length of this information element is 13 octets when CCITT recommended coding is used.

8	7	6	5	4	3	2	1	Octet
0	Bearer capability 0	0	0	0	1	0	0	1
			Information element identifier					
Length of the Bearer capability contents								2
1 ext	coding standard		information transfer capability					3
0/1 ext	transfer mode		information transfer rate					4
0/1 ext	structure			configuration		establishment		4a* (note 1)
1 ext	symmetry		information transfer rate (destination → origination)					4b* (note 1)
0/1 ext	0 layer 1	1 ident.	user information layer 1 protocol					5*
0/1 ext	synch./ asynch.	negot.	user rate					5a* (note 4)
0/1 ext	intermediate rate		NIC on Tx	NIC on Rx	Flow control on Tx	Flow control on Rx	0 Spare	5b* (note 2)
0/1 ext	Hdr/ no Hdr	Multi frame support	Mode	LLI negot.	Assignor/ Assignee	Inband/ Outband negot.	0 Spare	5b* (note 3)
0/1 ext	number of stop bits		number of data bits		Parity			5c* (note 4)
1 ext	duplex mode	modem type						5d* (note 4)
1 ext	1 layer 2	0 ident.	user information layer 2 protocol					6*
1 ext	1 layer 3	1 ident.	user information layer 3 protocol					7*

NOTE 1: If default values are used for all fields of octets 4a and 4b, then these octets are not included. If default values are used for all fields of octet 4b, but not for one or more fields of octet 4a, then only octet 4a is included. Otherwise, both octets 4a and 4b are included.

NOTE 2: This octet may be present only if octet 5 indicates CCITT recommended rate adaption V.110/X.30.

NOTE 3: This octet is present only if octet 5 indicates CCITT recommended rate adaption V.120.

NOTE 4: This octet may be present if octet 5 indicates either of the CCITT recommended rate adaptions V.110/X.30 or V.120.

Figure 11.10: Bearer capability information element

Table 11.30: Bearer capability information element

Coding Standard (octet 3)

Bits
7 6
0 0 CCITT standardized coding as described below (note 1)

NOTE 1: Codepoint "0 0" "CCITT standardized coding as described below" is always used.

Information transfer capability (octet 3)

Bits
5 4 3 2 1
0 0 0 0 0 speech
0 1 0 0 0 unrestricted digital information
1 0 0 0 0 3,1 kHz audio
1 0 0 0 1 unrestricted digital information with tones/announcements (previously 7 kHz audio in ETS 300 102-1)
1 1 0 0 0 video

All other values are reserved.

Transfer mode (octet 4)

Bits
7 6
0 0 Circuit mode
1 0 Packet mode

All other values are reserved.

Information transfer rate (octet 4 and 4b, bits 5 to 1)

Bits

5 4 3 2 1	**Circuit mode**	**Packet mode**
0 0 0 0 0		This code is used for packet-mode calls
1 0 0 0 0	64 kbit/s	-
1 0 0 0 1	2 × 64 kbit/s	-
1 0 0 1 1	384 kbit/s	-
1 0 1 0 1	1 536 kbit/s	-
1 0 1 1 1	1 920 kbit/s	-

All other values are reserved.

NOTE 2: When octet 4b is omitted, the Bearer capability is bi-directional symmetric at the information transfer rate specified in octet 4. When octet 4b is included, the information transfer rate in octet 4 refers to the origination → destination direction.

NOTE 3: When the information transfer rate 2 × 64 kbit/s is used the coding of octet 3 and 4 refer to both 64 kbit/s channels.

Structure (octet 4a)

Bits
7 6 5
0 0 0 default (see note 4)
0 0 1 8 kHz integrity (see note 5)
1 0 0 service data unit integrity
1 1 1 unstructured

All other values are reserved.

NOTE 4: If octet 4a is omitted, or the structure field is coded "000", then the value of the structure attribute is according to the following:

Transfer mode	**Transfer capability**	**Structure**
circuit	speech	8 kHz integrity
circuit	unrestricted digital	8 kHz integrity
circuit	audio	8 kHz integrity

Table 11.30 (continued): Bearer capability information element

	Transfer mode	**Transfer capability**	**Structure**
	circuit	video	8 kHz integrity
	packet	unrestricted digital	service data unit integrity.

NOTE 5: When the information transfer rate 2 × 64 kbit/s is used, 8 kHz integrity with Restricted Differential Time Delay (RDTD) is offered.

Configuration (octet 4a)

Bits **4 3**	
0 0	point-to-point

All other values are reserved.

NOTE 6: If octet 4a is omitted, the configuration is assumed to be point-to-point.

Establishment (octet 4a)

Bits **2 1**	
0 0	demand

All other values are reserved.

NOTE 7: If octet 4a is omitted, the method of establishment is assumed to be "demand".

Symmetry (octet 4b)

Bits **7 6**	
0 0	bi-directional symmetric

All other values are reserved.

NOTE 8: If octet 4b is omitted, bi-directional symmetric is assumed.

User information layer 1 protocol (octet 5)

Bits **5 4 3 2 1**	
0 0 0 0 1	CCITT standardized rate adaption V.110/X.30. This implies the presence of octet 5a and optionally octet 5b, 5c and 5d as defined below.
0 0 0 1 1	Recommendation G.711 A-law
0 0 1 0 0	Recommendation G.721 32 kbit/s ADPCM and Recommendation I.460
0 0 1 0 1	Recommendations H.221 and H.242
0 0 1 1 0	Recommendation G.7xx 384 kbit/s video
0 0 1 1 1	Non-CCITT standardized rate adaption. This implies the presence of octet 5a and optionally, octets 5b, 5c and 5d. The use of this codepoint indicates that the user rate specified in octet 5a is defined in accordance with the non-CCITT standardized rate adaption scheme. Additionally, octets 5b, 5c and 5d, if present, are defined consistent with the specified rate adaption.
0 1 0 0 1	CCITT standardized rate adaption X.31 HDLC flag stuffing.

All other values are reserved.

NOTE 9: If the transfer mode is "circuit mode"; and if the information transfer capability is "unrestricted digital information" or "restricted digital information"; and if the user information layer 1 protocol is not to be identified to the network, octet 5 is omitted. If the transfer mode is packet mode, octet 5 may be omitted. Otherwise, octet 5 is present.

Table 11.30 (continued): Bearer capability information element

Synchronous/asynchronous (octet 5a)

Bit
7
0 synchronous
1 asynchronous

NOTE 10: Octets 5b, 5c and 5d may be omitted in case of synchronous user rates.

Negotiation (octet 5a)

Bit
6
0 in-band negotiation not possible
1 in-band negotiation possible

NOTE 11: See CCITT Recommendations V.110 and X.30.

User rate (octet 5a)

Bits

5	**4**	**3**	**2**	**1**		
0	0	0	0	0	rate is indicated by E-bits specified in Recommendation I.460	
0	0	0	0	1	0,6 kbit/s	Recommendations V.6 and X.1
0	0	0	1	0	1,2 kbit/s	Recommendation V.6
0	0	0	1	1	2,4 kbit/s	Recommendations V.6 and X.1
0	0	1	0	0	3,6 kbit/s	Recommendation V.6
0	0	1	0	1	4,8 kbit/s	Recommendations V.6 and X.1
0	0	1	1	0	7,2 kbit/s	Recommendation V.6
0	0	1	1	1	8 kbit/s	Recommendation I.460
0	1	0	0	0	9,6 kbit/s	Recommendations V.6 and X.1
0	1	0	0	1	14,4 kbit/s	Recommendation V.6
0	1	0	1	0	16 kbit/s	Recommendation I.460
0	1	0	1	1	19,2 kbit/s	Recommendation V.6
0	1	1	0	0	32 kbit/s	Recommendation I.460
0	1	1	1	0	48 kbit/s	Recommendations V.6 and X.1
0	1	1	1	1	56 kbit/s	Recommendation V.6
1	0	0	0	0	64 kbit/s	Recommendation X.1
1	0	1	0	1	0,1345 kbit/s	Recommendation X.1
1	0	1	1	0	0,100 kbit/s	Recommendation X.1
1	0	1	1	1	0,075/1,2 kbit/s	Recommendations V.6 and X.1 (note 12)
1	1	0	0	0	1,2/0,075 kbit/s	Recommendations V.6 and X.1 (note 12)
1	1	0	0	1	0,050 kbit/s	Recommendations V.6 and X.1
1	1	0	1	0	0,075 kbit/s	Recommendations V.6 and X.1
1	1	0	1	1	0,110 kbit/s	Recommendations V.6 and X.1
1	1	1	0	0	0,150 kbit/s	Recommendations V.6 and X.1
1	1	1	0	1	0,200 kbit/s	Recommendations V.6 and X.1
1	1	1	1	0	0,300 kbit/s	Recommendations V.6 and X.1
1	1	1	1	1	12 kbit/s	Recommendation V.6

All other values are reserved.

NOTE 12: The first rate is the transmit rate in the forward direction of the call. The second rate is the transmit rate in the backward direction of the call.

*** Octet 5b for V.110/X.30 rate adaption ***

Intermediate rate (octet 5b)

Bits

7	**6**	
0	0	reserved, not used
0	1	8 kbit/s
1	0	16 kbit/s
1	1	32 kbit/s

Table 11.30 (continued): Bearer capability information element

Network Independent Clock (NIC) on Transmission (Tx) (octet 5b) (note 13**)**

Bit
5
0 not required to send data with Network Independent Clock
1 required to send data with Network Independent Clock

NOTE 13: Refers to transmission in the backward direction of the call.
NOTE 14: See CCITT Recommendations V.110 and X.30.

Network Independent Clock (NIC) on reception (Rx) (octet 5b) (note 15)

Bit
4
0 cannot accept data with Network Independent Clock (i.e. sender does not support this optional procedure)
1 can accept data with Network Independent Clock (i.e. sender does support this optional procedure)

NOTE 15: Refers to transmission in the forward direction of the call.
NOTE 16: See CCITT Recommendations V.110 and X.30.

Flow control on transmission (Tx) (octet 5b) (note 17)

Bit
3
0 not required to send data with flow control mechanism
1 required to send data with flow control mechanism

NOTE 17: Refers to transmission in the forward direction of the call.
NOTE 18: See CCITT Recommendations V.110 and X.30.

Flow control on reception (Rx) (octet 5b) (note 19)

Bit
2
0 cannot accept data with flow control mechanism (i.e. sender does not support this optional procedure).
1 can accept data with flow control mechanism (i.e. sender does support this optional procedure).

NOTE 19: Refers to transmission in the backward direction of the call.
NOTE 20: See CCITT Recommendations V.110 and X.30.

Rate adaption header/no header (octet 5b)

Bit
7
0 rate adaption header not included
1 rate adaption header included

Multiple frame establishment support in data link (octet 5b)

Bit
6
0 multiple frame establishment not supported. Only UI-frames allowed
1 multiple frame establishment supported

Mode of operation (octet 5b)

Bit
5
0 bit transparent mode of operation
1 protocol sensitive mode of operation

Table 11.30 (continued): Bearer capability information element

Logical link identifier negotiation (octet 5b)

Bit
4
0 default, LLI = 256 only
1 full protocol negotiation (note 21)

NOTE 21: A connection over which protocol negotiation will be executed is indicated in bit 2 of octet 5b.

Assignor/assignee (octet 5b)

Bit
3
0 message originator is "Default assignee"
1 message originator is "Assignor only"

In-band/Out-band negotiation (octet 5b)

Bit
2
0 negotiation is done with USER INFORMATION messages on a temporary signalling connection
1 negotiation is done in-band using logical link zero.

Number of stop bits (octet 5c)

Bits
7 6
0 0 reserved, not used
0 1 1 bit
1 0 1,5 bits
1 1 2 bits

Number of data bits excluding parity bit if present (octet 5c)

Bits
5 4
0 0 reserved, not used
0 1 5 bits
1 0 7 bits
1 1 8 bits

Parity information (octet 5c)

Bits
3 2 1
0 0 0 odd
0 1 0 even
0 1 1 none
1 0 0 forced to 0
1 0 1 forced to 1

All other values reserved.

Duplex mode (octet 5d)

Bit
7
0 half duplex
1 full duplex

Table 11.30 (concluded): Bearer capability information element

Modem type (octet 5d)

Bits **654321**	
000000 through 000101	reserved, national use
010001	CCITT Recommendation V.21
010010	CCITT Recommendation V.22
010011	CCITT Recommendation V.22 bis
010100	CCITT Recommendation V.23
010101	CCITT Recommendation V.26
010110	CCITT Recommendation V.26 bis
010111	CCITT Recommendation V.26 ter
011000	CCITT Recommendation V.27
011001	CCITT Recommendation V.27 bis
011010	CCITT Recommendation V.27 ter
011011	CCITT Recommendation V.29
011100	CCITT Recommendation V.32
100000 through 101111	reserved, national use
110000 through 111111	user specified

All other values reserved.

User information layer 2 protocol (octet 6)

Bits **5 4 3 2 1**	
0 0 0 1 0	Recommendation Q.921 (I.441)
0 0 1 1 0	Recommendation X.25, link level

All other values are reserved.

NOTE 22: If the transfer mode is "packet mode", octet 6 is present. For other cases, if the user layer 2 protocol is to be identified to the network, then octet 6 is present; otherwise octet 6 is omitted.

User information layer 3 protocol (octet 7)

Bits **5 4 3 2 1**	
0 0 0 1 0	Recommendation Q.931 (I.451)
0 0 1 1 0	Recommendation X.25, packet layer

All other values are reserved.

NOTE 23: If the user information layer 3 protocol is to be identified to the network, then octet 7 is present; otherwise octet 7 is omitted.

11.3.5.6 Call identity

This is not applicable to primary rate access.

11.3.5.7 Call state

Reference: ETS 300 102-1, subclause 4.5.7.

Definition: The purpose of the Call state information element is to describe the current status of a call (see subclause 11.1.1).

The Call state information element is coded as shown in figure 11.11 and table 11.31.

The maximum length of this information element is three octets when CCITT standard coding is used.

8	7	6	5	4	3	2	1	Octet
0	Call State 0 0 0 I 0 1 0 0 Information element identifier							1
Length of the Call state contents								2
coding standard	Call state value/global interface state value (state value is coded in binary)							3

Figure 11.11: Call state information element

Table 11.31: Call state information element

Coding standard (octet 3)

Bits

8 7

0 0 CCITT standardized coding, as described below
0 1 reserved for other international standards (note)
1 0 reserved, national standard (note)
1 1 reserved, standard defined for the network (either public or private) present on the network side of the interface (note

NOTE: These other coding standards should be used only when the desired Call state cannot be represented with the CCITT standardized coding.

Call state value (octet 3)

Bits

6 5 4 3 2 1	User State	Network state
0 0 0 0 0 0	U0- Null	N0- Null
0 0 0 0 0 1	U1- Call initiated	N1- Call initiated
0 0 0 0 1 0	U2- Overlap sending	N2- Overlap sending
0 0 0 0 1 1	U3- Outgoing call Proceeding	N3- Outgoing call Proceeding
0 0 0 1 0 0	U4- Call delivered	N4- Call delivered
0 0 0 1 1 0	U6- Call present	N6- Call present
0 0 0 1 1 1	U7- Call received	N7- Call received
0 0 1 0 0 0	U8- Connect Request	N8- Connect Request
0 0 1 0 0 1	U9- Incoming call proceeding	N9- Incoming call proceeding
0 0 1 0 1 0	U10 - Active	N10 - Active
0 0 1 0 1 1	U11 - Disconnect request	N11 - Disconnect request
0 0 1 1 0 0	U12 - Disconnect indication	N12 - Disconnect indication
0 1 0 0 1 1	U19 - Release request	N19 - Release request
0 1 1 0 0 1	U25 - Overlap receiving	N25 - Overlap receiving

All other values are reserved.

Global interface state value (octet 3)

Bits

6 5 4 3 2 1	State
0 0 0 0 0 0	REST 0 - Null
1 1 1 1 0 1	REST 1 - Restart request
1 1 1 1 1 0	REST 2 - Restart

All other values are reserved.

11.3.5.8 Called party number

Reference: ETS 300 102-1, subclause 4.5.8.

Definition: The purpose of the Called party number information element is to identify the called party of a call.

The Called party number information element is coded as shown in figure 11.12 and table 11.32.

The maximum length of this information element is 23 octets.

8	7	6	5	4	3	2	1	Octet
0	Called party number 1 1 1 0 0 0 0 Information element identifier							1
Length of Called party number contents								2
1 ext	Type of number			Numbering plan identification				3
0	Number digits (IA5 characters, see note)							4 etc

NOTE: The number digits appear in multiple octets 4, in the same order in which they would be entered, that is, the number digit which would be entered first is located in the first octet 4.

Figure 11.12: Called party number information element

Table 11.32: Called party number information element

Type of number (octet 3) (note 1)

Bits **7 6 5**	
0 0 0	unknown (note 2)
0 0 1	international number (note 3)
0 1 0	national number (note 3)
0 1 1	network specific number (note 4)
1 0 0	subscriber number (note 3)
1 1 0	abbreviated number (note 5)
1 1 1	reserved for extension

All other values are reserved.

NOTE 1: For the definition of international, national and subscriber number, see CCITT Recommendation I.330.

NOTE 2: The type of number "unknown" is used when the user or the network has no knowledge of the type of number, e.g. international number, national number, etc. In this case the number digits field is organized according to the network dialling plan; e.g. prefix or escape digits might be present.

NOTE 3: Prefix or escape digits are not included.

NOTE 4: The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5: The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

Table 11.32 (concluded): Called party number information element

Numbering plan identification (octet 3)
Numbering plan (applies for type of number = 000, 001, 010 and 100) Bits **4 3 2 1** 0 0 0 0 unknown (note 6) 0 0 0 1 ISDN/Telephony numbering plan (CCITT Recommendation E.164/E.163) 0 0 1 1 data numbering plan (CCITT Recommendation X.121) 0 1 0 0 telex numbering plan (CCITT Recommendation F.69) 1 0 0 0 national standard numbering plan 1 0 0 1 private numbering plan 1 1 1 1 reserved for extension All other values are reserved. NOTE 6: The numbering plan "unknown" is used when the user or the network has no knowledge of the numbering plan. In this case the number digits field is organized according to the network dialling plan; e.g. prefix or escape digits might be present.
Number digits (octets 4 etc.) This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

11.3.5.9 Called party subaddress

Reference: ETS 300 102-1, subclause 4.5.9.

Definition: The purpose of the Called party subaddress is to identify the subaddress of the called party of a call. For the definition of subaddress see CCITT Recommendation I.330.

The Called party subaddress is coded as shown in figure 11.13 and table 11.33.

The maximum length of this information element is 23 octets.

8	7	6	5	4	3	2	1	Octet
0	Called party subaddress 1 1 1 0 0 0 1 Information element identifier							1
Length of the Called party subaddress content								2
1 ext	Type of subaddress			odd/ even in- dicator	0	0 spare	0	3
Subaddress information								4 etc

Figure 11.13: Called party subaddress information element

Table 11.33: Called party subaddress information element

Type of subaddress (octet 3)	
Bits **7 6 5**	
0 0 0	NSAP (X.213/ISO 8348 AD2)
0 1 0	user specified
All other values are reserved.	
Odd/even indicator (octet 3)	
Bit **4**	
0	even number or address signals
1	odd number or address signals
NOTE 1: The odd/even indicator is used when the type of subaddress is "user specified" and the coding is Binary Coded Decimal (BCD).	
Subaddress information (octet 4, etc.)	
The Network Service Access Point (NSAP) X.213/ISO 8348 AD2 address, is formatted as specified by octet 4 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in X.213/ISO 8348 AD2. For the definition of this type of subaddress, see CCITT Recommendation I.334.	
For user specified subaddress, this field is encoded according to the user specification, subject to a maximum length of 20 octets. When interworking with X.25 networks BCD coding should be applied.	
NOTE 2: It is recommended that users apply the NSAP subaddress type since this subaddress type allows the use of decimal, binary and IA5 syntax's in a standardized manner.	
NOTE 3: It is recommended that users apply the local Initial Domain Identifier (IDI) format when the subaddress is used for terminal selection purposes. In this case the IA5 character syntax using only digits 0 to 9 is used for the Domain Specific Part (DSP).	

11.3.5.10 Cause

Reference: ETS 300 102-1, subclause 4.5.12.

Definition: The purpose of the Cause information element is to describe the reason for generating certain messages, to provide diagnostic information in the event of procedural errors and to indicate the location of the Cause originator.

The Cause information element is coded as shown in figure 11.14 and tables 11.34 and 11.35. The maximum length of this information element is 32 octets.

The Cause information element and diagnostic may be repeated in a message, e.g. to report multiple errors associated with a single call, but only one Cause value is transferred to the remote user through the network.

8	7	6	5	4	3	2	1	Octet
0	Cause 0 0 0 1 0 0 0 Information element identifier							1
Length of the Cause contents								2
0/1 etc	Coding Standard		0 Spare	Location				3
1 ext	Recommendation							3a*
1 ext	Cause Value							4
Diagnostic(s) (if any)								5

NOTE: If the default value applies for the Recommendation field, octet 3a is omitted.

Figure 11.14: Cause information element

Table 11.34: Cause information element

Coding standard (octet 3)

Bits 7 6	
0 0	CCITT standardized coding, as described below
0 1	reserved for other international standards (note 1)
1 0	reserved, national standard (note 1)
1 1	reserved, standard specific to identified location (note 1)

NOTE 1: These other coding standards should be used only when the desired Cause cannot be represented with CCITT standardized coding.

Location (octet 3)

Bits 4 3 2 1	
0 0 0 0	user
0 0 0 1	private network serving the local user
0 0 1 0	public network serving the local user
0 0 1 1	transit network
0 1 0 0	public network serving the remote user
0 1 0 1	private network serving the remote user
0 1 1 1	international network
1 0 1 0	network beyond interworking point

All other values are reserved.

NOTE 2: Depending on the location of the users, the local public network and remote public network may be the same network.

Recommendation (octet 3a) (note 3)

Bits 7 6 5 4 3 2 1	
0 0 0 0 0 0 0	Q.931 (note 4)
0 0 0 0 0 1 1	X.21
0 0 0 0 1 0 0	X.25

All other values are reserved.

NOTE 3: If octet 3a is omitted, CCITT Recommendation Q.931 is assumed.
NOTE 4: This value is used only when octet 3a is extended and the Cause in octet 4 is from table 11.35.

Table 11.34 (concluded): Cause information element

Cause value (octet 4)

The Cause value is divided in two fields, a class (bits 5 through 7) and a value within the class (bits 1 through 4).

The class indicates the general nature of the event.

Class (000):	normal event
Class (001):	normal event
Class (010):	resource unavailable
Class (011):	service or option not available
Class (100):	service or option not implemented
Class (101):	invalid message (e.g. parameter out of range)
Class (110):	protocol error (e.g. unknown message)
Class (111):	interworking

The Cause values are listed in table 11.35 below.

Diagnostics (octet 5)

Diagnostic information is not available for every Cause, see table 11.35 below. The inclusion of diagnostics is optional. When available the coding of diagnostic(s) is the same as for the corresponding information element in subclause 11.3.

Table 11.35: Cause information element

Cause Value		Cause Number	Cause	Diagnostics
Class bits 7 6 5	**Value bits 4 3 2 1**			
0 0 0	0 0 0 1	1	Unallocated (unassigned) number	note 11
0 0 0	0 0 1 0	2	No route to specified transit network	Transit network identity (note 10)
0 0 0	0 0 1 1	3	No route to destination	note 11
0 0 0	0 1 1 0	6	Channel unacceptable	-
0 0 0	0 1 1 1	7	Call awarded and being delivered in an established channel	-
0 0 1	0 0 0 0	16	Normal call clearing	note 11
0 0 1	0 0 0 1	17	User busy	-
0 0 1	0 0 1 0	18	No user responding	-
0 0 1	0 0 1 1	19	No answer from user (user alerted)	-
0 0 1	0 1 0 1	21	Call rejected	note 11 User supplied diagnostic (note 4)
0 0 1	0 1 1 0	22	Number changed	New destination (note 5)
0 0 1	1 0 1 0	26	Non-selected user clearing	-
0 0 1	1 0 1 1	27	Destination out of order	-
0 0 1	1 1 0 0	28	Invalid number format	-
0 0 1	1 1 0 1	29	Facility rejected	Facility identification (note 1)
0 0 1	1 1 1 0	30	Response to STATUS ENQUIRY	-
0 0 1	1 1 1 1	31	Normal, unspecified	-

Table 11.35 (continued): Cause information element

Cause Value		Cause Number	Cause	Diagnostics
Class bits 7 6 5	Value bits 4 3 2 1			
0 1 0	0 0 1 0	34	No circuit/channel available	-
0 1 0	0 1 1 0	38	Network out of order	-
0 1 0	1 0 0 1	41	Temporary failure	-
0 1 0	1 0 1 0	42	Switching equipment congestion	-
0 1 0	1 0 1 1	43	Access information discarded	Discarded information element identifier(s) (note 6)
0 1 0	1 1 0 0	44	Requested circuit/channel not available	-
0 1 0	1 1 1 1	47	Resources unavailable, unspecified	
0 1 1	0 0 0 1	49	Quality of service unavailable	(note 11)
0 1 1	0 0 1 0	50	Requested facility not subscribed	Facility identification (notes 1 and 3)
0 1 1	1 0 0 1	57	Bearer capability not authorized	
0 1 1	1 0 1 0	58	Bearer capability not presently available	(note 3)
0 1 1	1 1 1 1	63	Service or option not available, unspecified	-
1 0 0	0 0 0 1	65	Bearer capability not implemented	(note 3)
1 0 0	0 0 1 0	66	Channel type not implemented	Channel type (note 7)
1 0 0	0 1 0 1	69	Requested facility not implemented	Facility identification (note 1)
1 0 0	0 1 1 0	70	Only restricted digital information Bearer capability is available	-
1 0 0	1 1 1 1	79	Service or option not implemented, unspecified	-
1 0 1	0 0 0 1	81	Invalid Call reference value	-
1 0 1	0 0 1 0	82	Identified channel does not exist	Channel identity
1 0 1	0 0 1 1	83	A suspended call exists, but this call identity does not	-
1 0 1	0 1 0 0	84	Call identity in use	-
1 0 1	0 1 0 1	85	No call suspended	-
1 0 1	0 1 1 0	86	Call having the requested call identity has been cleared	Clearing Cause
1 0 1	1 0 0 0	88	Incompatible destination	Incompatible parameter (note 2)
1 0 1	1 0 1 1	91	Invalid transit network selection	-
1 0 1	1 1 1 1	95	Invalid message, unspecified	-
1 1 0	0 0 0 0	96	Mandatory information element is missing	Information element identifier(s) (note 6)
1 1 0	0 0 0 1	97	Message type non-existent or not implemented	Message type
1 1 0	0 0 1 0	98	Message not compatible with Call state or Message type non-existent or not implemented	Message type
1 1 0	0 0 1 1	99	Information element non-existent or not implemented	Information element identifier(s) (notes 6, 8)
1 1 0	0 1 0 0	100	Invalid information element contents	Information element identifier(s) (note 6)
1 1 0	0 1 0 1	101	Message not compatible with Call state	Message type
1 1 0	0 1 1 0	102	Recovery on timer expiry	Timer number (note 9)
1 1 0	1 1 1 1	111	Protocol error, unspecified	-
1 1 1	1 1 1 1	127	Interworking, unspecified	-

Table 11.35 (concluded): Cause information element

All other values are reserved.

NOTE 1: The coding of facility identification is network dependent.

NOTE 2: Incompatible parameter is composed of incompatible information element identifier.

NOTE 3: The format of the diagnostic field for Causes number 57, 58 and 65 is as shown in figure 11.15 and table 11.36.

NOTE 4: User supplied diagnostics field is encoded according to the user specification, subject to the maximum length of the Cause information element. The coding of user supplied diagnostics should be made in such a way that it does not conflict with the coding described in note 11 below.

NOTE 5: New destination is formatted as the Called party number information element, including information element identifier. Transit network selection may also be included.

NOTE 6: Locking and non-locking shift procedures described in subclause 11.3.5 are applied. In principle, information element identifiers are ordered in the same order as the information elements in the received message.

NOTE 7: The following coding is used:
Bit 8: Extension bit
Bits 7-5: spare
Bits 4-1: according to the table 11.38, octet 3.2, channel type.

NOTE 8: When only Locking shift information element is included and no variable length information element identifier follows, it means that the codeset in the locking shift itself is not implemented.

NOTE 9: The timer number is coded in IA5 characters, e.g. T308 is coded as '3' '0' '8'. The following coding is used in each octet:
Bit 8: Spare "0"
Bits 7-1: IA5 character.

NOTE 10: The diagnostic field contains the entire Transit network selection or Network specific facilities information element, as applicable.

NOTE 11: The following coding is used:
Bit 8: 1
Bits 7-3: 00000
Bits 2-1: condition as follows:
00 unknown
01 permanent
10 transient.

8	7	6	5	4	3	2	1	Octet
0/1 ext	Attribute number							5
0/1 ext	Rejected attribute							5a
1 ext	Available attribute							5b

NOTE 1: When diagnostics information is provided, octets 5 and 5a are present. Octet 5b is optional.

NOTE 2: Octets 5-5b may be repeated to report multiple rejected attributes.

Figure 11.15: Coding of the diagnostic field for Causes number 57, 58 and 65

Table 11.36: Coding of the diagnostic field for Causes number 57, 58 and 65

Attribute Number (octet 5)

Bits

7 6 5 4 3 2 1	**No.**	
0 1 1 0 0 0 1	1	Information transfer capability
0 1 1 0 0 1 0	2	Information transfer mode
0 1 1 0 0 1 1	3	Information transfer rate
0 1 1 0 1 0 0	4	Structure
0 1 1 0 1 0 1	5	Configuration
0 1 1 0 1 1 0	6	Establishment
0 1 1 0 1 1 1	7	Symmetry
0 1 1 1 0 0 0	8	Information transfer rate (dest → orig)
0 1 1 1 0 0 1	9	Layer identification

Rejected attribute (octet 5a)

Attribute No.

[1] **Information transfer capability:**
- Bits 7-6: 00
- Bits 5-1: according to table 11.30, octet 3.

[2] **Information transfer mode:**
- Bits 7-6: according to table 11.30, octet 4.
- Bits 5-1: 00000

[3] **Information transfer rate:**
- Bits 7-6: 00
- Bits 5-1: according to table 11.30, octet 4.

[4] **Structure:**
- Bits 7-5: according to table 11.30, octet 4a.
- Bits 4-1: 0000

[5] **Configuration:**
- Bits 7-5: 000
- Bits 4-3: according to table 11.30, octet 4a.
- Bits 2-1: 00

[6] **Establishment:**
- Bits 7-3: 00000
- Bits 2-1: according to table 11.30, octet 4a.

[7] **Symmetry**
- Bits 7-6: according to table 11.30, octet 4b.
- Bits 5-1: 00000

[8] **Information transfer rate (dest → orig):**
- Bits 7-6: 00
- Bits 5-1: according to table 11.30, octet 4b

[9] **Layer identification:**

Bits

7 6	
0 1 (Layer 1)	Bits 5-1 according to table 11.30, octet 5
1 0 (Layer 2)	Bits 5-1 according to table 11.30, octet 6
1 1 (Layer 3)	Bits 5-1 according to table 11.30, octet 7

Available attributes (octet 5b)

The same coding as octet 5a.

ETSI Cause values:

The coding of octets 3 and 5 is the same as defined for CCITT recommended Cause values (see table 11.34). Coding standard (octet 3) is coded "1 0" (National standard).

For the Cause value (octet 4) it is recommended that in allocating national Cause values the classification used for the CCITT coding standard is used also for national standard. In coding the specific Cause values the principle shown below should be followed:

Class	Value	
7 6 5	**4 3 2 1**	
X X X	0 X X X	national standard
X X X	1 X X X	ETSI standard

The ETSI Cause values are defined below:

Table 11.37: ETSI Cause values

Cause Value		Cause Number	Cause	Diagnostics
Class bits 7 6 5	Value bits 4 3 2 1			
1 0 1	1 0 0 0	88	Non-existent CUG (note)	-
1 0 1	1 0 0 1	89	Called user not member of CUG (note)	-
1 0 1	1 0 1 0	90	Called user belongs to CUG (note)	-
NOTE: This Cause value is used for the support of stimulus mode of the Closed User Group (CUG) supplementary service.				

11.3.5.11 Channel identification

Reference: ETS 300 102-1, subclause 4.5.13.

Definition: The purpose of the Channel identification information element is to identify a channel within the interface(s) controlled by these signalling procedures.

The Channel identification information element is coded as shown in figure 11.16 and table 11.38. The Channel identification information element may be repeated in a message; e.g. to list several acceptable channels during channel negotiation.

The default maximum length for this information element is network dependent.

8	7	6	5	4	3	2	1	Octet
0	0	0	Channel identification 1	1	0	0	0	1
			Information element identifier					
Length of Channel identification contents								2
1 ext	Int id present	Int. type	0 Spare	Pref./ excl.	D-chan-nel ind	Info. channel selection		3
0/1 ext	Interface identifier - not used							3.1* etc
1 ext	Coding standard		Number	Channel type				3.2* (note 1)
Channel number (note 2)								3.3* (note 1) (note 3)

NOTE 1: When the "interface type" field in octet 3 indicates "basic interface", octets 3.2 and 3.3 are functionally replaced by the "information channel selection" field in octet 3, and thus omitted.

NOTE 2: When channel number is used, bit 8 is reserved for use as an extension bit and is thus set to "1".

NOTE 3: When channel number is used, this octet may be repeated to indicate multiple channels.

Figure 11.16: Channel identification information element

Table 11.38: Channel identification information element

Interface identifier present (octet 3)

Bit
7
0 interface implicitly identified (note 1)
1 reserved

NOTE 1: The interface which includes the D-channel carrying this information element is indicated.

Interface type (octet 3)

Bit
6
0 basic interface
1 primary rate interface

Preferred/exclusive (octet 3) (note 2)

Bit
4
0 indicated channel is preferred
1 exclusive: only the indicated channel is acceptable

NOTE 2: Preferred/exclusive has significance only for B-channel selection.

D-channel indicator (octet 3) (note 3)

Bit
3
0 the channel identified is not the D-channel
1 the channel identified is the D-channel

NOTE 3: D-channel indication has significance in D-channel use. No other information affects D-channel use.

Information channel selection (octet 3) (note 4)

Bits **2 1**	Basic interface	Other interfaces
0 0	no channel	no channel
0 1	B1 channel	as indicated in following octets
1 0	B2 channel	reserved
1 1	any channel	any channel

NOTE 4: The information channel selection does not apply to the D-channel.

Coding standard (octet 3.2)

Bits
7 6
0 0 CCITT standardized coding as described below
0 1 reserved for other international standards (note 5)
1 0 national standard (note 5)
1 1 standard defined for the network (either public or private) present on the network side of the interface (note 5)

NOTE 5: These other coding standards should be used only when the desired Channel identification cannot be represented with the CCITT standardized coding.

Number (octet 3.2)

Bit
5
0 channel is indicated by the number in the following octet
1 reserved

Table 11.38 (concluded): Channel identification information element

Channel type (octet 3.2) Bits **4 3 2 1** 0 0 1 1 B-channel units 0 1 1 0 H_0-channel units 1 0 0 0 H_{11}-channel units 1 0 0 1 H12-channel units All other values are reserved.
Channel number (octet 3.3) Binary number assigned to the channel. For B-channels, the channel number equals the timeslot number.

11.3.5.12 High Layer Compatibility

Reference: ETS 300 102-1, subclause 4.5.16.

Definition: The purpose of the High layer compatibility information element is to provide a means which should be used by the remote user for compatibility checking.

The High layer compatibility information element is coded as shown in figure 11.17 and table 11.39.

The maximum length of this information element is five octets.

NOTE: The High layer compatibility information element is transported transparently by an ISDN between a call originating entity, e.g. a calling user and the addressed entity, e.g. a remote user or high layer function network node addressed by the call originating entity. However, if explicitly requested by the user (at subscription time), a network which provides some capabilities to realize teleservices may interpret this information to provide a particular service.

8	7	6	5	4	3	2	1	Octet
0	High layer compatibility 1 1 1 1 1 0 1 Information element identifier							1
Length of High layer compatibility contents								2
1 ext	Coding standard		Interpretation			Presentation method of protocol profile		3
0/1 ext	High layer characteristics identification							4
1 ext	Extended high layer characteristics identification							4a* (note)

NOTE: This octet may be present when octet 4 indicates Maintenance or Management.

Figure 11.17: High layer compatibility information element

Table 11.39: High layer compatibility information element

Coding standard (octet 3)

Bits **7 6**	
0 0	CCITT standardized coding as described below
0 1	reserved for other international standards (note 1)
1 0	reserved, national standard (note 1)
1 1	reserved, standard defined for the network (either public or private) present on the network side of the interface (note 1)

NOTE 1: These other coding standards should be used only when the desired High layer compatibility cannot be represented with the CCITT standardized coding.

Interpretation (octet 3)

Bits **5 4 3**	
1 0 0	First (primary only) high layer characteristics identification (in octet 4) to be used in the call.

All other values are reserved.

NOTE 2: "Interpretation" indicates how the "High layer characteristics identification" (in octet 4) should be interpreted.

NOTE 3: Currently, "Interpretation" has only a single value. However, "Interpretation", when enhanced, will be able to indicate how the "High layer characteristics identification" in the same information element is interpreted when multiple "High layer characteristics identifications" are used and exact relationship among them needs to be indicated (e.g. sequential usage, alternative list, simultaneous usage). Such enhancements in conjunction with the possible negotiation procedures is left for further study.

Presentation method of protocol profile (octet 3)

Bits **2 1**	
0 1	High layer protocol profile (without specification of attributes)

All other values are reserved.

NOTE 4: Currently, "Presentation method of protocol profile" has only a single value, i.e. a "profile value" is used to indicate a service to be supported by high layer protocols as required. Necessity of other presentation methods, e.g. service indications in the form of layer-by-layer indication of protocols to be used in high layers, is left for further study.

High layer characteristics identification (octet 4)

Bits **7 6 5 4 3 2 1**	
0 0 0 0 0 0 1	Telephony
0 0 0 0 1 0 0	Facsimile Group 2/3 (Recommendation F.182)
0 1 0 0 0 0 1	Facsimile Group 4 Class 1 (Recommendation F.184)
0 1 0 0 1 0 0	Teletex service, basic and mixed mode of operation (Recommendation F.230) and facsimile service Group 4, Classes II and III (Recommendation F.184)
0 1 0 1 0 0 0	Teletex service, basic and processable mode of operation (Recommendation F.220)
0 1 1 0 0 0 1	Teletex service, basic mode of operation (Recommendation F.200)
0 1 1 0 0 1 0	Syntax based videotex (Recommendations F.300 and T.102)
0 1 1 0 0 1 1	International videotex interworking via gateways or interworking units (Recommendations F.300 and T.101)
0 1 1 0 1 0 1	Telex service (Recommendation F.60)

Table 11.39 (concluded): High layer compatibility information element

Bits **7 6 5 4 3 2 1**	
0 1 1 1 0 0 0	Message Handling Systems (MHS) (Recommendation X.400 series)
1 0 0 0 0 0 1	OSI application (note 2) (Recommendation X.200 series)
1 0 1 1 1 1 0	Reserved for Maintenance (note 8)
1 0 1 1 1 1 1	Reserved for Management (note 8)
1 1 0 0 0 0 0	Videotelephony (Recommendation F.721) (note 8)
1 1 1 1 1 1 1	Reserved
All other values are reserved.	
NOTE 5: The coding above applies in case of "Coding standard" = "CCITT standard" and "Presentation method of protocol profile" = "High layer protocol profile".	
NOTE 6: Further compatibility checking will be executed by the OSI high layer protocol.	
NOTE 7: Code points are added only to those services for which CCITT Recommendations are available. See also CCITT Recommendation I.241.	
NOTE 8: When this coding is included, octet 4 may be followed by octet 4a.	
Extended high layer characteristics identification (octet 4a)	
To be used when octet 4 specifies Maintenance or Management	
Bits **7 6 5 4 3 2 1**	
0 0 0 0 0 0 1	Telephony
0 0 0 0 1 0 0	Facsimile Group 2/3 (Recommendation F.182)
0 1 0 0 0 0 1	Facsimile Group 4 Class I (Recommendation F.184)
0 1 0 0 1 0 0	Teletex service, basic and mixed mode of operation (Recommendation F.230) and facsimile service Group 4, Classes II and III (Recommendation F.184)
0 1 0 1 0 0 0	Teletex service, basic and processable mode of operation (Recommendation F.220)
0 1 1 0 0 0 1	Teletex service, basic mode of operation (Recommendation F.200)
0 1 1 0 0 1 0	Syntax based videotex (Recommendations F.300 and T.102)
0 1 1 0 0 1 1	International videotex interworking via gateways or interworking units (Recommendations F.300 and T.101)
0 1 1 0 1 0 1	Telex service (Recommendation F.60)
0 1 1 1 0 0 0	Message Handling Systems (MHS) (Recommendation X.400 series)
1 0 0 0 0 0 1	OSI application (Recommendation X.200 series)
1 0 1 1 1 1 0	Not available for assignment
1 0 1 1 1 1 1	Not available for assignment
1 1 1 1 1 1 1	Reserved
All other values are reserved.	
To be used when octet 4 specifies Videotelephony	
Bits **7 6 5 4 3 2 1**	
0 0 0 0 0 0 1	capability set of initial channel of Recommendation H.221
0 0 0 0 0 1 0	capability set of subsequent channel of Recommendation H.221
All other values are reserved.	

11.3.5.13 Low Layer Compatibility

Reference: ETS 300 102-1, subclause 4.5.18.

Definition: The purpose of the Low layer compatibility information element is to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user or an interworking unit or a high layer function network node addressed by the calling user). The Low layer compatibility information element is transferred transparently by an ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

If Low layer compatibility negotiation is allowed by the network, the Low layer compatibility information element is also passed transparently from the addressed entity to the originating entity.

The Low layer compatibility information element is coded as shown in figure 11.18 and table 11.40. The maximum length of this information element is 16 octets.

8	7	6	5	4	3	2	1	Octet
0	Low layer compatibility 1 1 1 1 1 0 0 Information element identifier							1
Length of the Low layer compatibility contents								2
0/1 ext	coding standard		information transfer capability					3
1 ext	Negot. indic.	0	0	0 spare	0	0	0	3a* (note 5)
0/1 ext	transfer mode		information transfer rate					4
0/1 ext	structure			configuration		establishment		4a* (note 1)
1 ext	symmetry		information transfer rate (destination → origination)					4b* (note 1)
0/1 ext	0 layer 1,	1 ident.	user information layer 1 protocol					5*
0/1 ext	synch./ asynch.	negot.	user rate					5a* (note 4)
0/1 ext	intermediate rate		NIC on Tx	NIC on Rx	Flow control on Tx	Flow control on Rx	0 Spare	5b* (note 2)
0/1 ext	Hdr/ no Hdr	Multi frame support	Mode	LLI negot.	Assignor/ Assignee	Inband/ Outband negot.	0 Spare	5b* (note 3)
0/1 ext	number of stop bits		number of data bits		Parity			5c* (note 4)
1 ext	duplex mode	modem type						5d* (note 4)
0/1 ext	1 layer 2	0 ident.	user information layer 2 protocol					6*
1 ext	Optional layer 2 protocol information							6a*
0/1 ext	1 layer 3	1 ident.	user information layer 3 protocol					7*
1 ext	Optional layer 3 protocol information							7a*

NOTE 1: If default values are used for all fields of octets 4a and 4b, then these octets are not included. If default values are used for all fields of octet 4b, but not for one or more fields of octet 4a, then only octet 4a is included. Otherwise, both octets 4a and 4b are included.

NOTE 2: This octet may be present only if octet 5 indicates CCITT standardized rate adaption V.110/X.30.

NOTE 3: This octet is present only if octet 5 indicates CCITT standardized rate adaption V.120.

NOTE 4: This octet may be present if octet 5 indicates either of the CCITT standardized rate adaptions V.110/X.30 or V.120.

NOTE 5: This octet is present if out-band negotiation is required.

Figure 11.18: Low layer compatibility information element

Table 11.40: Low layer compatibility information element

Coding standard (octet 3)

Bits

7	**6**	
0	0	CCITT standardized coding as described below
0	1	reserved for other international standards (note 1)
1	0	reserved, national standard (note 1)
1	1	reserved, standard defined for the network (either public or private) present on the network side of the interface (note 1)

NOTE 1: These other coding standards should be used only when the desired Low layer compatibility cannot be represented with the CCITT standardized coding.

Information transfer capability (octet 3)

Bits

5	**4**	**3**	**2**	**1**	
0	0	0	0	0	speech
0	1	0	0	0	unrestricted digital information
0	1	0	0	1	restricted digital information
1	0	0	0	0	3,1 kHz audio
1	0	0	0	1	unrestricted digital information with tones/announcements (previously 7 kHz audio in ETS 300 102-1)
1	1	0	0	0	video

All other values are reserved.

Negotiation indicator (octet 3a)

Bit

7	
0	out-band negotiation not possible
1	out-band negotiation possible

NOTE 2: When octet 3a is omitted, "out-band negotiation not possible" is assumed.

Transfer mode (octet 4)

Bits

7	**6**	
0	0	circuit mode
1	0	packet mode

All other values are reserved.

Information transfer rate (octets 4 and 4b)

Bits

5	**4**	**3**	**2**	**1**	**Circuit Mode**	**Packet Mode**
0	0	0	0	0	-	This code is used for packet-mode calls
1	0	0	0	0	64 kbit/s	-
1	0	0	0	1	2 × 64 kbit/s	-
1	0	0	1	1	384 kbit/s	-
1	0	1	0	1	1 536 kbit/s	-
1	0	1	1	1	1 920 kbit/s	-

All other values are reserved.

NOTE 3: When octet 4b is omitted, the Low layer compatibility is bi-directional symmetric at the information transfer rate specified in octet 4. When octet 4b is included, the information transfer rate in octet 4 refers to the origination → destination direction.

NOTE 4: When the information transfer rate 2 × 64 kbit/s is used, the coding of octet 3 and 4 refer to both 64 kbit/s channels.

Table 11.40 (continued): Low layer compatibility information element

Structure (octet 4)

Bits

7 6 5

0 0 0 default (see note 5)
0 0 1 8 kHz integrity (note 6)
1 0 0 service data unit integrity
1 1 1 unstructured

All other values are reserved.

NOTE 5: If octet 4a is omitted, or the structure field is coded "000", then the value of the structure attribute is according to the following:

Transfer mode	**Transfer capability**	**Structure**
circuit	speech	8 kHz integrity
circuit	unrestricted digital	8 kHz integrity
circuit	restricted digital	8 kHz integrity
circuit	audio	8 kHz integrity
circuit	video	8 kHz integrity
packet	unrestricted digital	service data unit integrity.

NOTE 6: When the information transfer rate 2 × 64 kbit/s is used, 8 kHz integrity with RDTD is offered.

Configuration (octet 4a)

Bits

4 3

0 0 point-to-point

All other values are reserved.

NOTE 7: If octet 4a is omitted, the configuration is assumed to be point-to-point.

Establishment (octet 4a)

Bits

2 1

0 0 demand

All other values are reserved.

NOTE 8: If octet 4a is omitted, the method of establishment is assumed to be "demand".

Symmetry (octet 4b)

Bits

7 6

0 0 bi-directional symmetric

All other values are reserved.

NOTE 9: If octet 4b is omitted, bi-directional symmetric is assumed.

User information layer 1 protocol (octet 5)

Bits

5 4 3 2 1

0 0 0 0 1 CCITT standardized rate adaption V.110/X.30. This implies the presence of octet 5a and optionally octet 5b, 5c and 5d as defined below
0 0 0 1 0 Recommendation G.711 μ-law
0 0 0 1 1 Recommendation G.711 A-law
0 0 1 0 0 Recommendation G.721 32 kbit/s ADPCM and Recommendation I.460
0 0 1 0 1 Recommendations H. 221 and H.242
0 0 1 1 0 Recommendation G.7xx 384 kbit/s video

Table 11.40 (continued): Low layer compatibility information element

Bits
5 4 3 2 1

0 0 1 1 1 Non-CCITT standardized rate adaption. This implies the presence of octet 5a and, optionally, octets 5b, 5c and 5d. The use of this code point indicates that the user rate specified in octet 5a is defined by the user. Additionally, octets 5b, 5c and 5d, if present, are defined consistent with the user specified rate adaption

0 1 0 0 0 CCITT standardized rate adaption V.120. This implies the presence of octets 5a and 5b as defined below and optionally octets 5c and 5d.

0 1 0 0 1 CCITT standardized rate adaption X.31 HDLC flag stuffing

All other values are reserved.

NOTE 10: If the transfer mode is "circuit mode", and if the information transfer capability is "unrestricted digital information" or "restricted digital information", and if the user information layer 1 protocol is not to be identified to the network, octet 5 is omitted. If the transfer mode is "packet mode", octet 5 may be omitted. Otherwise, octet 5 is present.

Synchronous/asynchronous (octet 5a)

Bit
7

0 synchronous
1 asynchronous

NOTE 11: Octets 5b-5d may be omitted in case of synchronous user rates.

Negotiation (octet 5a)

Bit
6

0 in-band negotiation not possible
1 in-band negotiation possible

NOTE 12: See CCITT Recommendations V.110 and X.30.

User rate (octet 5a)

Bits
5 4 3 2 1

0 0 0 0 0	rate is indicated by E-bits specified in Rec. I.460	
0 0 0 0 1	0,6 kbit/s	Recommendations V.6 and X.1
0 0 0 1 0	1,2 kbit/s	Recommendation V.6
0 0 0 1 1	2,4 kbit/s	Recommendations V.6 and X.1
0 0 1 0 0	3,6 kbit/s	Recommendation V.6
0 0 1 0 1	4,8 kbit/s	Recommendations V.6 and X.1
0 0 1 1 0	7,2 kbit/s	Recommendation V.6
0 0 1 1 1	8 kbit/s	Recommendation I.460
0 1 0 0 0	9,6 kbit/s	Recommendations V.6 and X.1
0 1 0 0 1	14,4 kbit/s	Recommendation V.6
0 1 0 1 0	16 kbit/s	Recommendation I.460
0 1 0 1 1	19,2 kbit/s	Recommendation V.6
0 1 1 0 0	32 kbit/s	Recommendation I.460
0 1 1 1 0	48 kbit/s	Recommendation V.6 and X.1
0 1 1 1 1	56 kbit/s	Recommendation V.6
1 0 0 0 0	64 kbit/s	Recommendation X.1
1 0 1 0 1	0,1345 kbit/s	Recommendation X.1
1 0 1 1 0	0,100 kbit/s	Recommendation X.1
1 0 1 1 1	0,075/1,2 kbit/s	Recommendations V.6 and X.1 (note 13)
1 1 0 0 0	1,2/0,075 kbit/s	Recommendations V.6 and X.1 (note 13)
1 1 0 0 1	0,050 kbit/s	Recommendations V.6 and X.1
1 1 0 1 0	0,075 kbit/s	Recommendations V.6 and X.1

Table 11.40 (continued): Low layer compatibility information element

Bits **5 4 3 2 1** 1 1 0 1 1 0,110 kbit/s Recommendations V.6 and X.1 1 1 1 0 0 0,150 kbit/s Recommendations V.6 and X.1 1 1 1 0 1 0,200 kbit/s Recommendations V.6 and X.1 1 1 1 1 0 0,300 kbit/s Recommendations V.6 and X.1 1 1 1 1 1 12 kbit/s Recommendation V.6 All other values are reserved. NOTE 13: The first rate is the transmit rate in the forward direction of the call. The second rate is the transmit rate in the backward direction of the call.
*** Octet 5b for V.110/X.30 rate adaption ***
Intermediate rate (octet 5b) Bits **7 6** 0 0 reserved, not used 0 1 8 kbit/s 1 0 16 kbit/s 1 1 32 kbit/s
Network Independent Clock (NIC) on Transmission (Tx) (octet 5b) (note 14) Bit **5** 0 not required to send data with Network Independent Clock 1 required to send data with Network Independent Clock NOTE 14: Refers to transmission in the forward direction of the call. NOTE 15: See CCITT Recommendations V.110 and X.30.
Network Independent Clock (NIC) on Reception (Rx) (octet 5b) (note 16) Bit **4** 0 cannot accept data with Network Independent Clock (i.e. sender does not support this optional procedure) 1 can accept data with Network Independent Clock (i.e. sender does support this optional procedure) NOTE 16: Refers to transmission in the backward direction of the call. NOTE 17: See CCITT Recommendations V.110 and X.30.
Flow control on Transmission (Tx) (octet 5b) (note 18) Bit **3** 0 Not required to send data with flow control mechanism 1 Required to send data with flow control mechanism NOTE 18: Refers to transmission in the forward direction of the call. NOTE 19: See CCITT Recommendations V.110 and X.30.
Flow control on Reception (Rx) (octet 5b) (note 20) Bit **2** 0 cannot accept data with flow control mechanism (i.e. sender does not support this optional procedure) 1 can accept data with flow control mechanism (i.e. sender does support this optional procedure) NOTE 20: Refers to transmission in the backward direction of the call. NOTE 21: See CCITT Recommendations V.110 and X.30.

Table 11.40 (continued): Low layer compatibility information element

*** Octet 5b for V.120 rate adaption ***
Rate adaption header/no header (octet 5b) Bit **7** 0 rate adaption header not included 1 rate adaption header included
Multiple frame establishment support in Data link (octet 5b) Bit **6** 0 multiple frame establishment not supported, only UI-frames allowed. 1 multiple frame establishment supported.
Mode of operation (octet 5b) Bit **5** 0 bit transparent mode of operation 1 protocol sensitive mode of operation
Logical link identifier negotiation (octet 5b) Bit **4** 0 default, LLI = 256 only 1 full protocol negotiation (note 22) NOTE 22: A connection over which protocol negotiation will be executed is indicated in bit 2 of octet 5b.
Assignor/assignee (octet 5b) Bit **3** 0 message originator is "Default assignee" 1 message originator is "Assignor only"
In-band/outband negotiation (octet 5b) Bit **2** 0 negotiation is done with USER INFORMATION messages on a temporary signalling connection 1 negotiation is done in-band using logical link zero
Number of stop bits (octet 5c) Bits **7 6** 0 0 reserved, not used 0 1 1 bit 1 0 1,5 bits 1 1 2 bits
Number of data bits excluding parity bit if present (octet 5c) Bits **5 4** 0 0 reserved, not used 0 1 5 bits 1 0 7 bits 1 1 8 bits

Table 11.40 (continued): Low layer compatibility information element

Parity information (octet 5c)

Bits

3	**2**	**1**	
0	0	0	odd
0	1	0	even
0	1	1	none
1	0	0	forced to 0
1	0	1	forced to 1

All other values are reserved.

Duplex mode (octet 5d)

Bit

7	
0	half duplex
1	full duplex

Modem type (octet 5d)

Bits

654321	
000000 through 000101	reserved, national use
010001	CCITT Recommendation V.21
010010	CCITT Recommendation V.22
010011	CCITT Recommendation V.22 bis
010100	CCITT Recommendation V.23
010101	CCITT Recommendation V.26
010110	CCITT Recommendation V.26 bis
010111	CCITT Recommendation V.26 ter
011000	CCITT Recommendation V.27
011001	CCITT Recommendation V.27 bis
011010	CCITT Recommendation V.27 ter
011011	CCITT Recommendation V.29
011100	CCITT Recommendation V.32
100000 through 101111	reserved, national use
110000 through 111111	user specified

All other values are reserved.

User information layer 2 protocol (octet 6)

Bits

5	**4**	**3**	**2**	**1**	
0	0	0	0	1	Basic mode ISO 1745
0	0	0	1	0	CCITT Recommendation Q.921 (I.441)
0	0	1	1	0	CCITT Recommendation X.25 link layer
0	0	1	1	1	CCITT Recommendation X.25 Multilink
0	1	0	0	0	Extended LAPB; for half duplex operation (T.71)
0	1	0	0	1	HDLC ARM (ISO 4335)
0	1	0	1	0	HDLC NRM (ISO 4335)
0	1	0	1	1	HDLC ABM (ISO 4335)
0	1	1	0	0	LAN Logical link control (ISO 8802/2)
0	1	1	0	1	CCITT Recommendation X.75 Single Link Procedure (SLP)
1	0	0	0	1	ISO 7776 DTE-DTE operation (note 23)

All other values are reserved.

NOTE 23: This standard is compatible with CCITT Recommendation X.75 modified by the application rules defined in CCITT Recommendation T.90.

Optional layer 2 protocol information (octet 6a)

User specified.

Table 11.40 (concluded): Low layer compatibility information element

User information layer 3 protocol (octet 7)
Bits **5 4 3 2 1** 0 0 0 1 0 CCITT Recommendation Q.931 (I.451) 0 0 1 1 0 CCITT Recommendation X.25, packet layer 0 0 1 1 1 ISO 8208 (X.25 packet level protocol for data TE) 0 1 0 0 0 ISO 8348 (OSI connection oriented network service specific subset of ISO 8208 and CCITT X.25) 0 1 0 0 1 ISO 8473 (OSI connectionless service) 0 1 0 1 0 CCITT Recommendation T.70 minimum network layer All other values are reserved.
Optional layer 3 protocol information (octet 7a) User specified.

11.3.5.14 Notification indicator

Reference: ETS 300 102-1, subclause 4.5.21.

Definition: The purpose of the Notification indicator information element is to indicate information pertaining to a call.

The Notification indicator information element is coded as shown in figure 11.19 and table 11.41. The maximum length of this information element is three octets.

8	7	6	5	4	3	2	1	Octet
0	Notification indicator 0 1 0 0 1 1 1 Information element identifier							1
Length of the Notification indicator contents								2
1 ext	Notification description							3

NOTE: For the coding and use of this information element in relation to the provision of supplementary services see ETS 300 196.

Figure 11.19: Notification indicator information element

Table 11.41: Notification indicator information element

Notification description (octet 3)	
Bits **7 6 5 4 3 2 1**	
0 0 0 0 0 0 0	user suspended
0 0 0 0 0 0 1	user resumed
All other values are reserved.	

11.3.5.15 Progress indicator

Reference: ETS 300 102-1, subclause 4.5.22.

Definition: The purpose of the Progress indicator information element is to describe an event which has occurred during the life of a call. The information element may occur two times in a message.

The Progress indicator information element is coded as shown in figure 11.20 and table 11.42. The default maximum length of this information element is 4 octets.

8	7	6	5	4	3	2	1	Octet
	Progress indicator							
0	0	0	1	1	1	1	0	1
	Information element identifier							
Length of the Progress indicator contents								2
1 ext	Coding standard		0 Spare	Location				3
1	Progress description							4

Figure 11.20: Progress indicator information element

Table 11.42: Progress indicator information element

Coding standard (octet 3)

Bits 7 6	
0 0	CCITT standardized coding as described below.
0 1	reserved for other international standards (note 1)
1 0	reserved, national standard (note 1)
1 1	reserved, standard specific to identified location (note 1)

NOTE 1: These other coding standards should be used only when the desired progress indication cannot be represented with the CCITT standardized coding.

Location (octet 3)

Bits 4 3 2 1	
0 0 0 0	user
0 0 0 1	private network serving the local user
0 0 1 0	public network serving the local user
0 1 0 0	public network serving the remote user
0 1 0 1	private network serving the remote user
0 1 1 1	international network
1 0 1 0	network beyond interworking point

All other values are reserved.

NOTE 2: Depending on the location of the users, the local public network and remote public network may be the same network.

Progress description (octet 4)

Bits 7 6 5 4 3 2 1	No.	
0 0 0 0 0 0 1	1.	Call is not end-to-end ISDN: further progress information may be available in-band
0 0 0 0 0 1 0	2.	Destination address is non-ISDN
0 0 0 0 0 1 1	3.	Origination address is non-ISDN
0 0 0 0 1 0 1	5.	Interworking has occurred and has resulted in a telecommunication service change
0 0 0 0 1 0 0	4.	Call has returned to the ISDN
0 0 0 1 0 0 0	8.	In-band information or appropriate pattern now available

All other values are reserved.

11.3.5.16 Restart indicator

Reference: ETS 300 102-1, subclause 4.5.24.

Definition: The purpose of the Restart indicator information element is to identify the class of the facility (i.e. channel or interface) to be restarted.

The Restart indicator information element is coded as shown in figure 11.21 and table 11.43. The maximum length of this information element is three octets.

8	7	6	5	4	3	2	1	Octet
0	Restart indicator 1 1 1 1 0 0 1 Information element identifier							1
Length of the Restart indicator contents								2
1 ext	0	0	0	0	Class			3

Figure 11.21: Restart indicator information element

Table 11.43: Restart indicator information element

Class (octet 3)

Bits **3 2 1**	
0 0 0	Indicated channels (note 1)
1 1 0	Single interface (note 2)
1 1 1	All interfaces (note 2)

All other values are reserved.

NOTE 1: The Channel identification information element shall be included and indicates which channel(s) is to be restarted or has been restarted.

NOTE 2: Since this TBR applies only to associated signalling, the Channel identification information element is not included to indicate the interface to be restarted. As a consequence, either code point can be used to perform the same function.

11.3.5.17 Sending complete

Reference: ETS 300 102-1, subclause 4.5.26.

Definition: The purpose of the Sending complete information element is to optionally indicate completion of Called party number, see subclauses 11.4.1.1, 11.4.1.2, 11.4.2.1 and 11.4.2.4.

It is a single octet information element coded as shown in figure 11.22.

8	7	6	5	4	3	2	1	Octet
1	Sending complete 0 1 0 0 0 0 1 Information element identifier							1

Figure 11.22: Sending complete information element

11.4 Circuit switched call control procedures

Reference: ETS 300 102-1, clause 5.

In addition to the messages exchanged as described in the following subclauses, INFORMATION messages for call control may be sent by the TE or by the network only after the first response to a SETUP message has been sent or received, and before clearing of the Call reference is initiated. An INFORMATION message received in the Release request state may be ignored.

11.4.1 Call establishment at the originating interface

Reference: ETS 300 102-1, subclause 5.1.

Requirement: Before these procedures are invoked, a reliable data link connection shall be established between the TE and the network. All layer 3 messages shall be sent to the data link layer using a DL-DATA-REQUEST primitive. The data link services described in clause 10 are assumed.

Test: This requirement shall be tested according to the procedures of annex D, test preamble PR30001.

11.4.1.1 Call request

Reference: ETS 300 102-1, subclause 5.1.1.

Requirement: A TE shall initiate call establishment by transferring a SETUP message across the user-network interface. Following the transmission of the SETUP message, the call shall be considered by the TE to be in the Call initiated state.

NOTE: Initiation of a call by the TE may require stimulation of the TE at some other point (e.g. the man-machine interface). The PIXIT in annex E requests information concerning the manner in which an outgoing call can be set up.

Test: This requirement shall be tested according to the procedures of annex D, test case TC20002.

11.4.1.2 Overlap sending

Reference: ETS 300 102-1, subclauses 5.1.2 and 5.1.3.

Requirement: If the SETUP message did not contain the Sending complete information element and a SETUP ACKNOWLEDGE message is received, the TE shall enter the Overlap sending state.

After receiving the SETUP ACKNOWLEDGE message and if the TE has additional call information, the TE shall send the remainder of the call information (if any) in one or more INFORMATION messages.

If the SETUP ACKNOWLEDGE message contains progress indicator #8 "in-band information or appropriate pattern is now available" or progress indicator #1 "call is not end-to-end ISDN; further call progress information may be available in-band", the TE may also attach to the B-channel.

The called number information shall be provided by the TE in the Called party number information element.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10104 and TC20204.

11.4.1.3 Call proceeding

11.4.1.3.1 Call proceeding, en-bloc sending

Reference: ETS 300 102-1, subclauses 5.1.2 and 5.1.5.1.

Requirement: If the TE receives the CALL PROCEEDING message when in the Call initiated state, the TE shall enter the Outgoing call proceeding state.

If the CALL PROCEEDING message contains progress indicator #8 "in-band information or appropriate pattern is now available" or progress indicator #1 "call is not end-to-end ISDN; further call progress information may be available in-band", the TE may also attach to the B-channel.

Test: This requirement shall be tested according to the procedures of annex D, test case TC10101.

11.4.1.3.2 Call proceeding, overlap sending

Reference: ETS 300 102-1, subclauses 5.1.2 and 5.1.5.2.

Requirement: If the TE receives the CALL PROCEEDING message when in the Overlap sending state, the TE shall enter the Outgoing call proceeding state.

If the CALL PROCEEDING message contains progress indicator #8 "in-band information or appropriate pattern is now available" or progress indicator #1 "call is not end-to-end ISDN; further call progress information may be available in-band", the TE may also attach to the B-channel.

Test: This requirement shall be tested according to the procedures of annex D, test case TC10203.

11.4.1.4 Call confirmation indication

Reference: ETS 300 102-1, subclauses 5.1.2 and 5.1.7.

Requirement: When the TE receives the ALERTING message, the TE shall enter the Call delivered state.

If the ALERTING message contains progress indicator #8 "in-band information or appropriate pattern is now available" or progress indicator #1 "call is not end-to-end ISDN; further call progress information may be available in-band", the TE may also attach to the B-channel.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10201 and TC10301.

11.4.1.5 Call connected

Reference: ETS 300 102-1, subclauses 5.1.2 and 5.1.8.

Requirement: On receipt of the CONNECT message, the TE may send a CONNECT ACKNOWLEDGE message; shall attach to the B-channel (if it has not already done so) and shall enter the Active state.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10202, TC10302 and TC10401.

11.4.2 Call establishment at the destination interface

Reference: ETS 300 102-1, subclause 5.2.

Requirement: Before responding to a SETUP message, a reliable data link connection shall be established between the TE and the network. All layer 3 messages shall be sent to the data link layer using a DL-DATA-REQUEST primitive. The data link services described in clause 10 are assumed.

Test: This requirement is tested implicitly by all the incoming call handling tests.

11.4.2.1 Incoming call

Reference: ETS 300 102-1, subclause 5.2.1.

Requirement: Upon receipt of a SETUP message received on a point-to-point datalink, the TE shall enter the Call present state.

Depending on the contents of the received message, either en-bloc receiving procedure (see subclause 11.4.2.5.1) or overlap receiving procedure (see subclause 11.4.2.4) shall follow. However, if the SETUP message includes the Sending complete information element, en-bloc receiving procedure shall follow.

TEs supporting only the en-bloc receiving procedure need not recognize the Sending complete information element and may directly analyse the received SETUP message on the assumption that all the call information is contained in the message.

NOTE: Countries using an open numbering plan usually implement the Direct Dialling In (DDI) supplementary service using overlap receiving. Support of overlap receiving is therefore recommended for those terminals intended to support DDI.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10005 and TC10006.

11.4.2.2 Address and compatibility checking

Requirement: If the requirements of compatibility checking and address checking are met, and any other conditions for which no requirement are specified are met, the TE shall perform the remainder of the procedures of 11.4.2.

11.4.2.2.1 Compatibility checking

Reference: ETS 300 102-1, subclause 5.2.2.

Requirement: If a TE is capable of being incompatible with the Bearer capability information element contents, it shall perform compatibility checking as appropriate on receipt of a SETUP message before responding to that SETUP message.

NOTE: It is for the user to determine, on whatever basis it chooses, whether it is compatible with the contents of the Bearer capability, High layer compatibility and Low layer compatibility information elements in the received SETUP message. The PIXIT in annex E contains questions concerning the contents of these information elements the TE responds to as compatible and incompatible. Further requirements may exist in Terminal TBRs.

When the SETUP message is delivered via a point-to-point data link, an incompatible TE shall respond with a RELEASE COMPLETE message, and enter the Null state.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10008 and TC10009.

11.4.2.2.2 Address checking

Reference: ETS 300 102-1, annex B.

There is no requirement for address checking in this TBR.

NOTE: The requirement in this TBR differs from TBR 3 because all incoming SETUP messages are delivered via a point-to-point data link.

11.4.2.3 B-channel selection - destination

11.4.2.3.1 SETUP message delivered by point-to-point data link

Reference: ETS 300 102-1, subclause 5.2.3.1.

Requirement: When the SETUP message is delivered by a point-to-point data link, the TE shall apply the following B-channel selection procedures:

a) In the SETUP message, the network indicates one of the following:

   1) channel is indicated, no acceptable alternative; or,
   2) channel is indicated, any alternative is acceptable; or,
   3) any channel is acceptable; or,
   4) no B-channel available.

b) In cases 1) and 2), if the indicated channel is acceptable and available, the TE shall select it for the call.

   In case 2), if the TE cannot grant the indicated channel, it shall select any other available B-channel, and identify that channel in the Channel identification information element as "channel is indicated, no acceptable alternative" in the first message sent in response to the SETUP message.

   In case 3), the TE shall select any available B-channel, and identify that channel in the first message sent in response to the SETUP message.

In case 4), no requirement shall apply.

Test: This requirement shall be tested according to the procedures of annex D, test preamble PR38001.

NOTE: No test for the second and third paragraphs of item b) is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.2.3.2 SETUP message delivered by broadcast data link.

This is not applicable to primary rate access.

11.4.2.4 Overlap receiving

Reference: ETS 300 102-1, subclause 5.2.4.

Requirement: When a TE implements overlap receiving and determines that a received SETUP message contains either:

a) no called number information; or
b) incomplete called number information; or
c) called number information which the TE cannot determine to be complete;

and when the TE:

d) is compatible with other call characteristics.

The TE shall send a SETUP ACKNOWLEDGE message to the network; and enter the Overlap receiving state.

Following the receipt of a Sending complete information element, or the determination that sufficient call information has been received, the TE shall send a CALL PROCEEDING, ALERTING or CONNECT message to the network.

If, following the receipt of a SETUP message or during overlap receiving, the TE determines that the received call information is invalid (e.g. invalid Called party number), it shall initiate call clearing in accordance with subclause 11.4.3.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10005 and TC12503.

NOTE: No test of clearance on receipt of invalid call information is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.2.5 Call confirmation

11.4.2.5.1 Response to en-bloc SETUP or completion of overlap receiving

Reference: ETS 300 102-1, subclause 5.2.5.1.

Requirement: When the TE determines that sufficient call setup information has been received and compatibility requirements have been satisfied according to subclause 11.4.2.2, the TE shall respond with either a CALL PROCEEDING, ALERTING, or CONNECT message, and enter the Incoming call proceeding, Call received or Connect Request state, respectively.

If, following the receipt of a SETUP message or during overlap receiving, the TE determines that the received call information is invalid (e.g. invalid Called party number), it shall initiate call clearing in accordance with subclause 11.4.3.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10005, TC10006 and TC12503.

11.4.2.6 Call accept

Reference: ETS 300 102-1, subclause 5.2.7.

Requirement: A TE shall indicate acceptance of an incoming call by sending a CONNECT message to the network.

Test: This requirement shall be tested according to the procedures of annex D, test preamble PR38001.

11.4.2.7 Active indication

Reference: ETS 300 102-1, subclause 5.2.8.

Requirement: Upon receipt of the CONNECT ACKNOWLEDGE message the TE shall enter the Active state.

Test: This requirement shall be tested according to the procedures of annex D, test case TC10801.

11.4.3 Call clearing

11.4.3.1 Terminology

Reference: ETS 300 102-1, subclause 5.3.1.

Definition: The following term is used in this TBR in the description of clearing procedures:

> A channel is "released" when the channel is not part of a circuit switched ISDN connection and is available for use in a new connection. Similarly, a Call reference that is "released" is available for reuse.

11.4.3.2 Exception conditions

Reference: ETS 300 102-1, subclause 5.3.2.

Requirement: Except as described in this subclause, call clearing shall be initiated when the TE sends a DISCONNECT message and follows the procedures defined in subclauses 11.4.3.3 and 11.4.3.4, respectively. The only exceptions to the above rule are as follows:

a) in response to a SETUP message, the TE may reject a call (e.g. because of the unavailability of a suitable B-channel) by responding with a RELEASE COMPLETE message provided no other response has previously been sent (e.g. the SETUP ACKNOWLEDGE message in the case of overlap receiving); releasing the Call reference; and enter the Null state;

b) unsuccessful termination of the B-channel selection procedure by the side offering the call shall be accomplished by sending a RELEASE message as described in subclauses 11.4.3.3 and 11.4.3.4.

Test: There is no test.

NOTE: No test is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.3.3 Clearing initiated by the user

Reference: ETS 300 102-1, subclause 5.3.3.

Requirement: Apart from the exceptions identified in subclauses 11.4.3.2 and 11.4.6, the TE shall initiate clearing by sending a DISCONNECT message, starting timer T305, and entering the Disconnect request state.

NOTE: When a TE initiates call clearing by sending a RELEASE message, the procedures described in subclause 11.4.3.4 are followed.

On receipt of the RELEASE message the TE shall cancel timer T305; release the B-channel; send a RELEASE COMPLETE message; release the Call reference; and return to the Null state.

If timer T305 expires, the TE shall send a RELEASE message, start timer T308, enter the Release Request state and follow the procedures of subclause 11.4.3.4.3.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC11105, TC20203, TC20301, TC20401 and TC21003.

11.4.3.4 Clearing initiated by the network

11.4.3.4.1 Clearing when tones/announcements provided

Reference: ETS 300 102-1, subclause 5.3.4.1.

Requirement: On receipt of the DISCONNECT message with Progress indicator #8, the TE shall either::

- enter the Disconnect indication state; or
- start timer T308, send a RELEASE message and enter the Release request state and follow the procedures of 11.4.3.4.3.

NOTE 1: The first option is usually accompanied by connection to the B-channel to receive an in-band tone or announcement.

If the TE follows the first option, the TE may subsequently continue clearing (before the receipt of a RELEASE message from the network) by sending a RELEASE message, starting timer T308 and entering the Release request state and following the procedures of 11.4.3.4.3.

On receipt of the RELEASE message, the TE shall act according to subclause 11.4.3.3.

Test: There is no test.

NOTE 2: No test is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.3.4.2 Clearing when tones/announcements not provided

Reference: ETS 300 102-1, subclause 5.3.4.2.

Requirement: On the receipt of the DISCONNECT message without Progress indicator #8, the TE shall send a RELEASE message, start timer T308, enter the Release request state and follow the procedures of 11.4.3.4.3.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC11001, TC10204, TC10303, TC10402, TC10701, TC10802, TC10901 and TC12501.

11.4.3.4.3 Completion of clearing

Reference: ETS 300 102-1, subclause 5.3.4.3.

Requirement: Following the receipt of a RELEASE COMPLETE message from the network, the TE shall stop timer T308, release both the B-channel and the Call reference; and return to the Null state.

If a RELEASE COMPLETE message is not received before the first expiry of T308, the RELEASE message shall be retransmitted and timer T308 shall be restarted.

If no RELEASE COMPLETE message is received before the second expiry of T308, the TE shall release the call reference and return to the Null state.

Test: This requirement shall be tested according to the procedures of annex D, test case TC11903.

11.4.3.5 Clear collision

Reference: ETS 300 102-1, subclause 5.3.5.

Requirement: When the TE receives a DISCONNECT message whilst in the Disconnect request state, the TE shall send a RELEASE message; and enter the Release request state.

The TE, on receiving a RELEASE message whilst within the Release request state shall release the Call reference and B-channel; and enter the Null state without sending or receiving a RELEASE COMPLETE message.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC11101 and TC11904.

11.4.4 Call rearrangements

This is not applicable to primary rate access

11.4.5 Call collisions

Reference: ETS 300 102-1, subclause 5.7.

Call collisions as such cannot occur at the network. Any simultaneous incoming or outgoing calls are dealt with separately and assigned different Call references.

NOTE Channel selection conflicts can occur if an incoming call and outgoing call select the same channel. In the case of such conflicts, the network gives priority to the incoming call over the call request received from the TE. It clears the outgoing call whenever the B-channel cannot be allocated by the network or accepted by the TE originating the call.

11.4.6 Handling of error conditions

Reference: ETS 300 102-1, subclause 5.8.

Where the TE implements the generic functional protocol defined in ETS 300 196, and ETS 300 196 defines an alternative procedure to any of those defined in this subclause, then the requirements of this subclause do not apply to the extent that the alternative procedure of ETS 300 196 is implemented. The alternative procedure defined in ETS 300 196 is not a requirement.

Clauses 11.4.6.1 through 11.4.6.6 are listed in order of precedence.

The term "Ignore" in the following subclauses means to do nothing, as if the message had never been received.

11.4.6.1 Protocol discrimination error

Reference: ETS 300 102-1, subclause 5.8.1.

Requirement: When a message is received with a Protocol discriminator coded other than "Q.931 (I.451) user-network call control message", no message shall be generated using a protocol discriminator coded as "Q.931(I.451) user-network call control message".

Test: This requirement shall be tested according to the procedures of annex D, test case TC10012.

11.4.6.2 Call reference procedural errors

Reference: ETS 300 102-1, subclause 5.8.3.2.

Requirement:

a) Whenever any message except SETUP, RELEASE, RELEASE COMPLETE, STATUS is received specifying a Call reference which is not recognized as relating to an active call or to a call in progress, clearing shall be initiated by sending a RELEASE message and following the procedures in subclause 11.4.3, specifying the Call reference in the received message. Alternatively, the receiving entity shall send a RELEASE COMPLETE message and remain in the Null state.

   When a STATUS ENQUIRY message is received specifying a call reference which is not recognized as relating to an active call or a call in progress, either the procedures of this subclause or of subclause 11.4.6.7 shall be followed.

b) When a RELEASE message is received that specified a Call reference which is not recognized as relating to an active call or to a call in progress, a RELEASE COMPLETE message shall be returned specifying the Call reference in the received message.

c) When a RELEASE COMPLETE message is received specifying a Call reference which is not recognized as relating to an active call or to a call in progress, no action shall be taken.

d) When a SETUP message is received specifying a Call reference which is recognized as relating to an active call or to a call in progress, this SETUP message shall be ignored.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10010, TC10002, TC10125 and TC10011.

11.4.6.3 Message type or message sequence errors

Reference: ETS 300 102-1, subclause 5.8.4 and 5.3.2 (b).

Requirement: Whenever an unexpected message, except RELEASE or RELEASE COMPLETE, or unrecognized message is received in any state other than the Null state, either

1) a STATUS message shall be returned with Cause #98 "message not compatible with Call state or Message type non-existent or not implemented" and, optionally, the corresponding diagnostic. If a TE can distinguish between un-implemented (or non-existent) Message types and implemented Message types which are incompatible with the Call state, then a STATUS message may be sent with one of the following causes:

   a) Cause #97 "Message type non-existent or not implemented"; or,
   b) Cause #101 "Message not compatible with Call state".

   or;

2) a STATUS ENQUIRY message may be sent requesting the Call state of the network (see subclause 11.4.6.9).

No change in state shall occur in either case at this time.

Whenever the TE receives an unexpected RELEASE message, the TE shall release the B-channel; return a RELEASE COMPLETE message to the network; release the Call reference; stop all timers and return to the Null state.

   NOTE: This event occurs when the network clears a call because the calling party has cleared before the call is answered (see ETS 300 102-1 subclause 5.3.2(e)).

Whenever the TE receives an unexpected RELEASE COMPLETE message, the TE shall release the B-channel; release the Call reference; stop all timers relating to that call and enter the Null state.

If a DISCONNECT message is received while in the Release request state,. the procedures described in the first paragraph of subclause 11.4.3.5 shall apply.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10107, TC10120, TC11008, TC11021, TC10103, TC11005 and TC10102, TC11004.

11.4.6.4 Duplicated information elements

Reference: ETS 300 102-1, subclause 5.8.5.2.

Requirement: If an information element is repeated in a message in which repetition of the Information element is not permitted, only the contents of information element appearing first shall be handled and all subsequent repetitions of the information element shall be ignored. When repetition of the information elements is permitted, only the contents of permitted information elements shall be handled. If the limit on repetition of information elements is exceeded, the contents of information elements appearing first up to the limit of repetitions shall be handled and all subsequent repetitions of the information element shall be ignored.

Test: This requirement shall be tested according to the procedures of annex D, test case TC10024.

11.4.6.5 Mandatory information element errors

11.4.6.5.1 Mandatory information element missing

Reference: ETS 300 102-1, subclause 5.8.6.1.

Requirement: When a message other than SETUP, DISCONNECT, RELEASE or RELEASE COMPLETE is received which has one or more mandatory information elements missing, no action shall be taken on the message and no state change shall occur. A STATUS message shall then be returned with Cause #96 "mandatory information element is missing".

When a SETUP or RELEASE message is received which has one or more mandatory information elements missing, a RELEASE COMPLETE message shall be returned.

Other actions taken on receipt of a RELEASE message with the Cause information element missing shall be the same as if a RELEASE message with Cause #31 "normal, unspecified" had been received.

When a RELEASE message is received as the first clearing message and with a Cause information element missing, the actions taken shall be the same as if a RELEASE message with Cause #31 "normal, unspecified" was received (see subclause 11.4.3).

When a DISCONNECT message is received with the Cause information element missing, the actions taken shall be the same as if a DISCONNECT message with Cause #31 "normal, unspecified" was received (see subclause 11.4.3).

When a RELEASE COMPLETE message is received with a Cause information element missing, it shall be assumed that a RELEASE COMPLETE message was received with Cause #31 "normal, unspecified".

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10015, TC10115, TC10222, TC11028 and TC11029.

NOTE: No test for the action on receipt of a DISCONNECT message with the Cause information element missing is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.6.5.2 Mandatory information element content error

Reference: ETS 300 102-1, subclause 5.8.6.2.

Requirement: When a message other than SETUP, DISCONNECT, RELEASE or RELEASE COMPLETE is received which has one or more mandatory information elements with invalid content, no

action shall be taken on the message and no state change shall occur. A STATUS message shall then be returned with Cause #100 "invalid information element contents".

When a SETUP or RELEASE message is received which has one or more mandatory information elements with invalid content, a RELEASE COMPLETE message shall be returned.

Other actions taken on receipt of a RELEASE message with the Cause information element with invalid content shall be the same as if a RELEASE message with Cause #31 "normal, unspecified" had been received.

When a DISCONNECT message is received with invalid content of the Cause information element, the actions taken shall be the same as if a DISCONNECT message with Cause #31 "normal unspecified" was received (see subclause 11.4.3).

When a RELEASE COMPLETE message is received with invalid content of the Cause information element, it shall be assumed that a RELEASE COMPLETE message was received with Cause #31 "normal, unspecified".

Information elements with a length exceeding the maximum length (given in subclause 11.2) shall be treated as information element with content error.

NOTE 1: As an option of a TE (e.g. NT2), Cause values, location codes, and diagnostics which are not understood by the NT2 may be passed on to another entity (e.g. user or NT2) instead of treating the Cause value as if it were Cause # 31 "normal, unspecified". This option is intended to aid the TE to be compatible with future additions of Cause values, location codes and diagnostics to this TBR.

NOTE 2: No test for the action on receipt of a message with a mandatory information element length exceeding the maximum is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10026, TC10116, TC10223 and TC11032.

11.4.6.6 Non-mandatory information element errors

Reference: ETS 300 102-1, subclause 5.8.7.

The following subclauses identify actions on information elements not recognized as mandatory.

11.4.6.6.1 Unrecognized information element

Reference: ETS 300 102-1, subclause 5.8.7.1.

Requirement: When a message is received which has one or more unrecognized information elements, the TE shall check whether any are encoded to indicate "comprehension required" (refer to table 11.27 for information element identifiers reserved with this meaning). If any unrecognized information element is encoded to indicate "comprehension required", then the procedures in subclause 11.4.6.5.1 are followed; i.e. as if a "missing mandatory information element" error condition had occurred. If all unrecognized information elements are not encoded to indicate "comprehension required", then the TE shall proceed as follows.

Action shall be taken on the message and those information elements which are recognized and have valid content. When the received message is other than DISCONNECT, RELEASE or RELEASE COMPLETE, a STATUS message may be returned containing one Cause information element. The STATUS message shall indicate the Call state of the receiver after taking action on the message. The Cause information element shall contain Cause #99 "information element non-existent or not implemented", and the diagnostic field, if present, shall contain the information element identifier for each information element which was unrecognized.

Subsequent actions are determined by the sender of the unrecognized information elements. If a clearing message contains one or more unrecognized information elements, the error is reported to the local TE in the following manner:

a) when a DISCONNECT message is received which has one or more unrecognized information elements, a RELEASE message shall be returned;

b) when a RELEASE message is received which has one or more unrecognized information elements, a RELEASE COMPLETE shall be returned;

c) when a RELEASE COMPLETE message is received which has one or more unrecognized information elements, no action shall be taken on the unrecognized information.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10027, TC10028, TC10718, TC11118 and TC11920.

11.4.6.6.2 Non-mandatory information element content error

Reference: ETS 300 102-1, subclause 5.8.7.2.

Requirement: When a message is received which has one or more non-mandatory information elements with invalid content, action shall be taken on the message and those information elements which are recognized and have valid content. A STATUS message may be returned containing one Cause information element. The STATUS message indicates the Call state of the receiver after taking action on the message. The Cause information element shall contain Cause #100 "invalid information element contents", and the diagnostic field, if present, shall contain the information element identifier for each information element which has invalid contents.

Information elements with a length exceeding the maximum length (given in subclause 11.2) shall be treated as an information element with content error with the exception of other access information elements (i.e. a user-to-user information, low layer compatibility, high layer compatibility, or subaddress information element) which may be truncated and processed;

For access information elements treated as information elements with content error, Cause #43 "access information discarded" shall be used instead of Cause #100 "invalid information element contents" in the STATUS message.

NOTE 1: As an option of a TE (e.g. NT2) Cause values, location codes, and diagnostics which are not understood by the NT2 may be accepted, or in the case of an NT2, passed on to another entity (e.g. user or NT2) instead of ignoring the Cause information element contents and optionally sending a STATUS message with Cause no. 100 "invalid information element contents". This option is intended to aid the TE to be compatible with future additions of Cause values, location codes, and diagnostics to this TBR.

Test: This requirement shall be tested according to the procedures of annex D, test case TC10029.

NOTE 2: No test for the action on receipt of a message containing an optional information element which is too long is specified in this version of the TBR because it was not possible to develop and verify a test due to shortage of time and resources. ETSI intends to develop and verify an appropriate test for inclusion in a later version.

11.4.6.7 Status enquiry procedure

Reference: ETS 300 102-1, subclause 5.8.10.

Requirement: When the TE is required to perform the procedures of this subclause, and a STATUS ENQUIRY message has not already been sent, a STATUS ENQUIRY message shall be sent. The TE shall treat any responding STATUS message according to the procedures of subclause 11.4.6.8.

Upon receipt of a STATUS ENQUIRY message, the receiver shall respond with a status message reporting the current Call state.

If the STATUS ENQUIRY message specifies a call reference which is not related to an active call or to a call in progress, then the receiver shall either respond with a STATUS message reporting the current call state, or the procedures of subclause 11.4.6.2 shall be followed.

Test: This requirement shall be tested according to the procedures of annex D, test case TC11107 and postamble CS59901.

11.4.6.8 Receiving a STATUS message

Reference: ETS 300 102-1, subclause 5.8.11.

Requirement:

a) If a STATUS message indicating any Call state except the Null state is received in the Null state, then the receiving entity shall either:

1) send a RELEASE message; and then follow the procedures of subclause 11.4.3; or
2) send a RELEASE COMPLETE message; and remain in the Null state.

b) If a STATUS message indicating any Call state except the Null state is received in the Release request state, no action shall be taken.

c) If a STATUS message, indicating the Null state, is received in any state except the Null state, the receiver shall release all resources and move into the Null state.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC10004, TC10105, TC11007 and TC11906.

11.4.7 User notification procedure

Reference: ETS 300 102-1, subclause 5.9.

Requirement: No state change shall occur at the TE following the receipt of a NOTIFY message.

Test: This requirement shall be tested according to the procedures of annex D, test cases TC11003 and TC11103.

11.4.8 Restart procedure

Reference: ETS 300 102-1, subclause 5.5 and 5.5.2.

Requirement: Upon receiving a RESTART message the TE shall enter the Restart state associated to the global call reference; it shall then initiate the appropriate internal actions to return the specified channels to the idle condition and Call references to the Null state. Upon completion of internal clearing and within 2 minutes of receipt of the RESTART, a RESTART ACKNOWLEDGE message shall be transmitted to the network, and the Null state entered.

Test: This requirement shall be tested according to the procedures of annex D, test case TC19003.

11.5 TE timers

Definition: The duration of timer T305 is in the range 15 s to 45 s.

NOTE 1: A value of 30 s is recommended.

The duration of timer T308 is in the range 3 s to 15 s.

NOTE 2: A value of 4 s is recommended.

Annex A (normative): TBR Requirements Table (TBR-RT)

The purpose of this TBR-RT is to state the logical inter-relationship of the various requirements within this TBR, and their dependence on the implementation or non-implementation of options within particular items of TE.

The contents of this TBR-RT can also perform a similar function to that of an Implementation Conformance Statement (ICS). Therefore, in order to facilitate the provision of information by the manufacturers to test laboratories, a blank column for "Support" has been added so that the TBR-RT may be copied and used as part of an ISC proforma (additional information to identify uniquely the IUT will be needed).

It is not a requirement of this TBR that information is provided to laboratories in this way, and other methods for providing information (e.g. ICSs for the base standards identified in the Scope) may be used.

A.1 Guidance for completion of the TBR-RT

For each layer, there are one or more tables of requirements.

The Number column, when taken with the table number, provides an unique identifier to each requirement (i.e. A6.1 is item 1 in table A.6).

The Reference column lists the subclause reference in the TBR where the requirement may be found.

The TBR Requirement column gives the clause title of the relevant clause, supplemented by any additional information necessary to identify the requirement.

The Status column contains one of the following items.

- m support for the requirement is mandatory,
- cx support for the requirement is mandatory if the relevant condition is met,
- o support for the requirement is optional,
- ox support for the requirement is optional, subject to certain options being selected according to the numbered footnote,
- n/a support for the requirement is not applicable,
- x support for the requirement is forbidden.

The outcome of a condition may be any of the other status values listed.

The Support column is blank for the user to complete.

A.2 Layer 1 and overvoltage requirements TBR-RT

Table A.1: Layer 1 and overvoltage conditions table

Refer-ence.	Condition	Status	Support (Y/N)	Comment
1	Is TE mains powered?	o		Affects requirements in clause 8

Table A.2: Overvoltage requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	8.1	Impulse transfer from mains, common mode	c1	
2	8.2	Impulse transfer from mains, transverse mode	c1	
3	8.3	Conversion of common mode to transverse mode	m	
c1 = m if A1.1 else n/a				

Table A.3: Layer 1 physical characteristics requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	9.1.1	Hardwiring	m	
2	9.1.2	Alternative connection method	o	

Table A.4: Layer 1 output port electrical requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	9.2.1	Waveform shape	m	
2	9.2.2	Impedance towards ground	m	
3	9.2.3	Clock accuracy	m	
4	9.2.4a	Output jitter, input timing derived from the same primary rate access	o1	
5	9.2.4b	Output jitter, input timing derived from a different primary rate access	o1	
6	9.2.4c	Output jitter, input timing derived from a non-ISDN 2 048 kbit/s access	o1	
7	9.2.4d	Output jitter, input timing derived from internal source.	o1	
8	9.2.4e	Output jitter, input timing derived from dedicated external reference	o1	
o1. One or more options shall be chosen.				

Table A.5: Layer 1 input port electrical requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	9.3.1	Return loss	m	
2	9.3.2	Immunity to attenuation and reflections	m	
3	9.3.3	Jitter tolerance	m	
4	9.3.4	Tolerable longitudinal voltage	m	
5	9.3.5	Impedance towards ground	m	

Table A.6: Layer 1 frame structure requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	9.4.4	Allocation of bits number 1 to 8 of the frame	m	
2	9.4.8	Use of bit 1 in 2 048 kbit/s CRC-4 multiframe	m	
3	9.4.9	D-channel	m	

Table A.7: Layer 1 operational functions requirements table

No	Ref	TBR Requirement	Status	Support (Y/N)
1	9.5.4.2.1	Anomalies and defect detection	m	
2	9.5.4.2.2	Detection of defect indication signals	m	
3	9.5.4.2.3	Consequent actions	m	
4	9.5.5.1	Loss of frame alignment	m	
5	9.5.5.2	Strategy for frame alignment recovery	m	
6	9.5.5.3	CRC multiframe alignment using information in bit 1 of the basic frame	m	
7	9.5.5.4	CRC bit monitoring	m	
8	9.5.5.5	Monitoring for false frame alignment	m	

A.3 Layer 2 TBR-RT

Table A.8 Layer 2 point-to-point configuration requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.3	Does the TE support a configuration using only a single point-to-point data link?	o	

Table A.9 Layer 2 unacknowledged operation requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.4.1	Transmission of unacknowledged information	c2	
2	10.4.2	Receipt of unacknowledged information	c2	
c2 = n/a if A8.1 else m				

Table A.10 Layer 2 TEI management requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.5.2	TEI assignment procedure, automatic TEIs	c3	
2	10.5.2	TEI assignment procedure, non-automatic TEIs	c3	
3	10.5.2.1	Expiry of timer T202	c4	
4	10.5.3	Operation of the TEI check procedure	c5	
5	10.5.4.1	Action taken by the data link layer entity receiving the MDL-REMOVE-REQUEST primitive	c4	
6	10.5.4.2	Conditions for TEI removal, receipt of an identity remove message	c4	
7	10.5.4.2	Conditions for TEI removal, receipt of MDL-ERROR INDICATION indicating possible multiple TEI assignment	c6	
8	10.5.5.2	Operation of the TEI identity verify procedure	c6	
9	10.5.5.3	Expiry of timer T202	c7	

c3 = n/a if A8.1 else o2
c4 = m if A10.1 else n/a
c5 = n/a if A8.1 else m
c6 = o3 if A10.1 else n/a
c7 = m if A10.9 else n/a
o2. One or more options shall be chosen.
o3. One or more options shall be chosen.

Table A.11: Layer 2 establishment and release procedures requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.6.1.1	General	m	
2	10.6.1.2	Establishment procedures	m	
3	10.6.1.3	Procedure on expiry of timer T200	m	
4	10.6.2	Termination of multiple frame operation	m	
5	10.6.3.1	Identical transmitted and received commands	m	

Table A.12: Layer 2 multiple frame operation requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.7.1	Transmitting I-frames	m	
2	10.7.2	Receiving I-frames	m	
3	10.7.2.1	P bit set to 1	m	
4	10.7.2.2	P bit set to 0	m	
5	10.7.3	Receiving acknowledgements	m	
6	10.7.4	Receiving REJ frames	m	
7	10.7.5.1	Receiving a valid RNR command or response	m	
8	10.7.5.2	Expiry of timer T200 during "peer receiver busy"	m	
9	10.7.5.3	Receiving a valid RNR command or response during "peer receiver busy"	m	
10	10.7.5.4	Receiving a valid RR or REJ command during "peer receiver busy"	m	
11	10.7.5.5	Appropriate supervisory response frame	m	
12	10.7.6	Waiting acknowledgement	m	
13	10.8	Re-establishment of multiple frame operation	m	

Table A.13: Layer 2 exception condition requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.9.1	N(S) sequence error	m	
2	10.9.2	Invalid frame condition	m	
3	10.9.3	Frame rejection condition	m	
4	10.9.4	Multiple-assignment of TEI value	c8	
c8 = m if A10.1 else n/a				

Table A.14: Layer 2 system parameters requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	10.10.7	Layer 2 response time, TE not operating in accordance with 10.3 (200 ms)	c9	
2	10.10.7	Layer 2 response time, TE operating in accordance with 10.3 (500 ms)	c10	
c9 = n/a if A8.1 else m c10 = m if A8.1 else n/a				

A.4 Layer 3 TBR-RT

Table A.15: Layer 3 Call establishment at the originating interface requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	11.4.1	Call establishment at the originating interface	m	
2	11.4.1.1	Call request, SETUP message with Sending Complete information element	o4	
3	11.4.1.1	Call request, SETUP message with all called party address information, but without Sending Complete information element	o4	
4	11.4.1.1	Call request, SETUP message without all called party address information	o4	
5	11.4.1.2	Overlap sending, enter Overlap sending state	c11	
6	11.4.1.2	Overlap sending, send INFORMATION messages	c12	
7	11.4.1.3.1	Call proceeding, en-bloc sending	c13	
8	11.4.1.3.2	Call proceeding, overlap sending	c11	
9	11.4.1.4	Call confirmation indication	m	
10	11.4.1.5	Call connected	m	
c11 = m if A15.3 or A14.4 else n/a c12 = m if A15.4 c13 = m if A15.2 or A15.3 else n/a o4. One or more options shall be chosen.				

Table A.16: Layer 3 Call establishment at the destination interface requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	11.4.2	Call establishment at the destination interface	m	
2	11.4.2.1	Incoming call, SETUP message delivered by point-to-point data link	m	
3	11.4.2.2.1	Compatibility checking on Bearer capability information element, SETUP message delivered by point-to-point data link	o	
4	11.4.2.3.1	B-channel selection-destination, SETUP message delivered by point-to-point data link	m	
5	11.4.2.4	Overlap receiving	o	
6	11.4.2.5.1	Response to en-bloc SETUP or completion of overlap receiving	m	
7	11.4.2.6	Call accept	m	
8	11.4.2.7	Active indication	m	

Table A.17: Layer 3 Call clearing requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	11.4.3.2	Exception conditions	m	
2	11.4.3.3	Clearing initiated by the user	m	
3	11.4.3.4.1	Clearing when tones/announcements provided, Disconnect Indication state entered	o5	
4	11.4.3.4.1	Clearing when tones/announcements provided, Release Request state entered	o5	
5	11.4.3.4.2	Clearing when tones/announcements not provided	m	
6	11.4.3.4.3	Completion of clearing	m	
7	11.4.3.5	Clear collision	m	
o5. One or more options shall be chosen.				

Table A.18: Layer 3 error conditions requirements table

No.	Reference	TBR Requirement	Status	Support (Y/N)
1	11.4.6.1	Protocol discrimination error	m	
2	11.4.6.2	Call reference procedural errors	m	
3	11.4.6.3	Message type or message sequence errors	m	
4	11.4.6.4	Duplicated information elements	m	
5	11.4.6.5.1	Mandatory information element missing	m	
6	11.4.6.5.2	Mandatory information element content error	m	
7	11.4.6.6.1	Unrecognized information element	m	
8	11.4.6.6.2	Non-mandatory information element content error	m	
9	11.4.6.7	Status enquiry procedure	m	
10	11.4.6.8	Receiving a STATUS message	m	
11	11.4.7	User notification procedure	m	
12	11.4.8	Restart procedure	m	

Annex B (normative): Layer 1 tests

B.1 Scope and general information

B.1.1 Scope

Reference: ETS 300 011, annex C, subclause C.1.1.

This annex provides the test principles for the requirements of this TBR used to determine the compliance of an implementation under test to this TBR.

Detailed test equipment accuracy and the specification tolerance of the test devices is not a subject of this annex. Where such details are provided then those test details are considered as being an "informative" addition to the test description.

The test configurations given do not imply a specific realization of test equipment, or arrangement, or the use of specific test devices for conformance testing. However, any test configuration used shall provide those test conditions specified under "system state", "stimulus" and "monitor" for each individual test.

B.1.2 General information

Reference: ETS 300 011, annex C, subclause C.1.2.

In the case of a multi-access implementation under test supporting interface I_a, unless otherwise stated, only one access at a time shall receive the stimulus. All other accesses shall receive "no signal" (state F3).

B.1.2.1 Additional information to support the test

Reference: ETS 300 011, annex C, subclause C.1.2.1.

It is assumed that, at least one of the following facilities is provided by IUT:

1) a transparent loopback of at least one timeslot towards the interface;

2) the ability to transmit a PRBS 2^{11}-1 in a timeslot.

When the IUT does not provide these facilities the equipment supplier shall provide:

a) a test equipment using the same chip set and interface components as in the IUT and able to provide a transparent loopback of at least one timeslot towards the interface; or

b) a test equipment using the same chip set and interface components as in the IUT and able to provide a PRBS 2^{11}-1 in a timeslot.

B.1.3 Connection of the simulator to the IUT

Reference: ETS 300 011, annex C, subclause C.1.3.

For testing the electrical characteristics of the IUT, the simulator, or its relevant part, shall be connected directly to the interconnecting points for the interface wiring at the IUT unless otherwise stated. For the tests given in subclauses B.2.1, B.2.2, B.3.1, B.3.2, B.3.4 and B.3.5 a cord connected at an IUT shall be removed since a cord is regarded as integral part of the interface wiring.

All other tests may be performed with interface wiring complying with the requirements given in subclause 9.1.

B.1.4 Connection of the IUT to ground

Connection of the IUT to ground represents either:

- galvanic connection (if supported); or
- a capacitive path to ground through the mains (e.g. as permitted for terminals designed according to safety class II of EN 60 950); or
- connection via an auxiliary interface.

B.1.5 Environmental conditions

Testing shall be performed at a temperature

a. within the intended operational range of the TE, and

b. within the range 19-25C.

Where there is not an overlap of at least 5C, testing shall be performed at any temperature within the intended operational range.

Testing shall be performed at a humidity in the range 5-75%.

B.1.6 Pulse measurements

Measurements of pulses described in B.2.1 shall be performed in dc mode.

B.2 Specification at the output port

B.2.1 Waveform shape

B.2.1.1 Pulse shape and amplitude of a mark (pulse)

Reference: ETS 300 011, annex C, subclause C.2.3.1.

Purpose: To check the conformance of the shape of all mark pulses, irrespective of the polarity, transmitted by IUT.

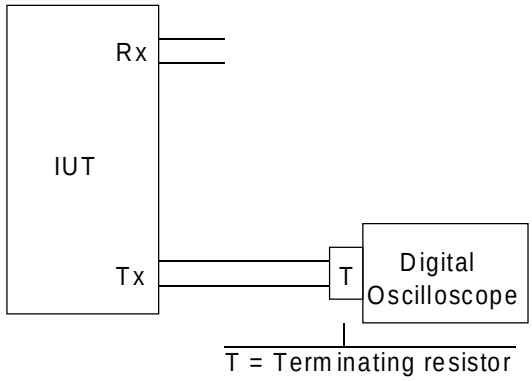


Figure B.1: Test configuration

System state: Any state F1 to F5.

Stimulus: Relevant signals defined to force IUT to enter the appropriate state.

Monitor: The marks transmitted by IUT, measured 10 times separately.

Results: All positive and negative pulses shall be within the mask of figure 9.2, assuming V = 100 %, to be 3 V.

A bandwidth of 200 MHz or greater shall be used to ensure the capture of over- or undershoot of the pulse.

B.2.1.2 Peak voltage of a space (no pulse)

Reference: ETS 300 011, annex C, subclause C.2.3.2.

Purpose: To check the absence of any voltage higher than 10 % of the nominal peak value of a pulse during the transmission of a space (no pulse).

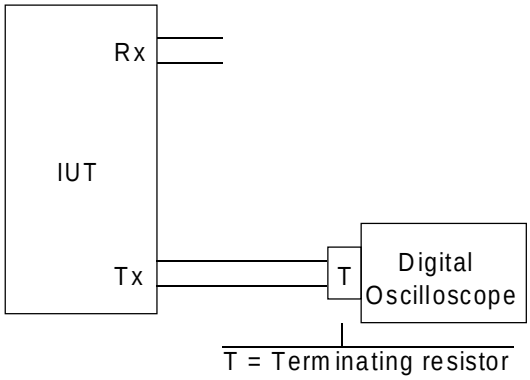


Figure B.2: Test configuration

System state: Any state F1 to F5.

Stimulus: Relevant signals defined to force IUT to enter the appropriate state.

Monitor: The spaces transmitted by IUT, measured 10 times separately.

Results: All bit intervals corresponding to a transmission of a space shall not present voltages higher than ± 0,3 V.

A bandwidth of 200 MHz or greater shall be used to ensure the capture of over- or undershoot of the pulse.

B.2.1.3 Ratio of the amplitudes of positive and negative pulses at the centre of the pulse

Reference: ETS 300 011, annex C, subclause C.2.3.3.

Purpose: To check the balance between the amplitude of positive and negative pulses (measured at the centre of the pulse).

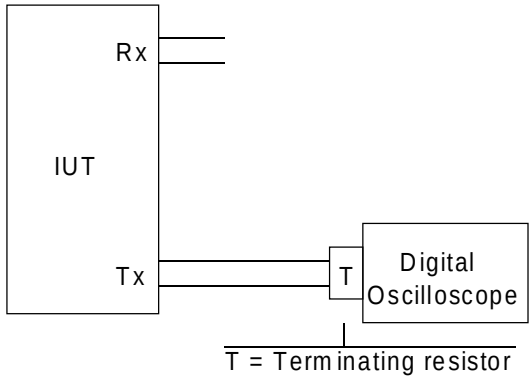


Figure B.3: Test configuration

System state: Any state F1 to F5.

Stimulus: Relevant signal defined to force IUT to enter the appropriate state.

Monitor: The amplitude of positive and negative pulses (measured 10 times separately at the centre of the pulse).

To determine the centre of a pulse:

- determine the level equal to half the nominal pulse amplitude (i.e. 1,5 V), where the width of the actual pulse shall be measured;

- a point equal to half the value of the measured width of the pulse is the centre of the pulse.

Results: The ratio between the amplitudes shall be within the range from 0,95 to 1,05.

B.2.1.4 Ratio of the widths of positive and negative pulses at the nominal half amplitude

Reference: ETS 300 011, annex C, subclause C.2.3.4.

Purpose: To check the balance between the time duration of pulses of different polarity (measured at the half of the nominal pulse amplitude).

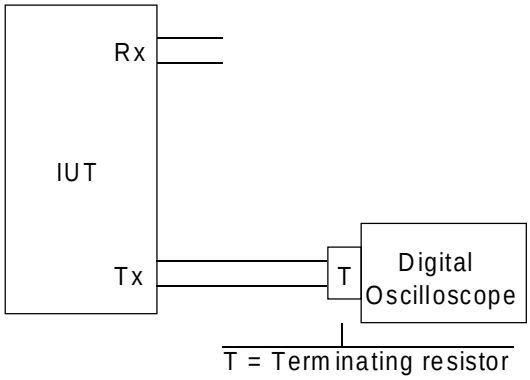


Figure B.4: Test configuration

System state: Any state F1 to F5.

Stimulus: Relevant signal defined to force IUT to enter the appropriate state.

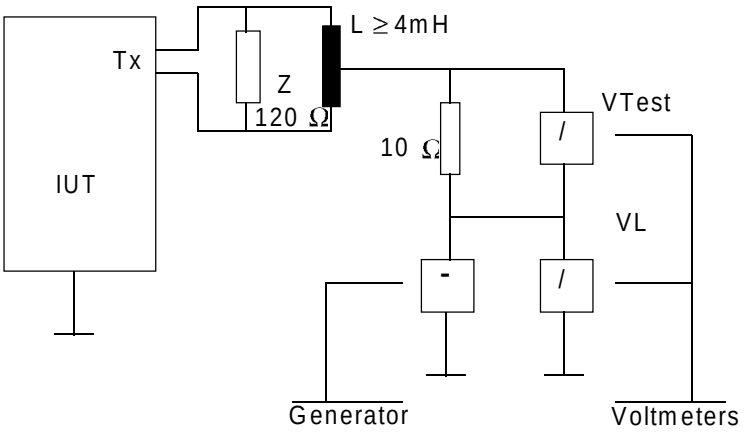
Monitor: The time duration of positive and negative pulses measured at the nominal half of the pulse amplitude (i.e. 1,5 V), measured 10 times separately.

Results: The ratio between the time durations shall be within the range from 0,95 to 1,05.

B.2.2 Impedance towards ground of the transmitter output

Reference: ETS 300 011, annex C, subclause C.2.11.2.

Purpose: To check IUT transmitter output impedance towards ground.



NOTE: The coil should have virtually zero loss for the given frequencies and the windings should be well balanced.

Figure B.5: Test configuration

System state: State F3.

Stimulus: Sinusoidal test signal voltage V_L shall be 2 Vrms.

The test signal shall be applied at the following frequencies in the range 10 Hz to 1 MHz:

10 Hz, 15 Hz, 31 Hz, 63 Hz, 125 Hz, 220 Hz, 443 Hz, 792 Hz, 1,5 kHz, 3,1 kHz, 6,3 kHz, 12,5 kHz, 22 kHz, 44,3 kHz, 79,2 kHz, 150 kHz, 220 kHz, 312 kHz, 443 kHz, 500 kHz, 628 kHz, 792 kHz and 1 MHz.

Monitor: Voltage of V_{TEST}.

NOTE: Frequency selective level measuring equipments should be used. Wideband measuring equipment is not suitable for devices measuring V_{TEST} and V_L.

Results:

a. 10 Hz ≤ f ≤ 500 kHz: $V_{TEST} \leq 20$ mV rms

b 500 Hz ≤ f ≤ 1 MHz: maximum value increasing at 6dB/octave from V_{TEST} = 20 mV rms

B.2.3 Bit rate when unsynchronized

Reference: ETS 300 011, annex C, subclause C.2.1.

Purpose: To measure the bit rate when the IUT (Implementation Under Test) is not synchronized.

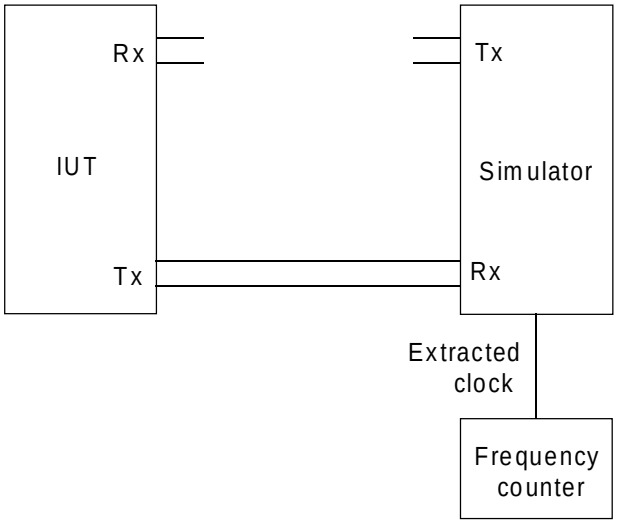


Figure B.6: Clock accuracy at the output port

System state: Any state where the IUT not synchronized to the network.

Stimulus: Any stimulus which allows the IUT to remain in free run mode.

Monitor: Measure bit rate with frequency counter, as extracted by the timing recovery circuit of the network simulator.

Results: The bit rate shall be in the range 2 048 kbit/s ± 50 ppm.

B.2.4 Output jitter

Reference: ETS 300 011, annex C, subclause C.2.8.2.1.

Purpose: To measure the jitter generated from IUT in the presence of input jitter when IUT is synchronized by the simulator.

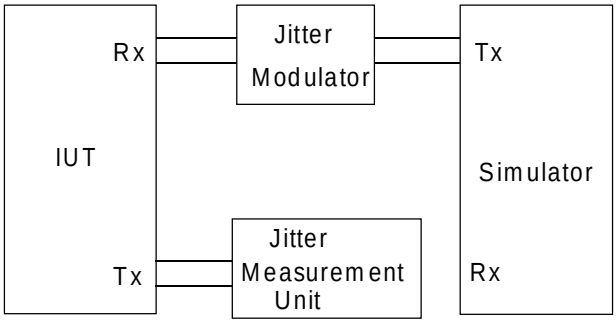


Figure B.7: Test configuration, effect of jitter on timing

The jitter measurement shall be performed using equipment that has an external timing reference to the jitter measurement set which has no phase variation energy in the jitter region under test. The jitter shall be measured with a bandpass filter having a high pass of first order (slope of 20 dB/decade) and having a low pass of third order (slope of 60 db/decade) with cut-off frequencies as defined in table 9.2.

System state: State F1.

Stimulus:

a) The input of the same primary rate access, with the maximum tolerable jitter specified in subclause 9.3.3.

Normal operational frames with jitter according to subclause 9.2.4, provided to the synchronising input and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

b) The input of another primary rate access connected to the TE, with the maximum tolerable jitter specified in subclause 9.3.3.

Normal operational frames with jitter according to subclause 9.2.4, provided to the synchronising input and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

c) The input of another 2 048 kbit/s interface connected to the TE, with the maximum tolerable jitter specified in subclause 9.3.3, except that the limits for input jitter given in table 9.5 are replaced by those given in table 9.3.

Normal operational frames as declared by the supplier with jitter according to subclause 9.2.4, provided to the synchronising input and with a PRBS pattern 2^{15}-1 in those parts of the input signal declared by the supplier. Normal operational frames provided to the input of the interface under test and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

d) Internal reference clock (free running mode)

Normal operational frames provided to the input of the interface under test and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

NOTE: the jitter modulator shown in figure B.7 is not needed for this configuration.

e) The input of an interface to a dedicated external reference clock.

Normal operational frames provided to the input of the interface under test and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0. Synchronising signal with maximum jitter as declared by the supplier applied to the synchronising input of the IUT.

NOTE: the jitter modulator shown in figure B.7 is not needed for this configuration.

Tests (a), (b) and (c) shall be performed for the following different cases:

1) simulator providing the nominal frequency;

2) simulator providing the nominal frequency plus 1 ppm;

3) simulator providing the nominal frequency minus 1 ppm.

In each case, the input jitter shall be applied at least at the following frequencies in the frequency range 1 Hz to 100 kHz:

1Hz, 2 Hz, 3 Hz, 6 Hz, 12 Hz, 20 Hz, 31 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz, 32 kHz, 64 kHz and 100 kHz.

Monitor: The jitter extracted from the signal transmitted by the IUT measured at the output.

Results: The peak to peak jitter shall be within the limits specified in table 9.2.

B.2.5 HDB3 coding

Reference: ETS 300 011, annex C, subclause C.3.1.1

Purpose: To check the coding and binary organization of the Normal Operational Frame.

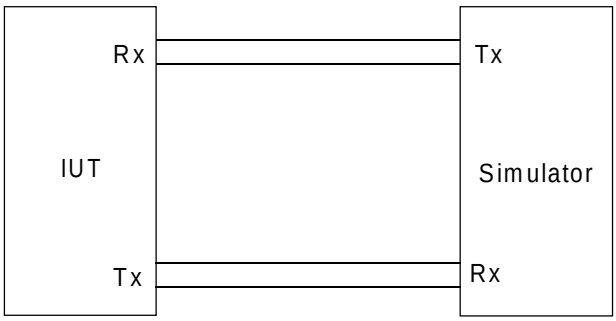


Figure B.8: Test configuration

System state: State F1. Application of one of the facilities defined in subclause B.1.2.1 is required.

Stimulus. Normal Operational Frame sent continuously from the simulator with valid timeslot 0 including active CRC and without CRC errors. A PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

Monitor: The correct coding and frame structure of the signal sent from the IUT for a period of 10 s.

Results: The signal received shall be encoded according to the HDB3 coding rule. The frame shall comprise a valid timeslot 0 with the A bit set to 0, E bit set to 1 and correct CRC bits without CRC blocks in error.

B.3 Specification at the input port

B.3.1 Return loss

Reference: ETS 300 011, annex C, subclause C.2.4.1.

Purpose: To measure the return loss of the receiving section of IUT.

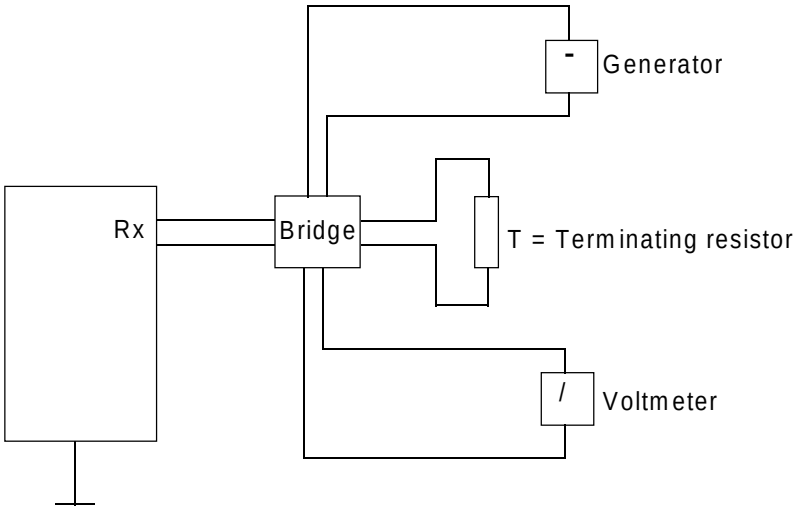


Figure B.9: Return loss at input port

System state: Powered.

Stimulus: Sinusoidal signal of 3 V peak at the input port, and at least at the frequencies as described below in the range between 51 kHz and 3 072 kHz:

51 kHz, 64 kHz, 128 kHz, 256 kHz, 512 kHz, 1 024 kHz, 2 048kHz and 3 072kHz.

Monitor: Voltage measured across the bridge, representing a terminating resistor of 120 Ω, using a selective voltmeter with bandwidth less than 1 kHz.

Results: The measured return loss shall be greater than the limits given in the requirement.

B.3.2 Immunity to attenuation and reflections

Reference: ETS 300 011, annex C, subclause C.2.4.2.

Purpose: To check the input port immunity against an interfering signal combined with the input signal with a cable attenuation of maximum 6 dB.

Test configuration:

The output signal of the network simulator shall conform to a pulse shape as defined in figure 9.2 when sending normal operational frames. The binary content of the timeslots 1 to 31 shall be a PRBS 2^{15}-1.

The simulator output shall provide maximum reflection (i.e. low output impedance to simulate simple transmitter implementations).

The interfering signal shall conform to a pulse shape as defined in figure 9.2, encoded HDB3. Its binary content shall be a PRBS 2^{15}-1. The bit rate shall be within ± 50 ppm and shall not be synchronized to the output signal of the simulator.

The interfering signal shall be combined with the main signal in a combining network having an impedance of 120 Ω, with zero loss in the main path and an attenuation of the interference path of 18 dB.

The conformance of IUT shall be verified in the following two test conditions:

a) without cable simulator. The amplitude of the signal transmitted by the simulator shall be 3,3 V (nominal amplitude + 10 %);

b) with cable simulator having 6 dB attenuation measured at 1 024 kHz and following a $\sqrt{f}$ law. The amplitude of the signal transmitted by the simulator shall be 2,7 V (nominal amplitude -10 %).

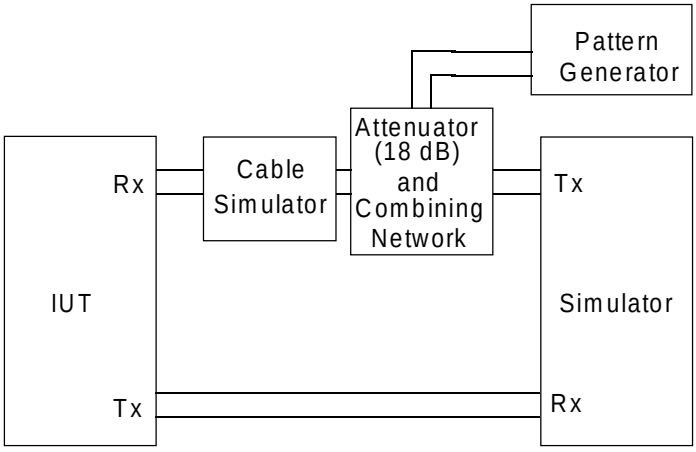


Figure B.10: Input loss tolerance and immunity against reflections

System state: State F1.

Stimulus: Normal Operational frames with PRBS pattern 2^{15}-1 in timeslots 1 to 31.

PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

The test shall be repeated with the wires at the IUT input reversed.

Monitor: Monitor the CRC error information report transmitted by IUT.

Results: No E bit set to 0 shall be received for a time period of at least one minute.

NOTE 1: The $\sqrt{f}$ law of a cable simulator should apply in a frequency range 100 kHz to 10 MHz.

NOTE 2: This test relies on the correct operation of the CRC error information report by IUT.

NOTE 3: If a single E-bit is set to 0, the test should be repeated to ensure that the cause of the failure is not because of an unrelated external bit error.

B.3.3 Minimum tolerance to jitter

Reference: ETS 300 011, annex C, subclause C.2.8.1.

Purpose: To check the ability of IUT to tolerate on the 2 048 kbit/s incoming signal a sinusoidal jitter/wander in accordance with subclause 9.3.3.

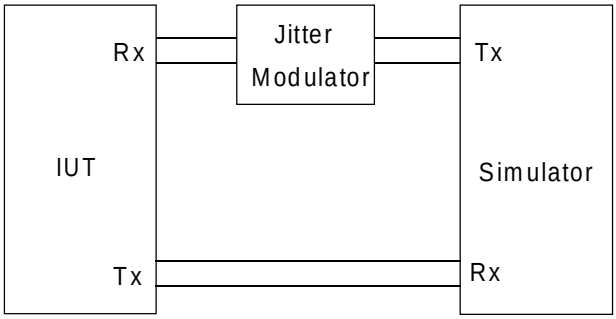


Figure B.11: Test configuration, effect of jitter on timing

System state: State F1.

Stimulus: Normal Operational frames with jitter/wander according to subclause 9.3.3. and with a PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0. The jitter shall be applied at least at the following frequencies in the range 1 Hz to 100 kHz:

20 Hz, 31 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz, 32 kHz, 64 kHz and 100 kHz.

Other inputs in state F3 (see B.1.2).

This test is performed at a frequency within ± 1 ppm of the nominal frequency.

Points A1-f2 and A2-f4 shall be measured.

Monitor: The frames transmitted by IUT.

Results: IUT shall remain in state F1, no CRC error information report shall be detected by the simulator for a time period of at least one minute.

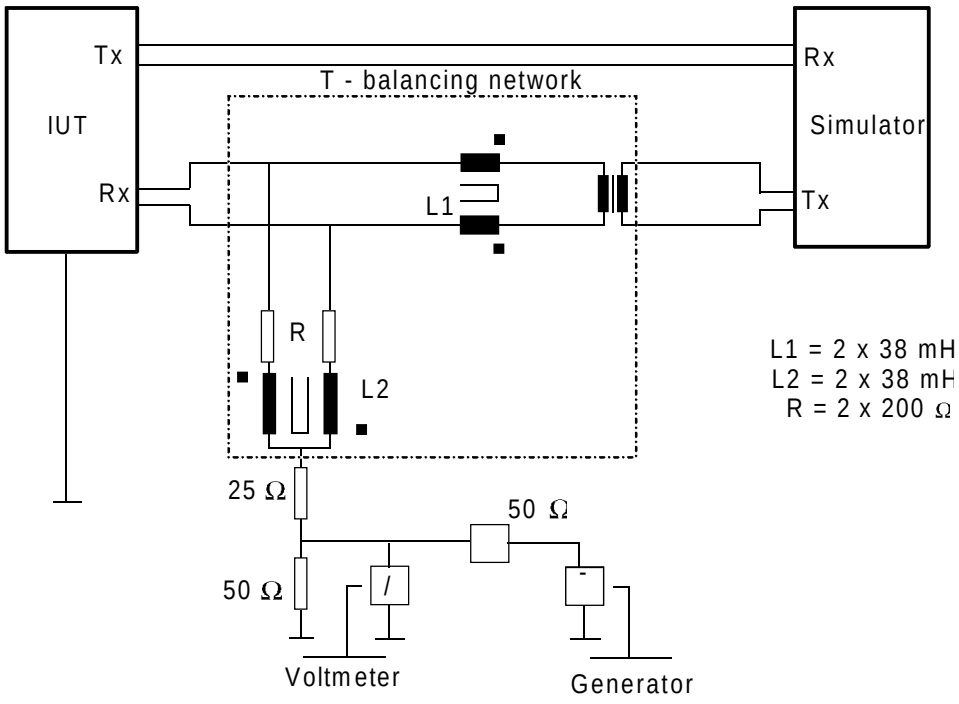
NOTE 1: This test relies on the correct operation of the CRC error information report by IUT.

NOTE 2: If a single E-bit is set to 0, the test should be repeated to ensure that the cause of the failure is not because of an unrelated external bit error.

B.3.4 Tolerable longitudinal voltage

Reference: ETS 300 011, annex C, subclause C.2.9.

Purpose: To check minimum tolerance to longitudinal voltage at input ports.



NOTE: The transformer has been added to provide ground decoupling between the IUT and the simulator.

Figure B.12: Test configuration

System state: State F1.

Stimulus: Normal operational frames with PRBS pattern 2^{15}-1 in timeslots 1 to 31. PRBS 2^{15}-1 shall fill continuously all the frame except timeslot 0.

A longitudinal sinusoidal voltage V_L of 2 Vrms shall be applied for 2 s at least at the following frequencies in the range 10 Hz to 150 kHz:

10 Hz, 15 Hz, 31 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz, 32 kHz, 64 kHz, 128 kHz and 150 kHz.

Monitor: Frames transmitted by IUT.

Results: IUT shall remain in state F1, no CRC error information report shall be detected by the simulator for a time period of at least one minute.

NOTE: If a single E-bit is set to 0, the test should be repeated to ensure that the cause of the failure is not because of an unrelated external bit error.

B.3.5 Impedance towards ground of the receiver inputs

Reference: ETS 300 011, annex C, subclause C.2.11.1.

Purpose: To check IUT receiver input impedance towards ground.

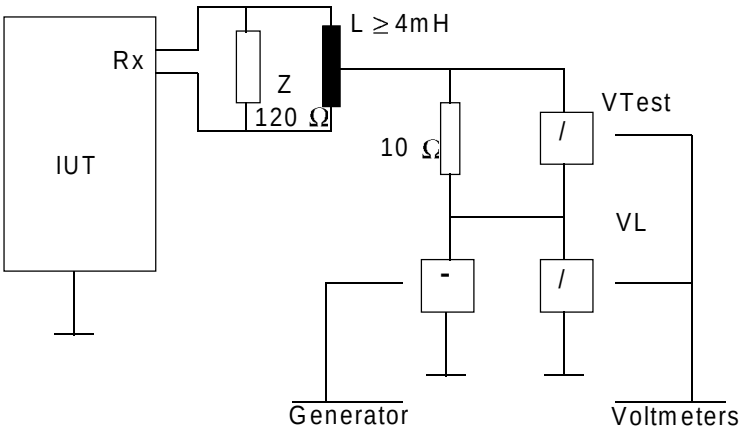


Figure B.13: Test configuration

System state: State F3.

Stimulus: Sinusoidal test signal voltage V_L shall be 2 Vrms.

The test signal shall be applied at the following frequencies in the range 10 Hz to 150 kHz:

10 Hz, 15 Hz, 31 Hz, 63 Hz, 125 Hz, 220 Hz, 443 Hz, 792 Hz, 1,5 kHz, 3,1 kHz, 6,3 kHz, 12,5 kHz, 22 kHz, 44,3 kHz, 79,2 kHz, 150 kHz, 220 kHz, 312 kHz, 443 kHz, 500 kHz, 628 kHz, 792 kHz and 1 MHz.

Monitor: Voltage of V_{TEST}.

Results: a. 10 Hz ≤ f ≤ 500 kHz: V_{TEST} ≤ 20 mV rms

b 500 Hz ≤ f ≤ 1 MHz: maximum value increasing at 6dB/octave from V_{TEST} = 20 mV rms

B.4 Frame structure

Reference: ETS 300 011, annex C, clause C.4.

The following definitions of test sequences apply to the tests of clauses B.4 and B.5.

FAS	Frame with correct Frame Alignment Signal (FAS), correct bits C_1 to C_4 and correct CRC Multi Frame Alignment Signal (MFAS) in timeslot 0.
/FAS	Frame with not correct FAS, correct bits C_1 to C_4 and correct MFAS in timeslot 0.
BIT 2	Bit 2 of timeslot 0 in frames not containing the frame alignment signal.
FRAME A	Two consecutive frames having FAS in the first timeslot 0, BIT 2 = 1 in the second timeslot 0 and no contiguous group of seven bits which simulates the FAS in timeslots 1 to 31.
FRAME B	Two consecutive frames having FAS in the first timeslot 0, BIT 2 = 1 in the second timeslot 0, simulated BIT 2 = 1 in the first timeslot 31 and simulated FAS (no corresponding MFAS) in the second timeslot 31.
FRAME C	Two consecutive frames having /FAS in the first timeslot 0, BIT 2 = 1 in the second timeslot 0, simulated BIT 2 = 1 in the first timeslot 31 and simulated FAS (no corresponding MFAS) in the second timeslot 31.
SMF A	Sub-multiframe having correct generation of C_1 to C_4 bits.
SMF B	Sub-multiframe having incorrect generation of C_1 to C_4 bits.
MF A	Multiframe having correct FAS, BIT 2 = 1, MFAS and correct C_1 to C_4 bits.
MF B	Multiframe having correct FAS, BIT 2 = 1, but incorrect MFAS and correct C_1 to C_4 bits.
# n	# indicates that the sequence defined in the previous line may be repeated before entering the next sub-sequence. If the parameter "n" is defined this sequence shall be repeated at least "n" times.

B.4.1 Generation of frame alignment word

Reference: ETS 300 011, annex C, subclause C.2.5.3.1.

Purpose: To check the correct generation of frame alignment word, multiframe alignment word, CRC bits C_1 to C_4.

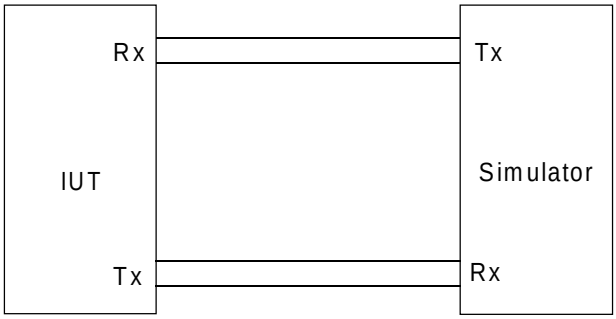


Figure B.14: Test configuration

System state: Any state F1 to F5 chosen by the test house.

Stimulus: Relevant signals defined to force IUT to enter the appropriate state.

Monitor: Correct frame alignment word pattern.

Results: No detection of incorrect frame alignment word, multiframe alignment word, Sa bits and no received submultiframes in error within 1 second measured in any state.

During this test the E bit is not considered.

B.4.2 CRC processing

Reference: ETS 300 011, annex C, subclause C.4.5.

Purpose: To test the correct execution of CRC calculation, comparison with the received bits C_1 to C_4 and generation of the CRC error report with bit E.

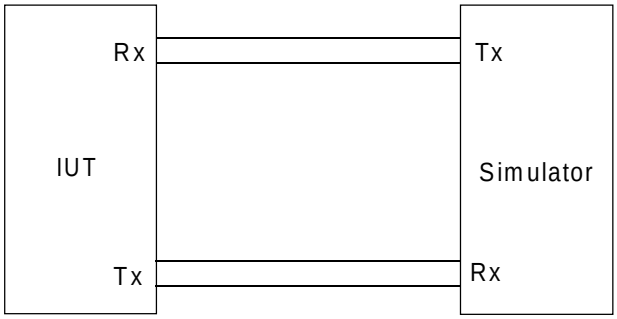


Figure B.15: Test configuration

System state: State F1.

Stimulus: SMF A and SMF B and /FAS as given in table B.1.

Monitor: Output signal, i.e. E bits and RAI as given in table B.1.

Results: As listed in table B.1.

A CRC error report, indicated by an E bit set to ZERO, shall be received within one second after the generation of a SMF in error. Definition of a SMF in error is given in subclause 9.5.5.4.

Table B.1: Test procedure

Stimulus	Monitor (see notes 1 and 2)
SMF A	No E bit set to zero
# Repeat more than 1 second	
SMF B	One E bit set to zero
SMF A	No E bit set to zero
#	
SMF B, SMF B	Two contiguous E bits set to zero
SMF A	No E bit set to zero
# Repeat more than 1 second	
914 X SMF B	914 contiguous E bits set to zero (note 4)
86 X SMF A	86 contiguous E bits set to ONE
914 X SMF B	914 contiguous E bits set to zero (note 4)
SMF A	No E bit set to zero
# Repeat more than 1 second	
915 X SMF B	Temporarily RAI (note 3)
85 X SMF A	
915 X SMF B	
SMF A	NOF, no E bit set to zero
#	
/FAS,BIT 2 = 1,/FAS,BIT 2 = 1, /FAS,BIT 2 = 1	RAI, no E bit set to zero
#	RAI, no E bit set to zero

NOTE 1: The change in the setting of RAI shall occur within 30 ms of the of the stimulus being applied. The variation in the delay between stimulus and response shall be no greater than 6 ms.

NOTE 2: Where no response is specified opposite a stimulus, the last described response shall continue to be sent.

NOTE 3: The vertical bar indicates that the given monitor result shall appear at least once during application of the stimulus.

NOTE 4: In a free-running implementation, because the output bit rate does not match the input bit rate, the number of E-bits set to zero may not exactly match the number of errored sub-multiframes received. In such cases, a discrepancy of one or two in the number of E-bits set to zero shall not be considered to be a failure.

B.5 Operational functions

The test sequences used in the tests of clause B.5 are the same as those defined in clause B.4.

B.5.1 States-matrix at the IUT user side

Reference: ETS 300 011, annex C, subclause C.3.2.2.

Purpose: The tests defined in this subclause intend to check the different stable states at the IUT side and the possible transitions between them. These tests are performed by simulating the opposite side, monitoring the IUT at the interface and verifying appropriate state transition.

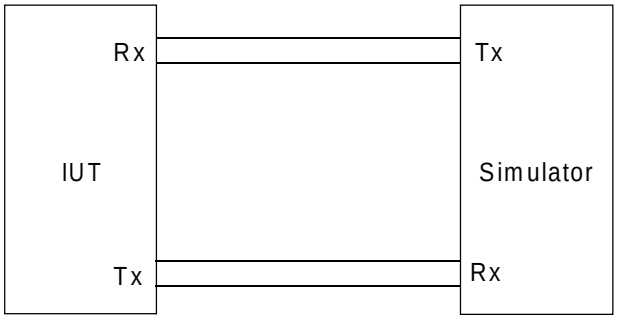


Figure B.16: Test configuration

System state: Each state F0 to F5.

It is not possible to distinguish between states F1, F2 and F5 or between states F3 and F4, using only layer 1 information at the interface.

Stimulus: For each initial state, each possible new event indicated in table 9.9 shall be performed, but see also subclause 9.5.3.

Stimulus shall be maintained for a time period sufficient to allow the expected state transition.

Sa bits in signals having a frame structure shall contain PRBS pattern.

The final state shall be checked 1 s after the stimulus has been transmitted.

Results: Transmitted signal according to table 9.10.

B.5.2 Frame alignment (without the test of CRC procedure)

Reference: ETS 300 011, annex C, subclause C.4.3.

Purpose: To test that IUT correctly executes the frame alignment procedure.

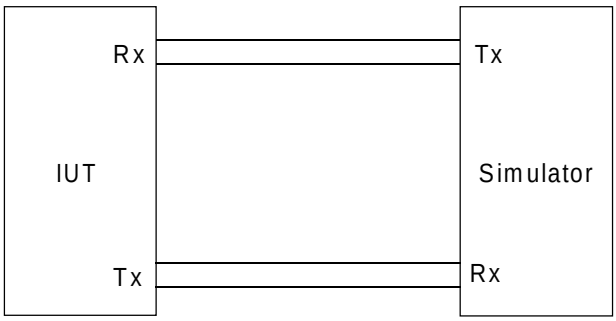


Figure B.17: Test configuration

System state: F1

NOTE: The IUT will progress through various states through the course of this test.

Stimulus: Consecutive correct and bad frame sequences (but including correct multiframe alignment signal and correct bits C_1 to C_4) from the simulator, i.e. bit 2 to 8 of timeslot 0 containing the frame alignment signal and bit 2 of timeslot 0 not containing the frame alignment signal, as given in table B.2.

The test signal shall not contain any other contiguous group of seven bits which simulates the Frame Alignment Signal.

Monitor: Output signal from the IUT.

Results: As listed in table B.2.

Table B.2: Test procedure

Stimulus	Monitor (see note 1)	Comment
BIT 2 = 1, FAS (see *)	NOF	Frame alignment tests
#		
BIT 2 = 1, /FAS	NOF	
BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 1, /FAS, BIT 2 = 1, /FAS	NOF	
BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 1, /FAS, BIT 2 = 1, /FAS, BIT 2 = 1, /FAS	RAI	
BIT 2 = 1, FAS, BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 1, /FAS, BIT 2 = 1, /FAS, BIT 2 = 1, /FAS	RAI	
BIT 2 = 1, FAS, BIT 2 = 1, /FAS	RAI	
#		
BIT 2 = 1, FAS	RAI	
BIT 2 = 0, FAS	RAI	
#		
BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 0, FAS, BIT 2 = 1, FAS, BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 0, FAS, BIT 2 = 0, FAS, BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 0, FAS, BIT 2 = 0, FAS, BIT 2 = 0, FAS	RAI or NOF (see **)	
#		
BIT 2 = 1, FAS	NOF	
#		
BIT 2 = 1		
FRAME B	NOF	correct frame alignment
#		
6 X FRAME C	RAI -> NOF	Loss of frame alignment and frame alignment with simulated frame alignment word.
FRAME B	NOF	
#		
4 to 8 mS	RAI and back to NOF will occur (if Multi-Frame Alignment is operating properly), (see ***).	No multiframe alignment on the simulated frame alignment word
No further RAI shall occur within a time period of 20 ms		

* This stimulus shall be repeated in order to allow the IUT to reach a stable condition, the time taken to do so may be dependant on the implementation.

** RAI or NOF depending on the implementation options described in CCITT Recommendation G.706 [2].

*** The vertical bar indicates that the given monitor result shall appear at least once during application of the stimulus.

NOTE 1: The response shall occur within 30 ms of the of the stimulus being applied. The variation in the delay between stimulus and response shall be no greater than 6 ms.

NOTE 2: Where no response is specified opposite a stimulus, the last described response shall continue to be sent.

B.5.3 CRC multiframe alignment

Reference: ETS 300 011, annex C, subclause C.4.4.

Purpose: To test the IUT correctly executes the CRC multiframe alignment.

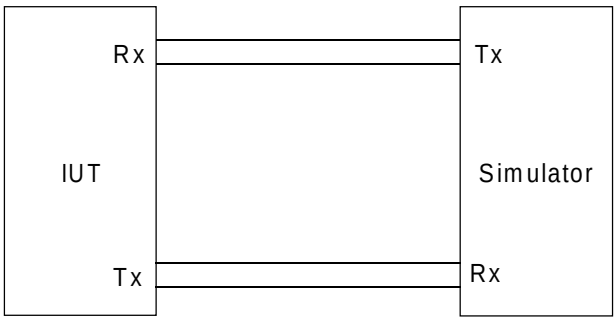


Figure B.18: Test configuration

System state: F1

NOTE: The IUT will progress through various states through the course of this test.

Stimulus: Consecutive correct and bad CRC multiframe alignment signals from the simulator, i.e. bit 1 in frames not containing the frame alignment signal as given in table B.3.

Monitor: Output signal from the IUT as given in table B.3.

Results: As listed in table B.3.

Table B.3: Test procedure

Stimulus	Monitor (see note)	Comment
FRAME B	(see *)	
#	NOF	
/FAS,BIT 2 = 1,/FAS,BIT 2 = 1		
/Fas,BIT 2 = 1	RAI	Initial condition
MF A	NOF	
4 X MF B	RAI	No multiframe alignment
MF A	NOF	
37 X MF B	NOF, transition to RAI and back to NOF	2 MFAS within 8ms in the limit of 100ms
MF A, MF B, MF A, MF B, MF A, MF B	NOF	
MF B	NOF	
# 251	Stable NOF	No RAI 500ms after a loss of multiframe alignment
/FAS,BIT 2 = 1,/FAS,BIT 2 = 1		
/FAS,BIT 2 = 1	RAI	Initial condition
MF B	NOF	Correct frame alignment but not multiframe alignment
# 250	NOF, transition to RAI and back to NOF, then stable RAI	No multiframe alignment within 500ms
MF B	RAI	
MF A, 4 X MF B	RAI	no 2 X MFAS within 8 ms
MF A, 2 X MF B, MF A	Undefined condition	
MF A, 2 X MF B, 2 X MF A	NOF	Multiframe alignment reached
MF B, MF A	NOF	
#		

* This stimulus shall be repeated in order to allow the IUT to reach a stable condition, the time taken to do so may be dependant on the implementation.

NOTE: The response shall occur within 30 ms of the of the stimulus being applied. The variation in the delay between stimulus and response shall be no greater than 6 ms.

Annex C (normative): Layer 2 tests

For the purposes of this TBR, the conformance testing routines have been produced in accordance with ISO/IES DIS 9646 Parts 1, 2 and 3 [4], [5] and [6].

C.1 Test case selection

Table C.1 contains the test case selection criteria for the interface procedure tests.

Table C.1: Test case selections for layer 2

Test Case Id	Selection criteria (Test Suite Parameter)
TC11013	PC_AUTOMAT_TEI AND PC_PTMP
TC13008	PC_AUTOMAT_TEI
TC13010	PC_AUTOMAT_TEI
TC13014	PC_AUTOMAT_TEI
TC14001	PC_MP AND PX_IUT_STA_S4
TC14002	PC_MP AND PX_IUT_STA_S4
TC14019	PC_AUTOMAT_TEI AND PC_VER_TEI_C AND PX_IUT_STA_S4
TC14021	PC_AUTOMAT_TEI AND PC_VER_TEI_C AND PX_IUT_STA_S4
TC14022	PC_AUTOMAT_TEI AND NOT PC_VER_TEI_C AND PX_IUT_STA_S4
TC24004	PX_IUT_STA_S4
TC24007	PC_AUTOMAT_TEI AND PX_IUT_STA_S4
TC24020	PX_IUT_STA_S4
TC25002	
TC25005	
TC25007	
TC25013	
TC27003	
TC27004	
TC27011	
TC27012	
TC27015	
TC27019	
TC27022	
TC27027	
TC27028	
TC27031	PC_AUTOMAT_TEI
TC27040	
TC27043	
TC27046	
TC27058	
TC27061	
TC27074	
TC27075	
TC27076	
TC27404	
TC27405	
TC27407	
TC27411	
TC27412	
TC27413	
TC27414	
TC27416	
TC27417	
TC28005	
TC28012	
TC28019	PC_AUTOMAT_TEI
TC28406	
TC28407	
TC28408	
TC28424	

C.2 Layer 2 test suite

Suite overview

Test Suite Overview	
Suite Name:	TBR4_L2
Standards ref:	TBR4
PICS Proforma ref:	TBR4, annex A
PIXIT Proforma ref:	TBR4, annex E
PICS/PIXIT use:	
Test Method(s):	Remote Single Layer Test Method
Comments:	The Layer 2 test cases in this TBR are based on the test cases from I-ETS 300 313 which is a conformance test suite for layer 2. However, changes have been introduced in order not to use non-essential requirements in the TBR test cases. This means that an IUT passing a test case in the TBR test suite may not pass the corresponding test case in I-ETS 300 313. The ability to pass a test with the same test case identifier in I-ETS 300 313 provides an alternative means of verifying the requirement of the TBR. However, failure to pass the equivalent test in I-ETS 300 313 shall not be taken as an indication that the test in the TBR is also failed. Testing shall be carried out at a temperature and humidity within the operational range of the terminal equipment. Structure of the test suite. The following naming scheme has been used in order to identify test cases, test steps and default subtrees to indicate their position within the test suite hierarchy. <test case reference> ::= TBR4_L2/<tg1>/<tg2>/<tg3>/<tg4>/<tg5>/<tcid> <tg1> ::= LM, DC, PR, PO, DF, MS <tg2> ::= S10, S30, S40, S50, S70, S71, S74, S80, S84, S85, SAL <tg3> ::= V, I, S <tg4> ::= <PDU type> <tg5> ::= N, O, I <tcid>::= <test case/step/default identifier> <tg1> "Area" Test Case Group LM = Layer Management DC = Data Control PR = Preamble PO = Postamble DF = Default Behaviour MS = Miscellaneous <tg2> "Starting State" Test Case Group Identifies the state in which the test case starts. However, for test steps for which a start state cannot be defined SAL (State All) is used.

	<tg3> "Type" Test Case Group V = Valid I = Inopportune S = Syntactically Invalid <tg4> "PDU" Test Case Group UI = UI-frame, IN = INFO frame, IA = ID.ASSIGNED, ID = ID.DENIED, CR = CHECK REQUEST, SA = SABME, DI = DISC, UA = UA, DM = DM, RR = RR, RN = RNR, RJ = REJECT, T0 = T200, N0 = N200, N2 = N202, LE = DL_EST_REQ, IT = I reTransmission, RT = RR reTransmission, KI = number of outstanding I-frame, RM = Recovery Mechanism, FC = Frame Check sequence <tg5> "Reference" Test Case Group N = NETs are the source of the base of the test case O = Other source is the base of the test case A = All is used for test steps and default steps <tcid> ::= <letter><letter><digit><digit><digit><digit><digit> The two letters indicate whether it is a test case, test step or default step (TC for test case, PR for preamble, CS for check state, PO for postamble and DF for default tree). The first digit indicates the Area (1 for LM, 2 for DC, 3 for PR, 4 for PO, 5 for CS and 6 for DF). The two following digits indicates the starting state. The two last digits indicate a sequence number. EXAMPLE: TBR4_L2/LM/S40/V/CR/N/TC14001: The test suite is TBR4_L2. The Layer Management is tested. The test starts with the IUT in state 4. A valid PDU is sent to the IUT. A Check Request PDU is sent to the IUT. The source of the base of the test case is the NETs. The test case identifier is TC14001.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC11013	TBR4_L2/LM/S10/I/UI/N/TC11013	194	Ensure that the IUT when in state 1 discards an incoming UI-frame with TEI value different from 127.
TC13008	TBR4_L2/LM/S30/V/ID/N/TC13008	194	Ensure that the IUT when in state 3 and receiving an Identity Denied frame remains in state 3.
TC13010	TBR4_L2/LM/S30/V/N2/N/TC13010	195	Ensure that the IUT when initiating TEI assignment procedure and receiving no response from the network, transmits ID-request at least N202 times.
TC13014	TBR4_L2/LM/S30/I/IA/O/TC13014	195	Ensure that the IUT when in state 3 ignores an ID assign message containing a RI different from the one transmitted in the ID request message
TC14001	TBR4_L2/LM/S40/V/CR/N/TC14001	196	Ensure that the IUT when in state 4 and after receiving an Identity Check Request with Action Indicator set to 127, responds with an Identity Check Response in which the value of the action indicator is equal to the TEI value assigned to the IUT and remains in state 4.
TC14002	TBR4_L2/LM/S40/V/CR/N/TC14002	196	Ensure that the IUT when in state 4 and after receiving an Identity Check Request with Action Indicator set to the value equal to the TEI value assigned to the terminal, responds with an Identity Check Response in which the value of the action indicator is equal to the TEI value assigned to the IUT and remains in state 4
TC14019	TBR4_L2/LM/S40/I/UA/O/TC14019	197	Ensure that the IUT when in state 4 and when ID verify procedure is implemented and after having sent an ID verify message on receipt of a UA frame on first expiry of T202 retransmits the ID-verify message and on second expiry of T202 enters state 1.
TC14021	TBR4_L2/LM/S40/I/UA/O/TC14021	198	Ensure that the IUT when in state 4 and when ID verify procedure is implemented and after receiving a UA frame and initiating TEI ID verify, completes the TEI ID verify procedure and remains in state 4.
TC14022	TBR4_L2/LM/S40/I/UA/O/TC14022	198	Ensure that the IUT when in state 4 and when ID verify procedure is not implemented and after receiving a UA frame enters state 1.
TC24004	TBR4_L2/DC/S40/V/LE/N/TC24004	199	Ensure the normal procedure of establishment of the Multiple Frame Operation initiated by the IUT.
TC24007	TBR4_L2/DC/S40/I/UA/O/TC24007	200	Ensure that the IUT when in state 4 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC24020	TBR4_L2/DC/S40/S/SA/N/TC24020	200	Ensure that the IUT when in state 4 takes no action on receipt of a SABME frame containing a TEI different from the TEI assigned to the IUT.
TC25002	TBR4_L2/DC/S50/V/DM/N/TC25002	201	Ensure that the IUT when in state 5 and receiving a DM F=1 enters state 4.
TC25005	TBR4_L2/DC/S50/V/N0/N/TC25005	201	Ensure that the IUT when in state 5 and receiving no response from the network, retransmits SABME at least N200 times
TC25007	TBR4_L2/DC/S50/I/SA/O/TC25007	202	Ensure that the IUT when in state 5 on receipt of a SABME frame (Call collision) transmits a UA frame and remains in state 5.
TC25013	TBR4_L2/DC/S50/I/RR/O/TC25013	202	Ensure that the IUT when in state 5 ignores an RR command frame.
TC27003	TBR4_L2/DC/S70/V/IN/N/TC27003	203	Ensure the operation of the sequence numbering of N(R) and N(S).
TC27004	TBR4_L2/DC/S70/V/IN/N/TC27004	203	Ensure that the IUT accepts acknowledgement by an I-frame.
TC27011	TBR4_L2/DC/S70/V/RJ/N/TC27011	204	Ensure that the IUT when in state 7.0 and an I-frame is outstanding, and the IUT receives a REJ F=0 indicating request of retransmission of last transmitted I-frame, retransmits the requested I-frame.
TC27012	TBR4_L2/DC/S70/V/DI/N/TC27012	204	Ensure the release procedure for Multiple Frame Established Operation initiated by the network side.
TC27015	TBR4_L2/DC/S70/V/IT/N/TC27015	205	Ensure that the IUT retransmits the last transmitted I-frame at least twice or transmits an RR command at least twice if no acknowledgement for the last transmitted I-frame is received. If the IUT transmits an RR command frame, it is tested whether the IUT retransmits the I-frame after receiving an RR response frame not acknowledging the outstanding I-frame.
TC27019	TBR4_L2/DC/S70/V/RM/N/TC27019	206	Ensure that the IUT when in state 7.0 and an I-frame is outstanding and the IUT receives no acknowledge for the outstanding I-frame will either retransmit the I-frame or transmit an RR P=1 at expiry of timer T200.
TC27022	TBR4_L2/DC/S70/I/SA/N/TC27022	206	Ensure the re-establishment procedure of Multiple Frame Operation initiated by the network.
TC27027	TBR4_L2/DC/S70/I/IN/N/TC27027	207	Ensure that the IUT when in state 7.0 and receiving an I-frame with P=1 and N(S) error transmits a REJect frame with F=1.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC27028	TBR4_L2/DC/S70/I/IN/N/TC27028	207	Ensure that the IUT when in state 7.0 and receiving an I-frame with P=0 and N(S) error transmits a REJect frame with F=0.
TC27031	TBR4_L2/DC/S70/I/UA/O/C27031	208	Ensure that the IUT when in state 7.0 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.
TC27040	TBR4_L2/DC/S70/I/RR/N/TC27040	208	Ensure that the IUT when in state 7.0 and receiving a RR command frame with P bit 1 and a N(R) error initiates re-establishment of the data link.
TC27043	TBR4_L2/DC/S70/I/RR/N/TC27043	209	Ensure that the IUT when in state 7.0 and receiving a RR response frame with F bit 1 and a N(R) error initiates re-establishment of the data link.
TC27046	TBR4_L2/DC/S70/I/RR/N/TC27046	209	Ensure that the IUT when in state 7.0 and receiving a RR response frame with F bit 0 and a N(R) error initiates re-establishment of the data link.
TC27058	TBR4_L2/DC/S70/S/FC/N/TC27058	210	Ensure that the IUT when receiving a frame which contains a frame check sequence error discards the frame.
TC27061	TBR4_L2/DC/S70/V/RR/N/TC27061	211	(Primary Rate Access only) Ensure that the IUT after receiving an acknowledgement and there are still outstanding I-frames not acknowledged by the network restarts timer T200 and ensure that the retransmission of the outstanding I-frame or the transmission of the RR command frame polling for an acknowledgement is within the allowed tolerances of timer T200.
TC27074	TBR4_L2/DC/S70/V/RJ/N/TC27074	212	(Primary Rate Access only) Ensure that the IUT when in state 7.0 and receiving a REJ frame indicating a request for retransmission of the last two transmitted I-frames, retransmits the two last transmitted I-frames.
TC27075	TBR4_L2/DC/S70/V/RR/N/TC27075	212	(Primary Rate Access only) Ensure that the IUT accepts acknowledgement of more than one I-frame in a RR response frame.
TC27076	TBR4_L2/DC/S70/V/KI/N/TC27076	213	(Primary Rate Access only) Ensure that the maximum number of outstanding I-frames for the IUT is k=7.
TC27404	TBR4_L2/DC/S74/V/IN/N/TC27404	214	Ensure that the IUT when in state 7.4 does not transmit any I-frames and that outstanding I-frames are transmitted after entering state 7.0.
TC27405	TBR4_L2/DC/S74/V/RJ/O/TC27405	215	Ensure that the IUT when in state 7.4 and receiving a REJ P=1 frame responds with an RR F=1 frame and retransmits the I-frame rejected.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC27407	TBR4_L2/DC/S74/V/RJ/O/TC27407	215	Ensure that the IUT when in state 7.4 and receiving a REJ F=0 frame retransmits the I-frame rejected.
TC27411	TBR4_L2/DC/S74/V/RT/N/TC27411	216	Ensure that the IUT when in state 7.4 and receiving no response from the network retransmits an RR command frame N200 times.
TC27412	TBR4_L2/DC/S74/V/RR/O/TC27412	216	Ensure that the IUT when in state 7.4 and receiving an RR P=1 frame transmits an RR F=1 and enters state 7.0.
TC27413	TBR4_L2/DC/S74/V/RR/O/TC27413	216	Ensure that the IUT when in state 7.4 and receiving an RR F=0 frame enters state 7.0.
TC27414	TBR4_L2/DC/S74/V/RN/O/TC27414	217	Ensure that the IUT when in state 7.4 and receiving a RNR P=1 frame transmits an RR F=1 and remains in state 7.4.
TC27416	TBR4_L2/DC/S74/V/RN/O/TC27416	217	Ensure that the IUT when in state 7.4 and receiving a RNR F=0 frame remains in state 7.4.
TC27417	TBR4_L2/DC/S74/V/T0/N/TC27417	218	Ensure that the IUT when in state 7.4 and receiving no frames from the network retransmits an RR command frame within the allowed tolerance of timer T200
TC28005	TBR4_L2/DC/S80/V/RJ/N/TC28005	219	Ensure that the IUT when in state 8.0 and receiving a REJ F=1 indicating a request for retransmission of the last I-frame, enters state 7.0 and retransmits the last transmitted I-frame.
TC28012	TBR4_L2/DC/S80/I/IN/N/TC28012	220	Ensure that the IUT when in state 8.0 is able to receive I-frames.
TC28019	TBR4_L2/DC/S80/I/UA/O/TC28019	221	Ensure that the IUT when in state 8.0 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.
TC28406	TBR4_L2/DC/S84/V/RN/N/TC28406	221	Ensure that the IUT when in state 8.4 is able to receive I-frames.
TC28407	TBR4_L2/DC/S84/V/RJ/O/TC28407	222	Ensure that the IUT when in state 8.4 and receiving a REJ F=1 indicating no request for retransmission of I-frames, enters state 7.0.
TC28408	TBR4_L2/DC/S84/I/SA/O/TC28408	222	Ensure that the IUT when in state 8.4 and receiving a SABME frame, transmits a UA frame, resets all state variables and enters state 7.0.
TC28424	TBR4_L2/DC/S84/I/RJ/O/TC28424	223	Ensure that the IUT when in state 8.4 and receiving a REJ P=1 frame not acknowledging the last transmitted I-frame, transmits an RR F=1 and enters state 8.0.

Test Step Identifier	Test Step Reference	Page	Description
PR31001	TBR4_L2/PR/S10/V/PR/A/PR31001	224	To bring the IUT in state 1.
PR31002	TBR4_L2/PR/S10/V/PR/A/PR31002	224	To bring the IUT in state 1. This preamble is used basic access point-to-multipoint configured IUTs.
PR31003	TBR4_L2/PR/S10/V/PR/A/PR31003	224	To bring the IUT in state 1. This preamble is used for IUTs of the automatic TEI assignment category configured for point-to-point.
PR31401	TBR4_L2/PR/S14/V/PR/A/PR31401	225	To bring the IUT in state 1 or state 4. Non automatic IUTs will end in state 4, and automatic IUTs will end in state 1.
PR33001	TBR4_L2/PR/S30/V/PR/A/PR33001	226	To bring the IUT in state 3.
PR33002	TBR4_L2/PR/S30/V/PR/A/PR33002	226	To bring the IUT in state 3. This preamble is used basic access point-to-multipoint configured IUTs.
PR33003	TBR4_L2/PR/S30/V/PR/A/PR33003	226	To bring the IUT in state 3. This preamble is used for IUTs of the automatic TEI assignment category configured for point-to-point.
PR34001	TBR4_L2/PR/S40/V/PR/A/PR34001	227	To bring the IUT in state 4.
PR34002	TBR4_L2/PR/S40/V/PR/A/PR34002	227	To bring the IUT in state 4. This preamble is used for IUTs configured for point-to-multipoint.
PR34003	TBR4_L2/PR/S40/V/PR/A/PR34003	228	To bring the IUT in state 4. This preamble is used for IUTs configured for point-to-point.
PR35001	TBR4_L2/PR/S50/V/PR/A/PR35001	230	To bring the IUT in state 5.
PR37001	TBR4_L2/PR/S70/V/PR/A/PR37001	230	To bring the IUT in state 7.0.
PR37002	TBR4_L2/PR/S70/V/PR/A/PR37002	231	To bring the IUT in state 7.0 and provide INFO generation from IUT.
PR37003	TBR4_L2/PR/S70/V/PR/A/PR37003	231	To bring the IUT in state 7.0 and provide INFO generation from the IUT. This preamble is used for IUTs configured for point-to-point.
PR37004	TBR4_L2/PR/S70/V/PR/A/PR37004	232	To bring the IUT in state 7.0 and provide INFO generation from the IUT. This preamble is used for IUTs configured for point-to-multipoint.
PR37005	TBR4_L2/PR/S70/V/PR/A/PR37005	233	To bring the IUT in state S7.0 with two outstanding I-frames (V(S)=V(A)+2).
PR37401	TBR4_L2/PR/S74/V/PR/A/PR37401	233	To bring the IUT in state 7.4.
PR37406	TBR4_L2/PR/S74/V/PR/A/PR37406	234	To bring the IUT in state S7.4 and stimulate its layer 3 to invoke a number (defined by TMP) of DL_DATA_REQUEST.
PR38001	TBR4_L2/PR/S80/V/PR/A/PR38001	234	To bring the IUT in state 8.0.

Test Step Identifier	Test Step Reference	Page	Description
PR38401	TBR4_L2/PR/S84/V/PR/A/PR38401	235	To bring the IUT in state 8.4.
PO44004	TBR4_L2/PO/S40/V/PO/A/PO44004	236	To ensure that the IUT is in a stable state at the end of a test case. That is one of the states 1, 4 or 7.
CS51001	TBR4_L2/MS/S10/V/MS/A/CS51001	237	To check that the IUT is in state 1.
CS53001	TBR4_L2/MS/S30/V/MS/A/CS53001	238	To check that the IUT is in state 3.
CS54001	TBR4_L2/MS/S40/V/MS/A/CS54001	238	To check that the IUT is in state 4.
CS57001	TBR4_L2/MS/S70/V/MS/A/CS57001	239	To check that the IUT is in state 7.0.
CS57101	TBR4_L2/MS/S71/V/MS/A/CS57101	239	To check that the IUT is in state 7.1.
CS57401	TBR4_L2/MS/S74/V/MS/A/CS57401	239	To check that the IUT is in state 7.4.

Default Identifier	Default Reference	Page	Description
DF69901	TBR4_L2/DF/SAL/V/DF/A/DF69901	240	Default subtree for all states except 7 and 8.
DF69902	TBR4_L2/DF/SAL/V/DF/A/DF69902	240	Default subtree for MF (state 7) and Timer Recovery (state 8) States.

Declarations Part

User Type Definitions			
Name	**Base Type**	**Definition**	**Comments**
SAPI_RANGE	INTEGER	(0 TO 63)	Other values not considered in this TS BITSTRING[6]
TEI_RANGE	INTEGER	(0 TO 127)	BITSTRING[7]
RI_RANGE	INTEGER	(0 TO 65535)	Reference number; BITSTRING[16]
N_RANGE	INTEGER	(0 TO 127)	N(S) and N(R) range; BITSTRING[7]

User Operation Definition	
Operation Name:	CR_VALUE
Result Type:	BITSTRING
Description: The return value represents the Command/Response bit. See table 1/Q.921: CR_VALUE = 1 for command frames from tester to IUT CR_VALUE = 0 for command frames from IUT to tester CR_VALUE = 0 for response frames from tester to IUT CR_VALUE = 1 for response frames from IUT to tester	

User Operation Definition	
Operation Name:	FCS_VALUE
Result Type:	OCTETSTRING
Description: The return value represents the 2 octet FCS field contained in any layer 2 frames.	

User Operation Definition	
Operation Name:	RANDOM(low:INTEGER; high:INTEGER)
Result Type:	INTEGER
Description: The return value represents a random value between "low" and "high" values. This operation is useful to provide the RI value during TEI management.	

User Operation Definition	
Operation Name:	TIME(tmax:INTEGER; tmin:INTEGER; t:INTEGER)
Result Type:	BOOLEAN
Description: Returns TRUE if "t" satisfies the condition: tmin<= t <= tmax. Otherwise FALSE is returned This function is used to test IUT timer values. Example: TIME(22,18,20) is TRUE TIME(22,18,23) is FALSE	

Test Suite Parameters			
Name	**Type**	**PICS/PIXIT ref**	**Comments**
PC_PTMP	BOOLEAN	A8.1	FALSE if the IUT is configured according to subclause 10.3.
PC_AUTOMAT_TEI	BOOLEAN	A10.1	TRUE if the IUT supports automatic TEI assignment.
PC_REM_TEI_C	BOOLEAN	A10.8	TRUE if the IUT removes its TEI on error code C.
PC_VER_TEI_C	BOOLEAN	A10.9	TRUE if the IUT supports the Identity verify procedure on error code C.
PX_TEI_VALUE	INTEGER	E.5.1	TEI value for non automatic assignment IUT. In case of automatic assignment IUT the initial value is 64.
PX_IUT_STA_S4	BOOLEAN	E.5.2	TRUE if the IUT is stable in state 4 for at least 6 seconds.
PX_COMPAT_SETUP	OCTETSTRING	E.6.1	A compatible SETUP PDU without Channel identification information element.

Test Suite Constants			
Name	**Type**	**Value**	**Comments**
T200VMAX	INTEGER	3000	T200 upper limit 3 s.
T200VMIN	INTEGER	950	T200 lower limit 0,95 s.
T202VMAX	INTEGER	5000	T202 upper limit 5 s.
TAC_PTP_SL	INTEGER	500	Layer 2 response time (500 ms) for PTP with single data link.
TAC_PTP_ML	INTEGER	200	Layer 2 response time (200 ms) for PTP with multiple data links.
TWL3_MAX	INTEGER	32	Layer 3 response time 32 s.
N200	INTEGER	3	Maximum number of retransmissions
N202	INTEGER	3	Maximum number of transmission of TEI identity request messages.
P0	BITSTRING	'0'B	0 Poll bit
F0	BITSTRING	'0'B	0 Final bit
P1	BITSTRING	'1'B	1 Poll bit
F1	BITSTRING	'1'B	1 Final bit
K	INTEGER	7	Window size. Maximum number of outstanding I-frames
RCMax	INTEGER	9	Maximum number of id request messages that shall be ignored when entering state 1
RELEASE	HEXSTRING	'080200014D'H	L3 RELEASE message, protocol discriminator, call reference 1, flag 0, message type
REL_COMPLET	HEXSTRING	'080280015A'H	L3 RELEASE COMPLETE message, protocol discriminator, call reference 1, flag 1, message type
SETUP	HEXSTRING	'0802000105'H	L3 SETUP message without an information field
L3_NULL	HEXSTRING	'00'H	L3 NULL message
BASIC_ACCESS	BOOLEAN	FALSE	Used to select the appropriate preambles

Test Suite Variables			
Name	**Type**	**Value**	**Comments**
CURRENT_TEI	TEI_RANGE	64	TEI value established during link start up and used during multiple frame operations
TAC_VAL	INTEGER	500	Layer 2 response time. The value depends on the configuration of the IUT. PTP or PTMP.

Test Case Variables			
Name	**Type**	**Value**	**Comments**
NR	N_RANGE	0	N(R) from tester side
NS	N_RANGE	0	N(S) from tester side
RC	INTEGER	0	retransmission counter
VRI	INTEGER	0	reference number
T	INTEGER	0	Used to store current time of a running timer
TMP	INTEGER	0	dummy variable
TMP1	INTEGER	0	dummy variable

PCO Type Declarations			
Name	**Type**	**Role**	**Comments**
L	PSAP	LT	Physical service access point at the lower tester

Timer Declarations			
Timer Name	**Duration**	**Units**	**Comments**
TW200	T200VMAX	ms	Timer at the end of which transmission of frame may be initiated
TW200MIN	T200VMIN	ms	
TW202	T202VMAX	ms	Time for Id. verify retransmission
TWL3	TWL3_MAX	sec	Maximum time for a response generated by layer 3
TWAIT	30	sec	Used by the tester for test synchronization with external procedure (maximum time for an IMPLICIT SEND execution)
TNOAC	3	sec	Ensures no response from IUT, PASS on timeout
TAC	TAC_VAL	ms	Timer used to test layer 2 response time.
TREAD	30	sec	Used in timer tests.

Abbreviation Declarations		
Abbreviation	**Expansion**	**Comments**
Icr_s	PH_DATA_RQ<MU^Icr>	Send a I-frame
Icr_r	PH_DATA_IN<MU~Icr>	Receive a I-frame
Is	PH_DATA_RQ<MU^I>	Send a I-frame
Ir	PH_DATA_IN<MU~I>	Receive a I-frame
RR_C	PH_DATA_RQ<MU^RR_C>	Send a RR_C frame
RR_Cr	PH_DATA_IN<MU~RR_C>	Receive a RR_C frame
RR_R	PH_DATA_RQ<MU^RR_R>	Send a RR_R frame
RR_Rr	PH_DATA_IN<MU~RR_R>	Receive a RR_R frame
RNR_C	PH_DATA_RQ<MU^RNR_R>	Send a RNR_C frame
RNR_Cr	PH_DATA_IN<MU~RNR_R>	Receive a RNR_C frame
RNR_R	PH_DATA_RQ<MU^RNR_C>	Send a RNR_R frame
RNR_Rr	PH_DATA_IN<MU~RNR_C>	Receive a RNR_R frame
REJ_C	PH_DATA_RQ<MU^REJ_R>	Send a REJ_C frame
REJ_Cr	PH_DATA_IN<MU~REJ_R>	Receive a REJ_C frame
REJ_R	PH_DATA_RQ<MU^REJ_C>	Send a REJ_R frame
REJ_Rr	PH_DATA_IN<MU~REJ_C>	Receive a REJ_R frame
SABME	PH_DATA_RQ<MU^SABME>	Send a SABME frame
SABMEr	PH_DATA_IN<MU~SABME>	Receive a SABME frame
DISC	PH_DATA_RQ<MU^DISC>	Send a DISC frame
DISCr	PH_DATA_IN<MU~DISC>	Receive a DISC frame
UA	PH_DATA_RQ<MU^UA>	Send a UA frame
UAr	PH_DATA_IN<MU~UA>	Receive a UA frame
DM	PH_DATA_RQ<MU^DM>	Send a DM frame
DMr	PH_DATA_IN<MU~DM>	Receive a DM frame
INV_U_FR	PH_DATA_RQ<MU^INV_U_FR>	Send a INV_U_FR frame
INV_I_FR	PH_DATA_RQ<MU^INV_I_FR>	Send a INV_I_FR frame
XID_Cr	PH_DATA_IN<MU^XID_C>	Receive a XID frame

ASP Type Declaration		
ASP Name: PH_DATA_RQ(PH_DATA_Request)	**PCO Type:** PSAP	**Comments:** see table 5.1, subclause 5.3.2
Service Parameter Information		
Field Name	**Type**	**Comments**
PI(Priority Indicator) MU(Message Unit)	BITSTRING OCTETSTRING	Unused Data Link Layer peer-to-peer message

ASP Type Declaration		
ASP Name: PH_DATA_IN(PH_DATA_Indication)	**PCO Type:** PSAP	**Comments:** see table 5.1, subclause 5.3.2
Service Parameter Information		
Field Name	**Type**	**Comments**
PI(Priority Indicator) MU(Message Unit)	BITSTRING OCTETSTRING	Unused Data Link Layer peer-to-peer message

ASP Type Declaration		
ASP Name: PH_ACT_RQ(PH_Activate_Request)	**PCO Type:** PSAP	**Comments:** see table 5.1, subclause 5.3.2

ASP Type Declaration		
ASP Name:	**PCO Type:**	**Comments:**
PH_ACT_IN(PH_Activate_Indication)	PSAP	see table 5.1, subclause 5.3.2

ASP Type Declaration		
ASP Name:	**PCO Type:**	**Comments:**
PH_DEACT_IN(PH_Deactivate_Indication)	PSAP	see table 5.1, subclause 5.3.2

PDU Type Declaration		
PDU Name:	**PCO Type:**	**Comments:**
I(Information)	PSAP	I-frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	BITSTRING	I Control Field
N_S	N_RANGE	Send Sequence Number
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
INFORMATION	HEXSTRING	Layer 3 data
RESTINFO	OCTETSTRING	Rest of Info field
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name:	**PCO Type:**	**Comments:**
Icr(Call Reference)	PSAP	see table 10.5 and figure 10.5 I-frames; Command for coding sequence of call reference see format convention, subclause 10.1.8
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	BITSTRING	I Control Field
N_S	N_RANGE	Send Sequence Number
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
PROT_DISCR	BITSTRING	Protocol Discriminator
CALLREFOCT1	BITSTRING	ZERO+LENGTH (=2)
FLAG	BITSTRING	1 or 0
CR	BITSTRING	Call reference value
MESSAGETYPE	BITSTRING	Message Type
RESTINFO	OCTETSTRING	Rest of Info field
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: RR_C(Receive Ready Command)	**PCO Type:** PSAP	**Comments:** S frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	RR Control Field
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: RR_R(Receive Ready Response)	**PCO Type:** PSAP	**Comments:** S frames; Response
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
R	BITSTRING	Response Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	RR Control Field
F	BITSTRING	Final Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: RNR_C(Receive Not Ready Command)	**PCO Type:** PSAP	**Comments:** S frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	RNR Control Field
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: RNR_R(Receive Not Ready Response)	**PCO Type:** PSAP	**Comments:** S frames; Response
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
R	BITSTRING	Response Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	RNR Control Field
F	BITSTRING	Final Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: REJ_C(Reject Command)	**PCO Type:** PSAP	**Comments:** S frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	REJ Control Field
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: REJ_R(Reject Response)	**PCO Type:** PSAP	**Comments:** S frames; Response
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
R	BITSTRING	Response Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	HEXSTRING	REJ Control Field
F	BITSTRING	Final Bit
N_R	N_RANGE	Receive Sequence Numb.
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: SABME(Set Asynchr. Balanced Mode Extended)	**PCO Type:** PSAP	**Comments:** U frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	SABME Contr. Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	SABME Contr.Fie.(Cont.)
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: DISC(Disconnect)	**PCO Type:** PSAP	**Comments:** U frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	DISC Contr. Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	DISC Contr.Fie.(Cont.)
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: DM(Disconnect Mode)	**PCO Type:** PSAP	**Comments:** U frames; Response
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
R	BITSTRING	Response Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	DM Contr. Field
F	BITSTRING	Final Bit
CONTROL2	BITSTRING	DM Contr.Fie.(Cont.)
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: UA(Unnumbered Acknowledge)	**PCO Type:** PSAP	**Comments:** U frames; Response
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
R	BITSTRING	Response Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	UA Contr. Field
F	BITSTRING	Final Bit
CONTROL2	BITSTRING	UA Contr.Fie.(Cont.)
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: UI(Unnumbered Information)	**PCO Type:** PSAP	**Comments:** U frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	UI Contr. Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	UI Contr.Fie.(Cont.)
INFORMATION	HEXSTRING	User Data
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: UI_M(Unnumbered In formation for TEI management)	**PCO Type:** PSAP	**Comments:** U frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	UI Control Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	UI Control Field (Control)
MANAG_ENTITY	HEXSTRING	Layer Management Entity Identifier
RI	RI_RANGE	Reference Identifier
TYPE	OCTETSTRING	Message Type
EA	BITSTRING	Extension Bit
AI	TEI_RANGE	Action Indicator
FCS_FIELD	OCTETSTRING	FCS field (2 octets)

PDU Type Declaration		
PDU Name: INV_U_FR(Invalid U frame)	**PCO Type:** PSAP	**Comments:** U frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	Control Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	Control Field (cont.)
INFORMATION	HEXSTRING	Additional (bad) field
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: INV_I_FR(Invalid I-frame)	**PCO Type:** PSAP	**Comments:** I-frames; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL	BITSTRING	I Control Field
N_S	N_RANGE	Send Sequence Number
P	BITSTRING	Poll Bit
N_R	N_RANGE	Receive Sequence Numb.
INFORMATION	HEXSTRING	Layer 3 data
FCS_FIELD	OCTETSTRING	FCS field (2 OCTETs)

PDU Type Declaration		
PDU Name: XID_C(Exchange Identification)	**PCO Type:** PSAP	**Comments:** U Frame; Command
PDU Field Information		
Field Name	**Type**	**Comments**
EA_OCTET2	BITSTRING	Ext. Addr. bit
C	BITSTRING	Command Bit
SAPI	SAPI_RANGE	Service Access Point Id
EA_OCTET3	BITSTRING	Ext. Addr. bit
TEI	TEI_RANGE	Terminal End Point Id.
CONTROL1	BITSTRING	Control Field
P	BITSTRING	Poll Bit
CONTROL2	BITSTRING	Control Field (Cont.)
INFORMATION	OCTETSTRING	Information Field
FCS_FIELD	OCTETSTRING	FCS field

Constraints Part

PDU Constraint Declaration	
PDU Name: I	**Constraint Name:** IN1(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
INFORMATION	?
RESTINFO	*
FCS_FIELD	FCS_VALUE
Comments: INFO frame with any message	

PDU Constraint Declaration	
PDU Name: I	**Constraint Name:** IN2(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
INFORMATION	RELEASE
RESTINFO	-
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE message	

PDU Constraint Declaration	
PDU Name: I	**Constraint Name:** IN3(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
INFORMATION	REL_COMPLETE
RESTINFO	*
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE COMPLETE message	

PDU Constraint Declaration	
PDU Name: Icr	**Constraint Name:** IN4(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE; CR_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
PROT_DISCR	'00001000'B
CALLREFOCT1	'00000010'B
FLAG	'0'B
CR	CR_
MESSAGETYPE	'01001101'B
RESTINFO	-
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE message	

PDU Constraint Declaration	
PDU Name: Icr	**Constraint Name:** IN5(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
PROT_DISCR	'00001000'B
CALLREFOCT1	'00000010'B
FLAG	'0'B
CR	?
MESSAGETYPE	'00000101'B
RESTINFO	?
FCS_FIELD	FCS_VALUE
Comments: INFO frame with SETUP message	

PDU Constraint Declaration	
PDU Name: Icr	**Constraint Name:** IN6(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE; CR_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
PROT_DISCR	'00001000'B
CALLREFOCT1	'00000010'B
FLAG	'1'B
CR	CR_
MESSAGETYPE	'01011010'B
RESTINFO	-
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE COMPLETE message	

PDU Constraint Declaration	
PDU Name: Icr	**Constraint Name:** IN7(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
PROT_DISCR	'00001000'B
CALLREFOCT1	'00000010'B
FLAG	'1'B
CR	?
MESSAGETYPE	'01011010'B
RESTINFO	?
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE COMPLETE message	

PDU Constraint Declaration	
PDU Name: I	**Constraint Name:** IN8(PBIT_:BITSTRING; NR_:N_RANGE; NS_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	PBIT_
N_R	NR_
INFORMATION	REL_COMPLETE
RESTINFO	-
FCS_FIELD	FCS_VALUE
Comments: INFO frame with RELEASE COMPLETE message	

PDU Constraint Declaration	
PDU Name: I	**Constraint Name:** IN9
Field Value Information	
Field Name	**Value**
EA_OCTET2 C SAPI EA_OCTET3 TEI CONTROL N_S P N_R INFORMATION RESTINFO FCS_FIELD	'0'B CR_VALUE 0 '1'B CURRENT_TEI '0'B ? ? ? ? * FCS_VALUE
Comments: I-frame with any P-bit value, any N(R) value, any N(S) value and any layer 3 message.	

PDU Constraint Declaration	
PDU Name: RR_C	**Constraint Name:** RRC(PBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2 C SAPI EA_OCTET3 TEI CONTROL P N_R FCS_FIELD	'0'B CR_VALUE 0 '1'B CURRENT_TEI '01'H PBIT_ NR_ FCS_VALUE

PDU Constraint Declaration	
PDU Name: RR_R	**Constraint Name:** RRR(FBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2 R SAPI EA_OCTET3 TEI CONTROL F N_R FCS_FIELD	'0'B CR_VALUE 0 '1'B CURRENT_TEI '01'H FBIT_ NR_ FCS_VALUE

PDU Constraint Declaration	
PDU Name: RNR_C	**Constraint Name:** RNC(PBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'05'H
P	PBIT_
N_R	NR_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: RNR_C	**Constraint Name:** RNC_ANY
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'05'H
P	?
N_R	?
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: RNR_R	**Constraint Name:** RNR(FBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
R	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'05'H
F	FBIT_
N_R	NR_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: RNR_R	**Constraint Name:** RNR_ANY
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
R	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'05'H
F	?
N_R	?
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: REJ_C	**Constraint Name:** RJC(PBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'09'H
P	PBIT_
N_R	NR_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: REJ_R	**Constraint Name:** RJR(FBIT_:BITSTRING; NR_:N_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
R	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'09'H
F	FBIT_
N_R	NR_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: SABME	**Constraint Name:** SA(PBIT_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'1111'B
P	PBIT_
CONTROL2	'011'B
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: DISC	**Constraint Name:** DI(PBIT_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'0011'B
P	PBIT_
CONTROL2	'010'B
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: DM	**Constraint Name:** DM(FBIT_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
R	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'1111'B
F	FBIT_
CONTROL2	'000'B
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UA	**Constraint Name:** UA(FBIT_:BITSTRING)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
R	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'0011'B
F	FBIT_
CONTROL2	'011'B
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI	**Constraint Name:** UI1
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
INFORMATION	PX_COMPAT_SETUP
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI	**Constraint Name:** UI2
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
INFORMATION	L3_NULL
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI	**Constraint Name:** UI3
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
INFORMATION	SETUP
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T1
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	?
TYPE	'01'H
EA	'1'B
AI	127
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T2(RI_:RI_RANGE; AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	RI_
TYPE	'02'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T3(RI_:RI_RANGE; AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	RI_
TYPE	'03'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T4(RI_:RI_RANGE; AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	RI_
TYPE	'04'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T5(AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	?
TYPE	'05'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T5_ANY_AI
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	?
TYPE	'05'H
EA	'1'B
AI	?
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T6(RI_:RI_RANGE; AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	RI_
TYPE	'06'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: UI_M	**Constraint Name:** UM_T7(RI_:RI_RANGE; AI_:TEI_RANGE)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	63
EA_OCTET3	'1'B
TEI	127
CONTROL1	'0011'B
P	'0'B
CONTROL2	'000'B
MANAG_ENTITY	'0F'H
RI	RI_
TYPE	'07'H
EA	'1'B
AI	AI_
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: INV_U_FR	**Constraint Name:** IUF_SA_BAD_TEI(PAR:INTEGER)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	PAR
CONTROL1	'1111'B
P	'1'B
CONTROL2	'011'B
FCS_FIELD	FCS_VALUE

PDU Constraint Declaration	
PDU Name: INV_I_FR	**Constraint Name:** IIF_FCS(NR_:N_RANGE; NS_:N_RANGE; PAR:INTEGER)
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	0
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL	'0'B
N_S	NS_
P	'0'B
N_R	NR_
INFORMATION	RELEASE
FCS_FIELD	PAR

PDU Constraint Declaration	
PDU Name: XID_C	**Constraint Name:** XID
Field Value Information	
Field Name	**Value**
EA_OCTET2	'0'B
C	CR_VALUE
SAPI	?
EA_OCTET3	'1'B
TEI	CURRENT_TEI
CONTROL1	'1111'B
P	'0'B
CONTROL2	'101'B
INFORMATION	?
FCS_FIELD	FCS_VALUE

Dynamic Part

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S10/I/UI/N/TC11013				
Identifier:	TC11013				
Purpose:	Ensure that the IUT when in state 1 discards an incoming UI-frame with TEI value different from 127.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				Preamble to S1 (1)
2	(CURRENT_TEI ::= RANDOM (0, 126))				
3	L!UI		UI2		(2)
4	+CS51001				State=1 ?
Extended Comments: (1) This test is applicable only to IUTs stable in state S1. (2) The TEI value used in this frame is not supported. References to requirements: 10.4.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S30/V/ID/N/TC13008				
Identifier:	TC13008				
Purpose:	Ensure that the IUT when in state 3 and receiving an Identity Denied frame remains in state 3.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR33001				Preamble to S3
2	L!UI_M		UM_T3(VRI, 127)		(2)
3	+CS53001				State=3 ?
Extended Comments: (2) UI_M Identity denied response with RI equal to that used in the request frame in +PR33001 (memorized in the test case variable VRI) and AI=127 (no TEI available). References to requirements: 10.5.2.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S30/V/N2/N/TC13010				
Identifier:	TC13010				
Purpose:	Ensure that the IUT when initiating TEI assignment procedure and receiving no response from the network, transmits ID-request at least N202 times.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR33001				Preamble to S3
2	(RC ::= 1)				(1)
3	START TW202	L1			
4	L?UI_Mr		UM_T1		ID-request
5	CANCEL TW202				
6	[RC < N202]				(2)
7	(RC ::= RC + 1)				
8	GOTO L1				
9	[RC = N202]			(P)	(3)
10	+PO44004				
11	?TIMEOUT TW202			(F)	(4)
12	+PO44004				

Extended Comments:

(1) One Id-request already received in the preamble.
(2) Less than N202 ID-requests are received.
(3) N202 ID-requests received.
(4) Less than N202 ID-requests received and timer TW202 has expired.

References to requirements: 10.5.2.1

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S30/I/IA/O/TC13014				
Identifier:	TC13014				
Purpose:	Ensure that the IUT when in state 3 ignores an ID assign message containing a RI different from the one transmitted in the ID request message				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR33001				Preamble to S3
2	(TMP ::= (VRI + 1) MOD 65536)				
3	L!UI_M		UM_T2(TMP, CURRENT_TEI)		
4	+CS53001				State=3 ?

Extended Comments:

References to requirements: 10.5.2

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S40/V/CR/N/TC14001				
Identifier:	TC14001				
Purpose:	Ensure that the IUT when in state 4 and after receiving an Identity Check Request with Action Indicator set to 127, responds with an Identity Check Response in which the value of the action indicator is equal to the TEI value assigned to the IUT and remains in state 4.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UI_M START TW200		UM_T4(0, 127)		(2)
3	L?UI_Mr CANCEL TW200	L1	UM_T5(CURRENT_TEI)	(P)	(3)
4	+CS54001				State=4 ?
5	L?UI_Mr START TW200		UM_T5_ANY_AI		
6	GOTO L1				
7	?TIMEOUT TW200			(F)	no response
8	+PO44004				Postamble
Extended Comments: (2) Identity Check Request with RI=0 (not used) and AI=127 (all TEI values to be checked). (3) Identity check response References to requirements: 10.4.1, 10.5.3.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S40/V/CR/N/TC14002				
Identifier:	TC14002				
Purpose:	Ensure that the IUT when in state 4 and after receiving an Identity Check Request with Action Indicator set to the value equal to the TEI value assigned to the terminal, responds with an Identity Check Response in which the value of the action indicator is equal to the TEI value assigned to the IUT and remains in state 4				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UI_M START TAC		UM_T4(0, CURRENT_TEI)		(1)
3	L?UI_Mr CANCEL TAC		UM_T5(CURRENT_TEI)	(P)	(2)
4	+CS54001				State=4 ?
5	?TIMEOUT TAC			(F)	
6	+PO44004				Postamble
Extended Comments: (1) UI_M identity check request with Ri=0 (not used) and Ai=Own TEI (2) Identity check response with Ri do not care and Ai=CURRENT_TEI. References to requirements: 10.5.3.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S40/I/UA/O/TC14019				
Identifier:	TC14019				
Purpose:	Ensure that the IUT when in state 4 and when ID verify procedure is implemented and after having sent an ID verify message on receipt of a UA frame on first expiry of T202 retransmits the ID-verify message and on second expiry of T202 enters state 1.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UA START TAC		UA(F1)		
3	L?UI_Mr CANCEL TAC, START TW202		UM_T7(0, CURRENT_TEI)		ID-verify
4	L?UI_Mr CANCEL TW202		UM_T7(0, CURRENT_TEI)	(P)	ID-verify
5	+CS51001				
6	?TIMEOUT TW202			(F)	
7	+PO44004				Postamble
8	L?UI_Mr [PC_REM_TEI_C] CANCEL TAC		UM_T1	(I)	(1)
9	+PO44004				Postamble
10	?TIMEOUT TAC [PC_REM_TEI_C]			(I)	(1)
11	+CS51001				Postamble
12	?TIMEOUT TAC			(F)	
13	+PO44004				Postamble
Extended Comments: (1) IUT removed TEI rather than initiate verify References to requirements: 10.5.5.2, 10.5.5.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S40/I/UA/O/TC14021				
Identifier:	TC14021				
Purpose:	Ensure that the IUT when in state 4 and when ID verify procedure is implemented and after receiving a UA frame and initiating TEI ID verify, completes the TEI ID verify procedure and remains in state 4.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UA START TAC		UA(F1)		
3	L?UI_Mr CANCEL TAC		UM_T7(0, CURREN_TEI)		(1)
4	L!UI_M START TAC		UM_T4(0, CURRENT_TEI)		
5	L?UI_Mr CANCEL TAC		UM_T5(CURREN T_TEI)	(P)	
6	+CS54001				State=4 ?
7	?TIMEOUT TAC			(F)	
8	+PO44004				Postamble
9	L?UI_Mr [PC_REM_TEI_C] CANCEL TAC		UM_T1	(I)	(2)
10	+PO44004				Postamble
11	?TIMEOUT TAC [PC_REM_TEI_C]			(I)	(2)
12	+CS51001				Postamble
13	?TIMEOUT TAC			(F)	
14	+PO44004				Postamble
Extended Comments: (1) Identity verify frame with Ai=CURRENT_TEI. (2) IUT removed TEI rather than initiate verify References to requirements: 10.5.4.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/LM/S40/I/UA/O/TC14022				
Identifier:	TC14022				
Purpose:	Ensure that the IUT when in state 4 and when ID verify procedure is not implemented and after receiving a UA frame enters state 1.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UA		UA(F1)	(P)	
3	+CS51001				
Extended Comments: References to requirements: 10.5.4.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S40/V/LE/N/TC24004				
Identifier:	TC24004				
Purpose:	Ensure the normal procedure of establishment of the Multiple Frame Operation initiated by the IUT.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	[BASIC_ACCESS]				
3	[PC_PTMP]				(1)
4	+PTMP_SUBTREE				
5	[NOT PC_PTMP]				(2)
6	+PTP_SUBTREE				
7	[NOT BASIC_ACCESS]				(2)
8	+PTP_SUBTREE				
9	**PTMP_SUBTREE**				
10	L!UI START TWL3	L1	UI1		(3)
11	L?SABMEr		SA(P1)	(P)	Link establishment
12	L!UA		UA(F1)		
13	L?Ir (NR ::= (NR + 1) MOD 128) CANCEL TWL3		IN1(P0, NS, NR)	(P)	(4)
14	L!RR_R		RRR(F0, NR)		(5)
15	+CS57001				State=7.0 ?
16	?TIMEOUT TWL3				no response
17	+CS57001				Postamble
18	?TIMEOUT TWL3			(I)	no response to UI
19	+PO44004				Postamble
20	**PTP_SUBTREE**				
21	< IUT ! SABME >	L2	SA(P1)		
22	START TWAIT				
23	L?SABMEr		SA(P1)	(P)	Link establishment
24	(NS ::= 0, NR ::= 0)				
25	L!UA		UA(F1)		
26	L?Icr_r (NR ::= (NR + 1) MOD 128) CANCEL TWAIT		IN5(P0, NS, NR)	(P)	SETUP
27	L!RR_R		RRR(F0, NR)		
28	+CS57001				State=7.0 ?
29	L?RR_Cr		RRC(P1, NS)		(6)
30	L!RR_R		RRR(F1, NR)		
31	GOTO L4				
32	?TIMEOUT TWAIT				no response
33	+CS57001				Postamble
34	?TIMEOUT TWAIT			(I)	
35	+PO44004				Postamble

Extended Comments:
(1) The IUT is configured for point-to-multipoint.
(2) The IUT is configured for point-to-point.
(3) UI with compatible SETUP.
(4) SETUP PDU (PTP)or response to compatible SETUP (inessential to check layer 3 contents).
(5) Updates NR and send acknowledge.
(6) IUT is polling (i.e. T203 has expired).

References to requirements: 10.6.1.2

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S40/I/UA/O/TC24007				
Identifier:	TC24007				
Purpose:	Ensure that the IUT when in state 4 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	L!UA		UA(F1)		Unsolicited UA
3	START TAC				
4	L?UI_Mr [PC_VER_TEI_C] CANCEL TAC		UM . T7(0, CURRENT_TEI)	(P)	ID-verify (1)
5	+PO44004				
6	L?UI_Mr [PC_REM_TEI_C] CANCEL TAC		UM_T1	(P)	ID-request (2)
7	+PO44004				
8	?TIMEOUT TAC [PC_REM_TEI_C]				
9	+CS51001				
10	?TIMEOUT TAC			(F)	
11	+PO44004				
Extended Comments: References to requirements: 10.9.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S40/S/SA/N/TC24020				
Identifier:	TC24020				
Purpose:	Ensure that the IUT when in state 4 takes no action on receipt of a SABME frame containing a TEI different from the TEI assigned to the IUT.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	(TMP ::= (CURRENT_TEI + 1) MOD 127)				
3	L!INV_U_FR START TNOAC		IUF_SA_BAD_TEI(TMP)		(1)
4	L?SABMEr		SA(P1)	(P)	(2)
5	+PO44004				Postamble
6	?TIMEOUT TNOAC			(P)	No response
7	+CS54001				State=4 ?
Extended Comments: (1) SABME with a TEI not assigned to the IUT. (2) IUT initiates establishment for its own reasons. References to requirements: 10.9.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S50/V/DM/N/TC25002				
Identifier:	TC25002				
Purpose:	Ensure that the IUT when in state 5 and receiving a DM F=1 enters state 4.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR35001				Preamble to S5
2	L!DM		DM(F1)		(2)
3	+CS54001				State=4 ? (1)

Extended Comments:
(1) The test step CS54001 is used for checking the IUT state.
(2) DM with F bit set to 1.

References to requirements: 10.6.1.2

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S50/V/N0/N/TC25005				
Identifier:	TC25005				
Purpose:	Ensure that the IUT when in state 5 and receiving no response from the network, retransmits SABME at least N200 times				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR35001				Preamble to S5
2	(RC ::= 1) START TW200				
3	L?SABMEr [RC < N200] CANCEL TW200	L1	SA(P1)	(P)	
4	(RC ::= RC + 1) START TW200				
5	GOTO L1				
6	L?SABMEr [RC = N200] CANCEL TW200		SA(P1)	(P)	(1)
7	+PO44004				
8	?TIMEOUT TW200			(F)	(2)
9	+PO44004				Postamble

Extended Comments:
(1) IUT has retransmitted SABME N200 times.
(2) Timer TW200 has expired and the IUT has retransmitted SABME less than N200 times.

References to requirements: 10.6.1.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S50/I/SA/O/TC25007				
Identifier:	TC25007				
Purpose:	Ensure that the IUT when in state 5 on receipt of a SABME frame (Call collision) transmits a UA frame and remains in state 5.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR35001				Preamble to S5
2	L!SABME START TAC		SA(P1)		(2)
3	L?UAr CANCEL TAC		UA(F1)	(P)	(3)
4	L!UA		UA(F1)		(4)
5	+CS57001				State=4 ?
6	?TIMEOUT TAC			(F)	(5)
7	+PO44004				Postamble
Extended Comments: (2) SABME collides with SABME sent entering S5. (3) Correct response to inopportune SABME. (4) Close establishment procedure. (5) Response to SABME not received. References to requirements: 10.6.3.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S50/I/RR/O/TC25013				
Identifier:	TC25013				
Purpose:	Ensure that the IUT when in state 5 ignores an RR command frame.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR35001				Preamble to S5
2	L!RR_C START TW200		RRC(P1, NR)		Inopportune frame
3	L?SABMEr CANCEL TW200		SA(P1)	(P)	SABME retransmission
4	L!DM		DM(F1)		IUT to state 4
5	+CS54001				State=4 ?
6	?TIMEOUT TW200			(F)	No response
7	+PO44004				Postamble
Extended Comments: References to requirements: 10.6.1.1					

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S70/V/IN/N/TC27003
Identifier: TC27003
Purpose: Ensure the operation of the sequence numbering of N(R) and N(S).
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	+PR37001				Preamble to S7.0
2	L!Is START TAC, START TWL3	L1	IN2(P0, NR, NS)		I-frame
3	(NS ::= (NS + 1) MOD 128)				
4	L?RR_Rr CANCEL TAC		RRR(F0, NS)	(P)	(3)
5	L?Ir CANCEL TWL3	L2	IN3(P0, NS, NR)	(P)	I-frame response
6	(NR ::= (NR + 1) MOD 128)	L3			(5)
7	L!RR_R		RRR(F0, NR)		
8	[NR > 0]				
9	GOTO L1				
10	[NR = 0]			(P)	All num checked
11	+CS57001				State=7.0 ?
12	L?RR_Cr		RRC(P1, NS)		Timeout T203
13	L!RR_R		RRR(F1, NR)		
14	GOTO L2				
15	?TIMEOUT TWL3			(I)	I not received
16	+PO44004				Postamble
17	L?Ir CANCEL TAC, CANCEL TWL3		IN3(P0, NS, NR)		(6)
18	GOTO L3				
19	?TIMEOUT TAC			(F)	No response
20	+PO44004				Postamble

Extended Comments:
(3) Acknowledgement by RR_R.
(6) Acknowledgement by I (4).
(5) Increment NR and acknowledge.

References to requirements: 10.7.1, 10.7.2, 10.7.2.2, 10.7.3

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S70/V/IN/N/TC27004
Identifier: TC27004
Purpose: Ensure that the IUT accepts acknowledgement by an I-frame.
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	+PR37002				Preamble to S7.0
2	L!Is START TWL3, START TAC		IN2(P0, NR, NS)		(2)
3	(NS ::= (NS + 1) MOD 128)				
4	L?RR_Rr CANCEL TAC		RRR(F0, NS)	(P)	Response received
5	L?Ir CANCEL TWL3		IN3(P0, NS, NR)		
6	(NR ::= (NR + 1) MOD 128)				
7	L!Is START TAC		IN8(P0, NR, NS)		
8	(NS ::= (NS + 1) MOD 128)				
9	L?RR_Rr CANCEL TAC		RRR(F0, NS)	(P)	
10	+CS57001				State=7.0 ?
11	?TIMEOUT TAC			(F)	
12	+PO44004				Postamble
13	?TIMEOUT TWL3			(I)	
14	+PO44004				Postamble
15	?TIMEOUT TAC			(F)	No response
16	+PO44004				Postamble

Extended Comments:
(2) I-frame which acknowledges the previous I.

References to requirements: 10.7.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/RJ/N/TC27011				
Identifier:	TC27011				
Purpose:	Ensure that the IUT when in state 7.0 and an I-frame is outstanding, and the IUT receieves a REJ F=0 indicating request of retransmission of last transmitted I-frame, retransmits the requested I-frame.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	(NR ::= (NR - 1) MOD 128)				
3	L!REJ_R START TAC		RJR(F0, NR)		Reject I received
4	L?Ir CANCEL TAC		IN3(P0, NS, NR)	(P)	I retransmission
5	(NR ::= (NR + 1) MOD 128)				
6	L!RR_R		RRR(F0, NR)		Updates N(R) and ack.
7	+CS57001				State=7.0 ?
8	?TIMEOUT TAC			(F)	No response
9	+PO44004				Postamble
Extended Comments: (1) Preamble to S7.0 with INFO generation. References to requirements: 10.7.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/DI/N/TC27012				
Identifier:	TC27012				
Purpose:	Ensure the release procedure for Multiple Frame Established Operation initiated by the network side.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	L!DISC START TAC		DI(P1)		
3	L?UAr CANCEL TAC		UA(F1)	(P)	
4	+CS54001				State=4 ? (1)
5	?TIMEOUT TAC			(F)	UA not received
6	+PO44004				Postamble
Extended Comments: (1) The test step CS54001 is used for checking the IUT state. References to requirements: 10.6.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/IT/N/TC27015				
Identifier:	TC27015				
Purpose:	Ensure that the IUT retransmits the last transmitted I-frame at least twice or transmits an RR command at least twice if no acknowledgement for the last transmitted I-frame is received. If the IUT transmits an RR command frame, it is tested whether the IUT retransmits the I-frame after receiving an RR response frame not acknowledging the outstanding I-frame.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	START TW200				
3	(NR ::= (NR - 1) MOD 128)				
4	L?RR_Cr START TW200		RRC(P1, NS)	(P)	polling by RR_C
5	L?RR_Cr CANCEL TW200		RRC(P1, NS)	(P)	polling by RR_C
6	L!RR_R START TAC		RRR(F1, NR)		(2)
7	L?Ir CANCEL TAC		IN3(P0, NS, NR)	(P)	RELEASE COMPLETE
8	(NR ::= (NR + 1) MOD 128)				
9	L!RR_R		RRR(F0, NR)		Confirms I delivery
10	+CS57001				
11	?TIMEOUT TAC			(F)	no I recovery
12	+PO44004				Postamble
13	?TIMEOUT TW200			(F)	
14	+PO44004				Postamble
15	L?Ir START TW200		IN3(P1, NS, NR)	(P)	Polling with I-frame
16	L?Ir CANCEL TW200		IN3(P1, NS, NR)	(P)	Polling with I-frame
17	(NR ::= (NR + 1) MOD 128)				
18	L!RR_R		RRR(F1, NR)		
19	L!Is START TAC, START TWL3		IN2(P0, NR, NS)		RELEASE
20	(NS ::= (NS + 1) MOD 128)				
21	L?RR_Rr CANCEL TAC		RRR(F0, NS)	(P)	
22	L?Ir CANCEL TWL3		IN3(P0, NS, NR)	(P)	RELEASE COMPLETE
23	(NR ::= (NR + 1) MOD 128)				
24	L!RR_R		RRR(F0, NR)		Confirms I delivery
25	+CS57001				
26	?TIMEOUT TWL3			(F)	
27	+PO44004				Postamble
28	?TIMEOUT TAC			(F)	
29	+PO44004				Postamble
30	?TIMEOUT TW200			(F)	
31	+PO44004				Postamble
32	?TIMEOUT TW200			(F)	
33	+PO44004				Postamble

Extended Comments:
(1) Preamble to S7.0 with INFO generation.
(2) RR_R confirms loss of previous I-frame.

References to requirements: 10.7.6

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/RM/N/TC27019				
Identifier:	TC27019				
Purpose:	Ensure that the IUT when in state 7.0 and an I-frame is outstanding and the IUT receives no acknowledge for the outstanding I-frame will either retransmit the I-frame or transmit an RR P=1 at expiry of timer T200.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0
2	(TMP ::= (NR - 1) MOD 128) START TW200				
3	L?RR_Cr CANCEL TW200		RRC(P1, NS)	(P)	Polling with RR frame
4	L!RR_R		RRR(F1, NR)		Response to polling
5	+CS57001				State=7.0 ?
6	L?Ir CANCEL TW200		IN3(P1, NS, TMP)	(P)	Polling with I-frame
7	L!REJ_R		RJR(F1, NR)		Response to polling
8	+CS57001				
9	?TIMEOUT TW200			(F)	no polling
10	+PO44004				Postamble
Extended Comments:					
References to requirements: 10.7.6					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/SA/N/TC27022				
Identifier:	TC27022				
Purpose:	Ensure the re-establishment procedure of Multiple Frame Operation initiated by the network.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	L!SABME START TAC		SA(P1)		Request to reset
3	L?UAr CANCEL TAC		UA(F1)	(P)	Correct reset
4	+CS57001				State=7.0 ? (1)
5	?TIMEOUT TAC			(F)	No response (4)
6	+PO44004				Postamble
Extended Comments:					
(1) The test step CS57001 is used for checking the IUT state.					
References to requirements: 10.6.1.2, 10.8					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/IN/N/TC27027				
Identifier:	TC27027				
Purpose:	Ensure that the IUT when in state 7.0 and receiving an I-frame with P=1 and N(S) error transmits a REJect frame with F=1.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	L!Is START TAC		IN8(P0, NR, NS)		
3	(TMP ::= (NS + 1) MOD 128)				
4	L?RR_Rr CANCEL TAC		RRR(F0, TMP)	(P)	
5	L!Is START TAC		IN8(P1, NR, NS)		N(S) out of sequence
6	(NS ::= (NS + 1) MOD 128)				
7	L?REJ_Rr CANCEL TAC		RJR(F1, TMP)	(P)	Rejecting I-frame
8	+CS57101				State=7.1 ?
9	?TIMEOUT TAC			(F)	REJ_R not received
10	+PO44004				Postamble
11	?TIMEOUT TAC			(F)	REJ_R not received
12	+PO44004				Postamble
Extended Comments: References to requirements: 10.9.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/IN/N/TC27028				
Identifier:	TC27028				
Purpose:	Ensure that the IUT when in state 7.0 and receiving an I-frame with P=0 and N(S) error transmits a REJect frame with F=0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	(TMP ::= (NS + K) MOD 128)				
3	L!Is START TAC		IN2(P0, NR, TMP)		N(S) out of sequence
4	L?REJ_Rr CANCEL TAC		RJR(F0, NS)	(P)	Rejecting I-frame
5	+CS57101				State=7.1 ?
6	?TIMEOUT TAC			(F)	REJ_R not received
7	+PO44004				Postamble
Extended Comments: References to requirements: 10.9.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/UA/O/C27031				
Identifier:	TC27031				
Purpose:	Ensure that the IUT when in state 7.0 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	L!UA		UA(F1)		Unsolicited UA
3	[PC_VER_TEI_C] START TWAIT				(1)
4	L?UI_Mr CANCEL TWAIT		UM_T7(0, CURRENT_TEI)	(P)	ID-verify
5	+PO44004				
6	?TIMEOUT TWAIT			(F)	No ID-verify
7	+PO44004				
8	[NOT PC_VER_TEI_C]			(P)	(2)
9	+CS51001				
Extended Comments: (1) ID verify request is expected. (2) TEI removal is expected. References to requirements: 10.9.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/RR/N/TC27040				
Identifier:	TC27040				
Purpose:	Ensure that the IUT when in state 7.0 and receiving a RR command frame with P bit 1 and a N(R) error initiates re-establishment of the data link.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	(TMP ::= (NR + K) MOD 128)				
3	L!RR_C START TAC		RRC(P0, TMP)		N(R) out of window
4	L?SABMEr CANCEL TAC		SA(P1)	(P)	Re-establishment
5	L!UA		UA(F1)		
6	+CS57001				
7	?TIMEOUT TAC			(F)	SABME not received
8	+PO44004				Postamble
Extended Comments: References to requirements: 10.9.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/RR/N/TC27043				
Identifier:	TC27043				
Purpose:	Ensure that the IUT when in state 7.0 and receiving a RR response frame with F bit 1 and a N(R) error initiates re-establishment of the data link.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	(TMP ::= (NR + K) MOD 128)				
3	L!RR_R START TAC		RRR(F1, TMP)		N(R) out of window
4	L?SABMEr CANCEL TAC		SA(P1)	(P)	Link reset
5	L!DM		DM(F1)		Brings IUT to state 4
6	+CS54001				State=4 ?
7	?TIMEOUT TAC			(F)	SABME not received
8	+PO44004				Postamble
Extended Comments: References to requirements: 10.9.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/I/RR/N/TC27046				
Identifier:	TC27046				
Purpose:	Ensure that the IUT when in state 7.0 and receiving a RR response frame with F bit 0 and a N(R) error initiates re-establishment of the data link.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	(TMP ::= (NR + K) MOD 128)				
3	L!RR_R START TAC		RRR(F0, TMP)		N(R) out of window
4	L?SABMEr CANCEL TAC		SA(P1)		Link reset
5	L!DM		DM(F1)		Brings IUT to state 4
6	+CS54001			(P)	State=4 ?
7	?TIMEOUT TAC			(F)	SABME not received
8	+PO44004				Postamble
Extended Comments: References to requirements: 10.9.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/S/FC/N/TC27058				
Identifier:	TC27058				
Purpose:	Ensure that the IUT when receiving a frame which contains a frame check sequence error discards the frame.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				(1)
2	(TMP ::= (FCS_VALUE + 1) MOD 256)				
3	L!INV_I_FR START TNOAC		IIF_FCS(NR, NS, TMP)		(2)
4	?DISCr CANCEL TNOAC		DI(P1)	(I)	(3)
5	L!UA		UA(F1)		IUT in state 4
6	+PO44004				Postamble
7	?TIMEOUT TNOAC			(P)	No response (4)
8	+CS57001				State=7.0 ?

Extended Comments:

(1) Preamble to S7.0

(2) I-frame with FCS error

(3) It is not posible to determine whether the IUT is not be stable in state 7.0, and initiates disconnection of the datalink or whether the DISC is sent as a result of the I-frame with a FCS error.

(4) No action from the IUT as a result of the I-frame with a FCS error.

References to requirements: 10.9.2

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S70/V/RR/N/TC27061
Identifier: TC27061
Purpose: (Primary Rate Access only) Ensure that the IUT after receiving an acknowledgment and there are still outstanding I-frames not acknowledged by the network restarts timer T200 and ensure that the retransmission of the outstanding I-frame or the transmission of the RR command frame polling for an acknowledgement is within the allowed tolerances of timer T200.
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	+PR37005				
2	(TMP ::= (NR - 1) MOD 128)				
3	L!RR_R START TREAD		RRR(F0, TMP)		Ack. one I-frame
4	L?Ir READTIMER TREAD(T), CANCEL TREAD		IN1(P1, NS, TMP)		Polling with I-frame
5	L!REJ_R		RJR(F1, NR)		
6	[TIME(T200VMAX, T200VMIN, T)]			(P)	
7	+CS57001				
8	[NOT TIME(T200VMAX, T200VMIN, T)]			(F)	
9	+PO44004				Postamble
10	L?RR_Cr READTIMER TREAD(T), CANCEL TREAD		RRC(P1, NS)		Polling with RR frame
11	L!RR_R		RRR(F1, NR)		
12	[TIME(T200VMAX, T200VMIN, T)]			(P)	
13	+CS57001				
14	[NOT TIME(T200VMAX, T200VMIN, T)]			(F)	
15	+PO44004				Postamble
16	?TIMEOUT TREAD			(F)	
17	+PO44004				Postamble

Extended Comments:

References to requirements: 10.7.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/RJ/N/TC27074				
Identifier:	TC27074				
Purpose:	(Primary Rate Access only) Ensure that the IUT when in state 7.0 and receiving a REJ frame indicating a request for retransmission of the last two transmitted I-frames, retransmits the two last transmitted I-frames.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37005				
2	(TMP ::= (NR - 2) MOD 128, TMP1 ::= (NR - 1) MOD 128)				
3	L!REJ_R START TAC		RJR(F0, TMP)		Rej. two I-frames
4	L?Ir CANCEL TAC		IN1(P0, NS, TMP)		
5	L!RR_R START TAC		RRR(F0, TMP1)		
6	L?Ir CANCEL TAC		IN1(P0, NS, TMP1)	(P)	
7	(TMP1 ::= (TMP1 + 1) MOD 128)				
8	L!RR_R		RRR(F0, TMP1)		
9	+PO44004				Postamble S4 (DISC)
10	?TIMEOUT TAC			(F)	
11	+PO44004				Postamble
12	?TIMEOUT TAC			(F)	
13	+PO44004				Postamble
Extended Comments: References to requirements: 10.7.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S70/V/RR/N/TC27075				
Identifier:	TC27075				
Purpose:	(Primary Rate Access only) Ensure that the IUT accepts acknowledgement of more than one I-frame in a RR response frame.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37406(2)				(1)
2	(NR ::= 0)				
3	L!RR_C START TAC		RRC(P0, NR)		
4	L?Icr_r START TAC	L1	IN7(P0, NS, NR)		
5	(NR ::= (NR + 1) MOD 128)				
6	L?Icr_r CANCEL TAC		IN7(P0, NS, NR)		
7	(NR ::= (NR + 1) MOD 128)				
8	L!RR_R		RRR(F0, NR)	(P)	Ack. two I-frames
9	+CS57001				
10	?TIMEOUT TAC			(I)	
11	+PO44004				Postamble
12	L?RR_Cr CANCEL TAC		RRC(P1, NS)		(2)
13	L!RR_R START TAC		RRR(F1, NR)		
14	GOTO L1				
15	?TIMEOUT TAC			(I)	
16	+PO44004				Postamble
Extended Comments: (1) Get multiple unacknowledged outstanding I-frames References to requirements: 10.7.3					

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S70/V/KI/N/TC27076
Identifier: TC27076
Purpose: (Primary Rate Access only) Ensure that the maximum number of outstanding I-frames for the IUT is k=7.
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	(TMP ::= K + 1)				
2	+PR37406(TMP)				(2)
3	(TMP ::= K, NR ::= 0)				
4	L!RNR_C START TW200MIN	L1	RNC(P0, 0)		
5	L!RR_C START TAC		RRC(P0, 0)		
6	L?Icr_r (NR ::= (NR + 1) MOD 128) START TAC		IN7(P0, NS, NR)		(3)
7	L?Icr_r (NR ::= (NR + 1) MOD 128)	L2	IN7(P0, NS, NR)		
8	(TMP ::= TMP - 1)				
9	GOTO L2				
10	?TIMEOUT TAC				
11	(TMP ::= TMP - 1)				
12	[TMP <> 0] CANCEL TW200MIN				
13	GOTO L1				
14	[TMP = 0]				
15	?TIMEOUT TW200MIN START TAC				
16	(NR ::= K - 1)				
17	L?Icr_r CANCEL TAC		IN7(P1, NS, NR)		Polling with I-frame
18	(NR ::= K)				
19	L!REJ_R START TAC		RJR(F1, NR)		
20	+END1				
21	L?RR_Cr CANCEL TAC		RRC(P1, NS)		Polling with RR frame
22	(NR ::= K)				
23	L!RR_R START TAC		RRR(F1, NR)		
24	+END1				
25	?TIMEOUT TAC			(F)	
26	+PO44004				Postamble
27	?TIMEOUT TAC			(F)	
28	+PO44004				Postamble
29	**END1**				
30	(NR ::= K)				
31	L?Icr_r CANCEL TAC		IN7(P0, NS, NR)	(P)	
32	(NR ::= (NR + 1) MOD 128)				
33	L!RR_R		RRR(F0, NR)		
34	+CS57001				
35	?TIMEOUT TAC			(F)	
36	+PO44004				Postamble

Extended Comments:
(2) Get multiple unacknowledged outstanding I-frames
(3) Receive, but do not acknowledge, the I-frames

References to requirements: 10.7.1

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/IN/N/TC27404				
Identifier:	TC27404				
Purpose:	Ensure that the IUT when in state 7.4 does not transmit any I-frames and that outstanding I-frames are transmitted after entering state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	L!Is START TAC, START TWAIT		IN2(P0, NR, NS)		(2)
3	(NS ::= (NS + 1) MOD 128)				
4	L?RR_Rr CANCEL TAC, START TW200		RRR(F0, NS)		acknowledge I
5	L?RR_Cr CANCEL TW200		RRC(P1, NS)		(3)
6	L!RR_R		RRR(F1, NR)		(4)
7	L?Ir CANCEL TWAIT	L1	IN3(P0, NS, NR)		(5)
8	(NR ::= (NR + 1) MOD 128)				
9	L!RR_R		RRR(F0, NR)		
10	+CS57001			(P)	State=7.0 ?
11	L?RR_Cr		RRC(P1, NS)		Timeout T203
12	L!RR_R		RRR(F1, NR)		
13	GOTO L1				
14	?TIMEOUT TWAIT			(I)	no I received
15	+PO44004				Postamble
16	?TIMEOUT TW200			(F)	(6)
17	+PO44004				Postamble
18	?TIMEOUT TAC			(F)	no response
19	+PO44004				Postamble

Extended Comments:
(2) I soliciting an I-frame from the IUT.
(3) Polling in peer receiver busy.
(4) Busy condition stops.
(5) I-frame solicited finally can be sent.
(6) No polling in peer busy.

References to requirements: 10.7.5

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RJ/O/TC27405				
Identifier:	TC27405				
Purpose:	Ensure that the IUT when in state 7.4 and receiving a REJ P=1 frame responds with an RR F=1 frame and retransmits the I-frame rejected.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	(NR ::= (NR - 1) MOD 128)				Decrements N(R)
3	L!RNR_R		RNR(F0, NR)		Brings IUT to 74
4	L!REJ_C START TAC		RJC(P1, NR)		Rejects I received
5	L?RR_Rr		RRR(F1, NS)		
6	CANCEL TAC				
7	START TAC				
8	L?Ir		IN1(P0, NS, NR)	(P)	I retransmission
9	CANCEL TAC				
10	(NR ::= (NR + 1) MOD 128)				Updates N(R)
11	L!RR_R		RRR(F0, NR)		
12	+CS57001				State=7.0 ?
13	?TIMEOUT TAC			(F)	I not received
14	+PO44004				Postamble
15	?TIMEOUT TAC			(F)	RR_R not received
16	+PO44004				Postamble
Extended Comments: (1) Preamble to S7.0 with INFO generation. References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RJ/O/TC27407				
Identifier:	TC27407				
Purpose:	Ensure that the IUT when in state 7.4 and receiving a REJ F=0 frame retransmits the I-frame rejected.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	(NR ::= (NR - 1) MOD 128)				Decrements N(R)
3	L!RNR_R		RNR(F0, NR)		IUT in state 7.4
4	L!REJ_R START TAC		RJR(F0, NR)		Rejects I send
5	L?Ir CANCEL TAC		IN1(P0, NS, NR)	(P)	INFO retransmission
6	(NR ::= (NR + 1) MOD 128)				Updates N(R)
7	L!RR_R		RRR(F0, NR)		
8	+CS57001				State=7.0 ?
9	?TIMEOUT TAC			(F)	No frame received
10	+PO44004				Postamble
Extended Comments: (1) Preamble to S7.0 with INFO generation. References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RT/N/TC27411				
Identifier:	TC27411				
Purpose:	Ensure that the IUT when in state 7.4 and receiving no response from the network retransmits an RR command frame N200 times.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	(RC ::= 1) START TW200				
3	L?RR_Cr [RC < N200] (RC ::= RC + 1) START TW200	L1	RRC(P1, NS)		(2)
4	GOTO L1				
5	L?RR_Cr [RC = N200] START TW200		RRC(P1, NS)	(P)	
6	L?SABMEr CANCEL TW200		SA(P1)	(P)	
7	L!DM		DM(F1)		Brings IUT to state 4
8	+CS54001				State=4 ?
9	?TIMEOUT TW200			(F)	no link reset
10	+PO44004				Postamble
11	?TIMEOUT TW200			(F)	(3)
12	+PO44004				Postamble
Extended Comments: (2) RC is a test case variable (set to 0 by default) used as retransmission counter. (3) Incorrect number of RR_C retransmissions. References to requirements: 10.7.5, 10.7.6					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RR/O/TC27412				
Identifier:	TC27412				
Purpose:	Ensure that the IUT when in state 7.4 and receiving an RR P=1 frame transmits an RR F=1 and enters state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	L!RR_C START TAC		RRC(P1, NR)		
3	L?RR_Rr CANCEL TAC		RRR(F1, NS)	(P)	
4	+CS57001				State=7.0 ?
5	?TIMEOUT TAC			(F)	RR not received
6	+PO44004				Postamble
Extended Comments: References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RR/O/TC27413				
Identifier:	TC27413				
Purpose:	Ensure that the IUT when in state 7.4 and receiving an RR F=0 frame enters state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	L!RR_R		RRR(F0, NR)		
3	+CS57001				State=7.0 ?
Extended Comments: References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RN/O/TC27414				
Identifier:	TC27414				
Purpose:	Ensure that the IUT when in state 7.4 and receiving a RNR P=1 frame transmits an RR F=1 and remains in state 7.4.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	L!RNR_C START TAC		RNC(P1, NR)		
3	L?RR_Rr CANCEL TAC		RRR(F1, NS)	(P)	
4	+CS57401				State=7.4 ?
5	?TIMEOUT TAC			(F)	RR not received
6	+PO44004				Postamble
Extended Comments: References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/RN/O/TC27416				
Identifier:	TC27416				
Purpose:	Ensure that the IUT when in state 7.4 and receiving a RNR F=0 frame remains in state 7.4.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	L!RNR_R		RNR(F0, NR)		
3	+CS57401				State=7.4 ?
Extended Comments: References to requirements: 10.7.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S74/V/T0/N/TC27417				
Identifier:	TC27417				
Purpose:	Ensure that the IUT when in state 7.4 and receiving no frames from the network retransmits an RR command frame within the allowed tolerance of timer T200				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	START TW200				
3	L?RR_Cr CANCEL TW200, START TREAD		RRC(P1, NS)		(2)
4	L?RR_Cr READTIMER TREAD(T), CANCEL TREAD		RRC(P1, NS)		(3)
5	[TIME(T200VMAX, T200VMIN, T)]			(P)	(4)
6	+PO44004				Postamble
7	[NOT TIME(T200VMAX, T200VMIN, T)]			(F)	(5)
8	+PO44004				Postamble
9	?TIMEOUT TREAD			(F)	RR_C not received
10	+PO44004				Postamble
11	?TIMEOUT TW200			(F)	RR_C not received
12	+PO44004				Postamble

Extended Comments:
(2) Wait for a RR_C and START TREAD (long timer).
(3) On receipt of RR_C read the value of TREAD and memorize it into test case variable T.
(4) T200 is within tolerance (TIME() has returned TRUE).
(5) T200 is out of tolerance (TIME() has returned FALSE).

References to requirements: 10.7.5, 10.7.6

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S80/V/RJ/N/TC28005
Identifier: TC28005
Purpose: Ensure that the IUT when in state 8.0 and receiving a REJ F=1 indicating a request for retransmission of the last I-frame, enters state 7.0 and retransmits the last transmitted I-frame.
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	+PR37002				Preamble to S7.0 (1)
2	(TMP ::= (NR - 1) MOD 128) START TW200				
3	L?RR_Cr CANCEL TW200		RRC(P1, NS)		Polling with RR frame
4	L!REJ_R START TAC		RJR(F1, TMP)		(3)
5	(TMP1 ::= (NR - 1) MOD 128)				
6	L?Ir CANCEL TAC		IN3(P0, NS, TMP1)	(P)	
7	L!RR_R		RRR(F0, NR)		(4)
8	+CS57001				State=7.0 ?
9	?TIMEOUT TAC			(F)	no polling
10	+PO44004				Postamble
11	L?Ir CANCEL TW200		IN3(P1, NS, TMP)		Polling with I-frame
12	L!REJ_R START TAC		RJR(F1, TMP)		(3)
13	(TMP1 ::= (NR - 1) MOD 128)				
14	L?Ir CANCEL TAC		IN3(P0, NS, TMP1)	(P)	
15	L!RR_R		RRR(F0, NR)		(4)
16	+CS57001				State=7.0 ?
17	?TIMEOUT TAC			(F)	no polling
18	+PO44004				Postamble
19	?TIMEOUT TW200			(F)	no polling
20	+PO44004				Postamble

Extended Comments:
(1) Preamble to S7.0 with INFO generation.
(3) Response to polling. REJ should not confirm I-frame delivery.
(4) Confirms I-frame delivery.

References to requirements: 10.7.4, 10.7.6

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S80/I/IN/N/TC28012				
Identifier:	TC28012				
Purpose:	Ensure that the IUT when in state 8.0 is able to receive I-frames.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR38001				Preamble to S8.0
2	(NR ::= (NR - 1) MOD 128)				
3	L!Icr_s (TMP ::= (NS + 1) MOD 128) START TAC		IN4(P0, NR, NS, 2)		REL 2. cref
4	L?RR_Rr CANCEL TAC, START TW200		RRR(F0, TMP)	(P)	
5	L?RR_Cr CANCEL TW200		RRC(P1, TMP)	(P)	Polling with RR frame
6	(NR ::= (NR + 1) MOD 128)				
7	L!RR_R START TAC		RRR(F1, NR)		
8	(NS ::= (NS + 1) MOD 128)				
9	L?Icr_r [Icr.CR = 2] CANCEL TAC		IN7(P0, NS, NR)	(P)	RELEASE COMPLETE with 2. cref
10	(NR ::= (NR + 1) MOD 128)				
11	L!RR_R		RRR(F0, NR)		
12	+CS57001				State=7.0 ?
13	?TIMEOUT TAC			(F)	
14	+PO44004				Postamble
15	L?Ir CANCEL TW200		IN3(P1, TMP, NR)	(P)	Polling with I-frame
16	(NR ::= (NR + 1) MOD 128)				
17	L!RR_R START TAC		RRR(F1, NR)		
18	(NS ::= (NS + 1) MOD 128)				
19	L?Icr_r [Icr.CR = 2] CANCEL TAC		IN7(P0, NS, NR)	(P)	RELEASE COMPLETE with 2. cref
20	(NR ::= (NR + 1) MOD 128)				
21	L!RR_R		RRR(F0, NR)		
22	+CS57001				State=7.0 ?
23	?TIMEOUT TAC			(F)	
24	+PO44004				Postamble
25	?TIMEOUT TW200			(F)	
26	+PO44004				Postamble
27	?TIMEOUT TAC			(F)	No acknowledge
28	+PO44004				Postamble
Extended Comments:					
References to requirements: 10.7.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S80/I/UA/O/TC28019				
Identifier:	TC28019				
Purpose:	Ensure that the IUT when in state 8.0 and receiving an UA F=1 frame either initiates TEI removal or TEI verify procedure.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR38001				Preamble to S8.0
2	L!UA		UA(F1)		Unsolicted UA frame
3	[PC_VER_TEI_C] START TWAIT				(1)
4	L?UI_Mr CANCEL TWAIT		UM_T7(0, CURRENT_TEI)	(P)	ID-verify
5	+PO44004				
6	?TIMEOUT TWAIT			(F)	
7	+PO44004				
8	[NOT PC_VER_TEI_C]			(P)	(2)
9	+CS51001				
Extended Comments: (1) ID verify request is expected (2 TEI removal is expected remove TEI. References to requirements: 10.9.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S84/V/RN/N/TC28406				
Identifier:	TC28406				
Purpose:	Ensure that the IUT when in state 8.4 is able to receive I-frames.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR38401				Preamble to S8.4
2	L!RNR_R		RNR(F1, NR)		
3	L!Is START TAC		IN2(P0, NR, NS)		RELEASE
4	(NS ::= (NS + 1) MOD 128)				
5	L?RR_Rr CANCEL TAC, START TW200		RRR(F0, NS)	(P)	
6	L?RR_Cr CANCEL TW200		RRC(P1, NS)	(P)	
7	L!RR_R START TAC		RRR(F1, NR)		
8	L?Ir CANCEL TAC		IN3(P0, NS, NR)	(P)	RELEASE COMPLETE
9	(NR ::= (NR + 1) MOD 128)				
10	L!RR_R		RRR(F0, NR)		
11	+CS57001				State=7.0 ?
12	?TIMEOUT TAC			(F)	
13	+PO44004				Postamble
14	?TIMEOUT TW200			(F)	
15	+PO44004				Postamble
16	?TIMEOUT TAC			(F)	
17	+PO44004				Postamble
Extended Comments: References to requirements: 10.7.1, 10.7.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S84/V/RJ/O/TC28407				
Identifier:	TC28407				
Purpose:	Ensure that the IUT when in state 8.4 and receiving a REJ F=1 indicating no request for retransmission of I-frames, enters state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR38401				Preamble to S8.4
2	L!REJ_R		RJR(F1, NR)		
3	+CS57001				State=7.0 ?
Extended Comments: References to requirements: 10.7.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L2/DC/S84/I/SA/O/TC28408				
Identifier:	TC28408				
Purpose:	Ensure that the IUT when in state 8.4 and receiving a SABME frame, transmits a UA frame, resets all state variables and enters state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR38401				Preamble to S8.4
2	L!SABME START TAC		SA(P1)		(2)
3	L?UAr CANCEL TAC		UA(F1)	(P)	
4	(NR ::= 0, NS ::= 0)				reset variables
5	+CS57001				State=7.0 ?
6	?TIMEOUT TAC			(F)	(4)
7	+PO44004				Postamble
Extended Comments: (2) SABME with poll bit = 1. (4) UA not received. References to requirements: 10.8.1					

Test Case Dynamic Behaviour

Reference: TBR4_L2/DC/S84/I/RJ/O/TC28424
Identifier: TC28424
Purpose: Ensure that the IUT when in state 8.4 and receiving a REJ P=1 frame not acknowledging the last transmitted I-frame, transmits an RR F=1 and enters state 8.0.
Default: DF69902

No	Behaviour Description	L	Cref	V	C
1	+PR37002				Preamble to S7.0 (1)
2	(NR ::= (NR - 1) MOD 128)				
3	L!RNR_R START TW200		RNR(F0, NR)		(2)
4	L?RR_Cr START TW200		RRC(P1, NS)		(3)
5	L!REJ_C START TAC		RJC(P1, NR)		(4)
6	L?RR_Rr CANCEL TAC		RRR(F1, NS)		(9)
7	L?RR_Cr CANCEL TW200		RRC(P1, NS)		(10)
8	L!RR_R START TAC		RRR(F1, NR)		(5)
9	L?Ir (NR ::= (NR + 1) MOD 128) CANCEL TAC		IN3(P0, NS, NR)	(P)	(11)
10	L!RR_R		RRR(F0, NR)		(12)
11	+CS57001				State=7.0 ?
12	?TIMEOUT TAC			(F)	
13	+PO44004				Postamble
14	L?Ir CANCEL TW200		IN3(P1, NS, NR)	(P)	(10)
15	(NR ::= (NR + 1) MOD 128)				
16	L!RR_R		RRR(F1, NR)		(5)
17	+CS57001				State=7.0 ?
18	?TIMEOUT TW200			(F)	RR not received
19	+PO44004				Postamble
20	?TIMEOUT TAC			(F)	RR not received
21	+PO44004				Postamble
22	?TIMEOUT TW200			(F)	RR not received
23	+PO44004				Postamble

Extended Comments:
(1) Preamble to S7.0 with INFO generation.
(2) RNR to put the IUT into state 7.4.
(3) T200 timeout. RR_C with poll bit = 1. IUT enters state 8.4.
(4) REJ_C with poll bit set to 1, IUT enters state 8.0.
(5) RR_R to put the IUT into state 7.0.
(9) The received REJ P=1 frame shall be acknowledged by a RR F=1 frame.
(10) On timeout T200 either an I P=1 or a RR P=1 shall be transmitted.
(11) The lost I P=0 shall be retransmitted.
(12) The retransmitted I P=0 shall be acknowledged.

References to requirements: 10.7.4

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S10/V/PR/A/PR31001				
Identifier:	PR31001				
Purpose:	To bring the IUT in state 1.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	[BASIC_ACCESS]				
2	[PC_PTMP]			(P)	
3	+PR31002				(1)
4	[NOT PC_PTMP]			(P)	
5	+PR31003				(2)
6	[NOT BASIC_ACCESS]			(P)	
7	+PR31003				(3)
Extended Comments: (1) S1 preamble to be used for basic access Point-to-multipoint IUTs. (2) S1 preamble to be used for basic access Point-to-point IUTs. (3) S1 preamble to be used for primary rate access IUTs.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S10/V/PR/A/PR31002				
Identifier:	PR31002				
Purpose:	To bring the IUT in state 1. This preamble is used basic access point-to-multipoint configured IUTs.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31401			(P)	(1)
Extended Comments: (1) Preamble to bring the IUT to state S1 or S4. This preamble will end in state S1 for all IUTs except non automatic IUTs with unstable S1.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S10/V/PR/A/PR31003				
Identifier:	PR31003				
Purpose:	To bring the IUT in state 1. This preamble is used for IUTs of the automatic TEI assignment category configured for point-to-point.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	L!UI_M (RC ::= 0) START TNOAC		UM_T6(0, 127)		(1)
2	L?UI_Mr (RC ::= RC + 1) CANCEL TNOAC	L1	UM_T1		(2)
3	[RC <= RCMax] START TNOAC				
4	GOTO L1				
5	[RC > RCMax]			(I)	(3)
6	+PO44004				Postamble
7	L?OTHERWISE				(4)
8	GOTO L1				
9	?TIMEOUT TNOAC			(P)	
Extended Comments: (1) Send an Id Remove (2) Automatic IUT will request a new TEI value. (3) Since more that one data link may have removed its TEI value, it is possible that more than one Id Request procedure is activated. RCMax allows three data links to request a new TEI value. (4) Ignore other message, i.e. active data links may have sent some messages before they removed there TEI value.					

Test Step Dynamic Behaviour

Reference: TBR4_L2/PR/S14/V/PR/A/PR31401
Identifier: PR31401
Purpose: To bring the IUT in state 1 or state 4. Non automatic IUTs will end in state 4, and automatic IUTs will end in state 1.
Default: DF69901

No	Behaviour Description	L	Cref	V	C
1	[PC_PTMP]				
2	(TAC_VAL ::= TAC_PTP_ML)				(1)
3	+SUBTREE_1				
4	[NOT PC_PTMP]				
5	(TAC_VAL ::= TAC_PTP_SL)				(2)
6	+SUBTREE_1				
7	**SUBTREE_1**				
8	[PC_AUTOMAT_TEI]				
9	L!UI_M (RC ::= 0) START TNOAC		UM_T6(0, 127)		(3)
10	+SUBTREE_2(RC)				
11	[NOT PC_AUTOMAT_TEI]				
12	(CURRENT_TEI ::= PX_TEI_VALUE)				
13	L!DISC START TAC		DI(P1)		
14	L?DMr START TAC	L1	DM(F1)		
15	GOTO L1				
16	L?UAr START TAC		UA(F1)		
17	GOTO L1				
18	L?SABMEr CANCEL TAC		SA(P1)	(P)	(4)
19	L!DM		DM(F1)		
20	?TIMEOUT TAC				
21	L!DM START TNOAC		DM(F1)		
22	L?SABMEr CANCEL TNOAC		SA(P1)	(P)	(4)
23	L!DM		DM(F1)		
24	?TIMEOUT TNOAC			(P)	
25	**SUBTREE_2(RC:INTEGER)**				
26	L?UI_Mr (RC ::= RC + 1) CANCEL TNOAC	L2	UM_T1		(5)
27	[RC <= RCMax] START TNOAC				(6)
28	GOTO L2				
29	[RC > RCMax]			(F)	
30	+PO44004				Postamble
31	?TIMEOUT TNOAC			(P)	

Extended Comments:

(1) IUT is configured for point-to-multipoint. The required response time is set accordingly. All Basic Access test cases are starting with this preamble. Therefore the value for timer TAC is initialized in this test step.
(2) IUT is configured for point-to-point. The required response time is set accordingly.
(3) Identity remove with Ri=0 (not used) and Ai=127. Non automatic IUTs with unstable state 1 will enter state 4.
(4) IUT is unstable in state 4. Preamble is exited.
(5) Identity request with Ri do not care.
(6) RCMax=9 because it shall be possible to handle the id assignment procedure for three DLE's.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S30/V/PR/A/PR33001				
Identifier:	PR33001				
Purpose:	To bring the IUT in state 3.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	[BASIC_ACCESS]				
2	[PC_PTMP]			(P)	
3	+PR33002				(1)
4	[NOT PC_PTMP]			(P)	
5	+PR33003				(2)
6	[NOT BASIC_ACCESS]			(P)	
7	+PR33003				(3)
Extended Comments: (1) S3 preamble to be used for basic access Point-to-multipoint IUTs. (2) S3 preamble to be used for basic access Point-to-point IUTs. (3) S3 preamble to be used for primary rate access IUTs.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S30/V/PR/A/PR33002				
Identifier:	PR33002				
Purpose:	To bring the IUT in state 3. This preamble is used basic access point-to-multipoint configured IUTs.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				Preamble to S1
2	L!UI START TWL3		UI3		(1)
3	L?UI_Mr (VRI ::= UI_M.RI) CANCEL TWL3		UM_T1	(P)	(2)
4	?TIMEOUT TWL3			(I)	(3)
5	+PO44004				Postamble
Extended Comments: (1) SETUP with no information element. (2) Identity request with Ri do not care. (3) TEI request not provided by the IUT.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S30/V/PR/A/PR33003				
Identifier:	PR33003				
Purpose:	To bring the IUT in state 3. This preamble is used for IUTs of the automatic TEI assignment category configured for point-to-point.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				Preamble to S1
2	< IUT ! UI_Mr >		UM_T1		
3	START TWAIT				
4	L?UI_Mr (VRI ::= UI_M.RI) CANCEL TWAIT		UM_T1	(P)	ID-request
5	?TIMEOUT TWAIT			(I)	
6	+PO44004				Postamble
Extended Comments:					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S40/V/PR/A/PR34001				
Identifier:	PR34001				
Purpose:	To bring the IUT in state 4.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	[BASIC_ACCESS]				
2	[PC_PTMP]				(1)
3	[NOT PC_AUTOMAT_TEI]			(P)	(2)
4	(CURRENT_TEI ::= PX_TEI_VALUE)				
5	+PR34002				
6	[PC_AUTOMAT_TEI]			(P)	
7	+PR34002				
8	[NOT PC_PTMP]				(3)
9	[NOT PC_AUTOMAT_TEI]			(P)	(2)
10	(CURRENT_TEI ::= PX_TEI_VALUE)				
11	+PR34003				
12	[PC_AUTOMAT_TEI]			(P)	
13	+PR34003				
14	[NOT BASIC_ACCESS]				(4)
15	(TAC_VAL ::= TAC_PTP_SL)				(5)
16	[NOT PC_AUTOMAT_TEI]			(P)	(2)
17	(CURRENT_TEI ::= PX_TEI_VALUE)				
18	+PR34003				
19	[PC_AUTOMAT_TEI]			(P)	
20	+PR34003				

Extended Comments:
(1) The IUT is a Basic Access terminal with a point-to-multipoint configuration.
(2) The IUT is a non-automatic terminal, and a fixed TEI value supported by the IUT is assigned to the Variabel CURRENT_TEI
(3) The IUT is a Basic Access terminal with a point-to-point configuration.
(4) The IUT is a Primary Rate Access terminal.
(5) Layer 2 response time is initialized for PA IUTs in this preamble, as all PA test cases starts with this preamble.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S40/V/PR/A/PR34002				
Identifier:	PR34002				
Purpose:	To bring the IUT in state 4. This preamble is used for IUTs configured for point-to-multipoint.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	L!DISC START TAC		DI(P1)		(2)
3	(NS ::= 0, NR ::= 0)				(3)
4	L?UAr CANCEL TAC		UA(F1)	(P)	
5	?TIMEOUT TAC			(F)	(4)
6	+PO44004				Postamble

Extended Comments:
(1) Preamble to state 7.0 with one I-frame unacknowledged.
(2) DISC command.
(3) CANCEL NS and NR.
(4) UA not received.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S40/V/PR/A/PR34003				
Identifier:	PR34003				
Purpose:	To bring the IUT in state 4. This preamble is used for IUTs configured for point-to-point.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	L!DISC START TAC		DI(P1)		(1)
2	L?DMr START TAC	L1	DM(F1)	(P)	
3	GOTO L1				
4	L?UAr START TAC		UA(F1)	(P)	
5	GOTO L1				
6	L?SABMEr START TAC		SA(P1)	(P)	
7	L!DM		DM(F1)		(2)
8	GOTO L1				
9	?TIMEOUT TAC				
10	L!DM		DM(F1)		(2)
11	(RC ::= 0) START TNOAC				(3)
12	L?SABMEr	L2	SA(P1)	(P)	
13	L!DM		DM(F1)		IUT is in state 4
14	L?OTHERWISE (RC ::= RC + 1) CANCEL TNOAC				(3)
15	[RC <= RCMax] START TNOAC				(3)
16	GOTO L2				(3)
17	[RC > RCMax]			(I)	
18	+PO44004				Postamble
19	?TIMEOUT TNOAC				(4)
20	L!DISC START TAC	L3	DI(P1)		
21	L?DMr CANCEL TAC		DM(F1)	(P)	(5)
22	L!UI_M START TW200		UM_T4(0, 127)		(7)
23	L?UI_Mr	L4	UM_T5(CURRENT_TEI)	(P)	(8)
24	GOTO L4				(9)
25	L?UI_Mr CANCEL TW200		UM_T5_ANY_AI		(10)
26	+PR31001				(11)
27	+S1toS4			(P)	(12)
28	L?SABMEr		SA(P1)	(P)	
29	L!DM		DM(F1)		
30	GOTO L4				
31	?TIMEOUT TW200			(P)	
32	L?SABMEr CANCEL TAC		SA(P1)	(P)	
33	L!DM		DM(F1)		
34	GOTO L3				
35	?TIMEOUT TAC				(6)
36	+PR31001				(11)
37	+S1toS4				(12)
38	**S1toS4**				
39	< IUT ! SABME >		SA(P1)		
40	START TWAIT				(13)
41	L?SABMEr CANCEL TWAIT	L5	SA(P1)	(P)	(14)
42	(NS ::= 0, NR ::= 0)				
43	L!UA START TWL3		UA(F1)		
44	L?Icr_r (TMP ::= Icr.CR, NR ::= (NR + 1) MOD 128) CANCEL TWL3		IN5(P0, NS, NR)	(P)	(15)

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No	Behaviour Description	L	Cref	V	C
45	L!Icr_s START TAC		IN6(P0, NR, NS, TMP)		(16)
46	(NS ::= (NS + 1) MOD 128)				
47	L?RR_Rr CANCEL TAC		RRR(F0, NS)	(P)	
48	L!DISC START TAC		DI(P1)		(17)
49	(NR ::= 0, NS ::= 0)				
50	L?UAr CANCEL TAC		UA(F1)	(P)	(17)
51	L?DISCr START TAC		DI(P1)	(P)	
52	L!UA		UA(F1)		
53	L?UAr CANCEL TAC		UA(F1)	(P)	
54	?TIMEOUT TAC			(F)	
55	+PO44004				Postamble
56	?TIMEOUT TAC			(F)	
57	+PO44004				Postamble
58	?TIMEOUT TAC			(F)	
59	+PO44004				Postamble
60	?TIMEOUT TWL3			(I)	
61	+PO44004				Postamble
62	L?UI_Mr (VRI ::= UI_M.RI)		UM_T1	(P)	
63	(CURRENT_TEI ::= RANDOM (64, 126))				
64	L!UI_M		UM_T2(VRI, CURRENT_TEI)		
65	GOTO L5				
66	?TIMEOUT TWAIT			(I)	
67	+PO44004				Postamble

Extended Comments:

(1) If the IUT was in an unstable state (most states), this message will prevent the IUT from activating some of the error procedures resulting in a TEI removal. The IUT is now in state 1, 2, 3, 4, 5, or 6.
(2) If the IUT is in state 5 or 6, an error procedure will be activated (resulting in a TEI removal). A DM F=1 will prevent this. The IUT is now in state 1, 2, 3 or 4.
(3) During (1) and (2), the IUT may have sent several messages. If the IUT is in state 2 or 3, messages may still be sent. These message will be ignored.
(4) The IUT is now in state 1 or 4.
(5) A datalink with TEI=CURRENT_TEI exist and is in state 4.
(6) A datalink with TEI=CURRENT_TEI does not exist.
(7) Checks if more TEI values are in use.
(8) This message acknowledges the existence of CURRENT_TEI.
(9) Waits until the responding time has expired.
(10) Other TEI values than CURRENT_TEI are also used.
(11) Resets all datalinks.
(12) Acquires one TEI value (CURRENT_TEI) and enter state 4.
(13) Some manual action is required to send a SETUP message. Since a datalink in state 7.0 does not exist yet, L3 of the IUT will first send a DL_ESTABLISH_REQ.
(14) IUT has entered state 5.
(15) After the IUT has entered state 7.0, the invoked SETUP will be transmitted.
(16) The tester will respond with a release complete.
(17) Disconnect the multiple established mode of operation.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S50/V/PR/A/PR35001				
Identifier:	PR35001				
Purpose:	To bring the IUT in state 5.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	(TMP ::= (NR + 1) MOD 128)				
3	L!RR_C START TAC		RRC(P0, TMP)		(1)
4	L?SABMEr CANCEL TAC		SA(P1)		
5	(NS ::= 0, NR ::= 0)			(P)	
6	?TIMEOUT TAC			(I)	SABME not received
7	+PO44004				Postamble
Extended Comments:					
(1) RR command with N(R) error. This causes the IUT to initiate re-establishment.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S70/V/PR/A/PR37001				
Identifier:	PR37001				
Purpose:	To bring the IUT in state 7.0.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR34001				Preamble to S4
2	[PX_IUT_STA_S4]				
3	L!SABME START TAC		SA(P1)		
4	L?UAr CANCEL TAC		UA(F1)	(P)	
5	(NS ::= 0, NR ::= 0)				
6	L?DMr CANCEL TAC		DM(F1)	(I)	(1)
7	+PO44004				Postamble
8	?TIMEOUT TAC			(F)	(2)
9	+PO44004				Postamble
10	[NOT PX_IUT_STA_S4]				
11	START TWAIT				
12	L?SABMEr		SA(P1)	(P)	
13	L!UA		UA(F1)		
14	(NS ::= 0, NR ::= 0)				
15	?TIMEOUT TWAIT			(I)	(2)
16	+PO44004				Postamble
Extended Comments:					
(1) Unable to enter MF state					
(2) UA not provided by IUT.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S70/V/PR/A/PR37002				
Identifier:	PR37002				
Purpose:	To bring the IUT in state 7.0 and provide INFO generation from IUT.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	[BASIC_ACCESS]				
2	[PC_PTMP]			(P)	
3	+PR37004				(1)
4	[NOT PC_PTMP]			(P)	
5	+PR37003				(2)
6	[NOT BASIC_ACCESS]			(P)	
7	+PR37003				(3)
Extended Comments: (1) S7 preamble to be used for basic access Point-to-multipoint IUTs. (2) S7 preamble to be used for basic access Point-to-point IUTs. (3) S7 preamble to be used for primary rate access IUTs.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S70/V/PR/A/PR37003				
Identifier:	PR37003				
Purpose:	To bring the IUT in state 7.0 and provide INFO generation from the IUT. This preamble is used for IUTs configured for point-to-point.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				
2	L!Is START TWL3, START TAC		IN2(P0, NR, NS)		(1)
3	(NS ::= (NS + 1) MOD 128)				
4	L?RR_Rr CANCEL TAC		RRR(F0, NS)		(2)
5	L?Ir CANCEL TWL3		IN1(P0, NS, NR)		(3)
6	(NR ::= (NR + 1) MOD 128)			(P)	
7	?TIMEOUT TWL3			(I)	
8	+PO44004				Postamble
9	?TIMEOUT TAC			(F)	
10	+PO44004				Postamble
Extended Comments: (1) Sends a Release to L3 of the IUT. (2) Acknowledgement of the transmitted I-frame. (3) The IUT has respond with a Release Complete.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S70/V/PR/A/PR37004				
Identifier:	PR37004				
Purpose:	To bring the IUT in state 7.0 and provide INFO generation from the IUT. This preamble is used for IUTs configured for point-to-multipoint.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31401				
2	L!UI START TWL3		UI3		(2)
3	L?UI_Mr (VRI ::= UI_M.RI)		UM_T1		(3)
4	(CURRENT_TEI ::= RANDOM (64, 126))				
5	L!UI_M		UM_T2(VRI, CURRENT_TEI)		(4)
6	L?SABMEr		SA(P1)		
7	(NS ::= 0, NR ::= 0)				
8	+SUBTREE				
9	?TIMEOUT TWL3			(I)	(6)
10	+PO44004				Postamble
11	L?SABMEr		SA(P1)		
12	+SUBTREE				
13	?TIMEOUT TWL3			(I)	(6)
14	+PO44004				Postamble
15	**SUBTREE**				
16	L!UAr		UA(F1)		
17	L?Ir CANCEL TWL3		IN1(P0, NS, NR)		(7)
18	(NR ::= (NR + 1) MOD 128)			(P)	
19	?TIMEOUT TWL3			(I)	(6)
20	+PO44004				Postamble

Extended Comments:

(2) Layer 3 SETUP message without any information element. The IUT should respond with a RELEASE COMPLETE

(3) Identity requests if IUT was in state 1.

(4) Identity assign message with Ri equal to that used by the IUT in its TEI request and Ai value equal to the assigned TEI value.

(6) The IUT has not responded to the empty SETUP. Not possible to determine whether it is a layer 2 or layer 3 error.

(7) Release Complete (coding of information field is not checked).

References to requirements: 10.4.2, 10.5.2, 10.5.4.1, 10.5.4.2, 10.6.1.1

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S70/V/PR/A/PR37005				
Identifier:	PR37005				
Purpose:	To bring the IUT in state S7.0 with with two outstanding I-frames (V(S)=V(A)+2).				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37406(2)				
2	(NR ::= 0)				
3	L!RR_C START TAC		RRC(P0, NR)		
4	L?Ir (NR ::= (NR + 1) MOD 128)	L1	IN1(P0, NS, NR)		
	START TAC				
5	L?Ir (NR ::= (NR + 1) MOD 128)		IN1(P0, NS, NR)	(P)	
	CANCEL TAC				
6	?TIMEOUT TAC			(F)	
7	+PO44004				Postamble
8	L?RR_Cr		RRC(P1, NS)		(1)
9	L!RR_R		RRR(F1, NR)		
10	GOTO L1				
11	?TIMEOUT TAC			(F)	
12	+PO44004				Postamble
Extended Comments:					
(1) Polling RR frame collided with RR from tester.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S74/V/PR/A/PR37401				
Identifier:	PR37401				
Purpose:	To bring the IUT in state 7.4.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				Preamble to S7.0
2	L!RNR_R		RNR(F0, NR)	(P)	
Extended Comments:					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S74/V/PR/A/PR37406				
Identifier:	PR37406(TMP:INTEGER)				
Purpose:	To bring the IUT in state S7.4 and stimulate its layer 3 to invoke a number (defined by TMP) of DL_DATA_REQUEST.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37001				(1)
2	(TMP1 ::= TMP)				
3	L!RNR_C	L1	RNC(P0, NR)		
4	L!Icr_s START TAC		IN4(P0, NR, NS, TMP1)		(2)
5	(NS ::= (NS + 1) MOD 128)				
6	L?RR_Rr CANCEL TAC		RRR(F0, NS)		
7	(TMP1 ::= TMP1 - 1)				
8	[TMP1 <> 0]				
9	GOTO L1				
10	+LAYER3WAIT(TMP)				
11	?TIMEOUT TAC			(F)	
12	+PO44004				Postamble
13	**LAYER3WAIT(TMP:INTEGER)**				
14	(TMP1 ::= TMP)				
15	START TWL3	L3			
16	L?RR_Cr	L2	RRC(P1, NS)		
17	L!RNR_R		RNR(F1, NR)		
18	GOTO L2				
19	?TIMEOUT TWL3				(3)
20	(TMP1 ::= TMP1 - 1)				
21	[TMP1 <> 0]				
22	GOTO L3				
23	[TMP1 = 0]			(P)	
Extended Comments: (1) Preamble that brings the IUT in state S70 (2) Send (TMP) number of layer 3 RELEASE messages (3) Wait for a DL_DATA_REQest					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S80/V/PR/A/PR38001				
Identifier:	PR38001				
Purpose:	To bring the IUT in state 8.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37002				Preamble to S7.0 (1)
2	(TMP ::= (NR - 1) MOD 128)				
3	START TW200				
4	L?RR_Cr CANCEL TW200		RRC(P1, NS)	(P)	Polling with RR frame
5	L?Ir CANCEL TW200		IN1(P1, NS, TMP)	(P)	Polling with I-frame
6	?TIMEOUT TW200			(F)	
7	+PO44004				Postamble
Extended Comments: (1) Preamble to S7.0 with INFO generation.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PR/S84/V/PR/A/PR38401				
Identifier:	PR38401				
Purpose:	To bring the IUT in state 8.4.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR37401				Preamble to S7.4
2	START TW200				
3	L?RR_Cr CANCEL TW200		RRC(P1, NS)	(P)	
4	?TIMEOUT TW200			(F)	no response
5	+PO44004				Postamble
Extended Comments:					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/PO/S40/V/PO/A/PO44004				
Identifier:	PO44004				
Purpose:	To ensure that the IUT is in a stable state at the end of a test case. That is one of the states 1, 4 or 7.				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	START TNOAC				(1)
2	L?UI_Mr CANCEL TNOAC		UM_T7(0, CURRENT_TEI)		ID-verify
3	L!UI_M START TW200		UM_T4(0, CURRENT_TEI)		ID-check request
4	L?UI_Mr CANCEL TW200		UM_T5(CURRENT_TEI)		ID-check response
5	+SUBTREE				(2)
6	?TIMEOUT TW200			(I)	No ID check response
7	+SUBTREE				
8	L?UI_Mr CANCEL TNOAC		UM_T1		ID-request
9	(VRI ::= UI_M.RI)				
10	(CURRENT_TEI ::= RANDOM (64, 126))				
11	L!UI_M		UM_T2(VRI, CURRENT_TEI)		ID-assign
12	+SUBTREE				IUT is in state 4
13	L?Ir		IN9		Any I-frame
14	+SUBTREE				(7)
15	?TIMEOUT TNOAC				
16	+SUBTREE				
17	L?OTHERWISE CANCEL TNOAC				Ignore this PDU
18	+SUBTREE				
19	**SUBTREE**				
20	L!SABME START TAC		SA(P1)		(4)
21	L?UAr CANCEL TAC, START TNOAC		UA(F1)		IUT in state 5 or 7.0
22	L?DISCr CANCEL TNOAC		DI(P1)	R	(5)
23	L!UA		UA(F1)		IUT is in state 4
24	L?SABME CANCEL TNOAC		SA(P1)	R	IUT is in state 5
25	L!UA		UA(F1)		IUT is in state 7.0
26	?TIMEOUT TNOAC			R	IUT is in state 7.0
27	L?DMr CANCEL TAC		DM(F1)	R	(6)
28	L?SABMEr CANCEL TAC		SA(P1)		SABME-SABME collision
29	L!UA START TAC		UA(F1)		
30	L?UAr CANCEL TAC		UA(F1)	R	IUT is in state 7.0
31	?TIMEOUT TAC			I	
32	L?DISCr CANCEL TAC		DI(P1)		SABME-DISC collision
33	L!DM START TAC		DM(F1)		
34	L?DMr		DM(F1)	R	IUT is in state 4
35	?TIMEOUT TAC			I	
36	?TIMEOUT TAC			R	IUT is in state 1

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No	Behaviour Description	L	Cref	V	C
Extended Comments: (1) Wait to ensure that no collision of non-management messages occurs. (2) IUT has performed ID check procedure and is therefore not in state 1, 2 or 3. (3) IUT is in any state exept state 2 or 3. (4) Establish or re-establish (5) IUT not stable in state 7. IUT initiates release of data link. (6) IUT is not able to enter state 7.0. IUT is in state 4. (7) IUT has sent an I-frame. By entering SUBTREE which transmits a SABME the I queue is dicarded, all state variables are set to zero, exception conditions are cleared and the IUT shall if possible respond by UA and enter state 7.0.					

Test Step Dynamic Behaviour	
Reference:	TBR4_L2/MS/S10/V/MS/A/CS51001
Identifier:	CS51001
Purpose:	To check that the IUT is in state 1.
Default:	DF69901

No	Behaviour Description	L	Cref	V	C
1	START TNOAC				
2	L?UI_Mr CANCEL TNOAC		UM_T1	(P)	ID-request (1)
3	+PO44004				
4	?TIMEOUT TNOAC				
5	L!UI_M START TNOAC		UM_T4(0, 127)		ID check req (2)
6	L?UI_Mr CANCEL TNOAC		UM_T1	(P)	ID-request (1)
7	+PO44004				
8	?TIMEOUT TNOAC			(P)	
9	+PO44004				
Extended Comments: (1) In case the IUT is in state 1 it may initiate TEI assignment at any time. (2) If the IUT is in a TEI unassigned state it will ignore the ID check request.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/MS/S30/V/MS/A/CS53001				
Identifier:	CS53001				
Purpose:	To check that the IUT is in state 3.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	START TW202				
2	L?UI_Mr (VRI ::= UI_M.RI) CANCEL TW202		UM_T1	(P)	ID-request IUT in state 3
3	+SUBTREE				
4	?TIMEOUT TW202			(F)	
5	+PO44004				
6	**SUBTREE**				
7	(CURRENT_TEI ::= RANDOM (64, 126))				
8	L!UI_M START TWL3		UM_T2(VRI, CURRENT_TEI)		ID-assign
9	L?SABMEr		SA(P1)	(P)	
10	L!UA		UA(F1)		
11	L?Ir (NR ::= (NR + 1) MOD 128) CANCEL TWL3		IN1(P0, NS, NR)	(P)	I-frame from IUT
12	L!RR_R		RRR(F0, NR)		
13	+PO44004				
14	?TIMEOUT TWL3			(P)	No I-frames from IUT
15	+PO44004				
16	?TIMEOUT TWL3			(P)	No SABME from IUT
17	+PO44004				

Extended Comments:
(1) Before entering this postamble, the IUT may have an I-frame in its I queue, which it will transmit when possible. In order to leave the IUT in a stable state SUBTREE allows the IUT to establish the data link and transmit the I-frame.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/MS/S40/V/MS/A/CS54001				
Identifier:	CS54001				
Purpose:	To check that the IUT is in state 4.				
Default:	DF69901				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	START TNOAC				
2	L?SABMEr [NOT PX_IUT_STA_S4]		SA(P1)		(1)
3	CANCEL TNOAC				
4	L!UA		UA(F1)	(P)	
5	+PO44004				Postamble
6	?TIMEOUT TNOAC			(P)	(2)
7	L!DISC START TAC		DI(P1)		
8	L?DMr CANCEL TAC		DM(F1)	(P)	
9	+PO44004				Postamble
10	L?SABMEr [NOT PX_IUT_STA_S4]		SA(P1)	(P)	(3)
11	CANCEL TNOAC				Postamble
12	L!DM		DM(F1)		
13	+PO44004				Postamble
14	?TIMEOUT TAC			(I)	(4)
15	+PO44004				Postamble

Extended Comments:
(1) SABME received due to unstable state 4
(2) Timeout to distinguish state 4 from state 5.
(3) SABME due to unstable state 4 collided with DISC from tester
(4) It is non-essential to respond to a DISC with a DM when in state 4. Therefore the verdict assigned is inconclusive.

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/MS/S70/V/MS/A/CS57001				
Identifier:	CS57001				
Purpose:	To check that the IUT is in state 7.0.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	START TNOAC				
2	L?DISCr CANCEL TNOAC		DI(P1)	(I)	(1)
3	L!UA		UA(F1)		
4	+PO44004			(P)	
5	?TIMEOUT TNOAC			(P)	(2)
6	L!RR_C START TAC		RRC(P1, NR)		
7	L?RR_Rr CANCEL TAC		RRR(F1, NS)	(P)	
8	+PO44004				
9	?TIMEOUT TAC			(F)	
10	+PO44004				Postamble
Extended Comments: (1) It is not possible to determine whether the IUT was in state 7 (IUT unstable in state 7), or whether the IUT was in state 6. (2) Timeout to distinguish state 7.0 from state 7.4.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/MS/S71/V/MS/A/CS57101				
Identifier:	CS57101				
Purpose:	To check that the IUT is in state 7.1.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	(TMP ::= (NS + K) MOD 128)				
2	L!Is START TAC		IN8(P1, NR, TMP)		(1)
3	L?RR_Rr CANCEL TAC		RRR(F1, NS)	(P)	
4	+PO44004				Postamble
5	?TIMEOUT TAC			(F)	
6	+PO44004				Postamble
Extended Comments: (1) I with RELEASE COMPLETE and NS out of window. This check procedure leaves the IUT in state 7.1. References to requirements: 10.7.2.1					

Test Step Dynamic Behaviour					
Reference:	TBR4_L2/MS/S74/V/MS/A/CS57401				
Identifier:	CS57401				
Purpose:	To check that the IUT is in state 7.4.				
Default:	DF69902				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	START TW200				
2	L?RR_Cr		RRC(P1, NS)		
3	L!RNR_R CANCEL TW200		RNR(F1, NR)	(P)	
4	+PO44004				Postamble
5	?TIMEOUT TW200			(F)	(1)
6	+PO44004				Postamble
Extended Comments: (1) Timeout without receiving poll frame. This procedure leaves IUT in initial state. It does not distinguish between State 7.4 and 8.4.					

Default Dynamic Behaviour					
Reference:	TBR4_L2/DF/SAL/V/DF/A/DF69901				
Identifier:	DF69901				
Purpose:	Default subtree for all states except 7 and 8.				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	L?PH_DEAC_IN			(I)	(1)
2	[R = R]			R	
3	L?PH_ACT_IN			(I)	
4	[R = R]			R	
5	L?XID_C		XID	(I)	
6	L!DM START TNOAC		DM(F1)		
7	?TIMEOUT TNOAC			R	(1)
8	L?OTHERWISE			(F)	
9	L?OTHERWISE			(F)	(3)
10	L!DM START TNOAC		DM(F1)		
11	?TIMEOUT TNOAC			R	(1)
12	L?OTHERWISE			R	
Extended Comments:					
(1) Layer 1 deactivation.					
(3) Received message not foreseen.					

Default Dynamic Behaviour					
Reference:	TBR4_L2/DF/SAL/V/DF/A/DF69902				
Identifier:	DF69902				
Purpose:	Default subtree for MF (state 7) and Timer Recovery (state 8) States.				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	L?PH_DEAC_IN			(I)	(1)
2	[R = R]			R	
3	L?PH_ACT_IN			(I)	
4	[R = R]			R	
5	L?RNR_Rr		RNR_ANY	(I)	
6	L!DISC START TAC		DI(P1)		
7	L?DMr CANCEL TAC		DM(F1)	R	
8	L?UAr CANCEL TAC		UA(F1)	R	
9	?TIMEOUT TAC			(F)	no response
10	L?OTHERWISE			(F)	
11	L?RNR_Cr		RNC_ANY	(I)	(4)
12	L!DISC START TAC		DI(P1)		
13	L?DMr CANCEL TAC		DM(F1)	R	
14	L?UAr CANCEL TAC		UA(F1)	R	
15	?TIMEOUT TAC			(F)	no response
16	L?OTHERWISE			(F)	
17	L?XID_C		XID	(I)	
18	L!DISC START TAC		DI(P1)		
19	L?DMr CANCEL TAC		DM(F1)	R	
20	L?UAr CANCEL TAC		UA(F1)	R	
21	?TIMEOUT TAC			(F)	no response
22	L?OTHERWISE			(F)	
23	L?OTHERWISE			(F)	(3)
24	L!DISC START TAC		DI(P1)		
25	L?DMr CANCEL TAC		DM(F1)	R	
26	L?UAr CANCEL TAC		UA(F1)	R	
27	?TIMEOUT TAC			R	no response
28	L?OTHERWISE			R	
Extended Comments:					
(1) Layer 1 deactivation.					
(3) Received message not expected.					
(4) IUT receiver not ready.					

Annex D (normative): Layer 3 tests

For the purposes of this TBR, the conformance testing routines have been produced in accordance with ISO/IES DIS 9646 Parts 1, 2 and 3 [4], [5] and [6].

D.1 Test case selection

Table D.1 contains the test case selection criteria for the interface procedure tests.

Table D.1: Test case selections for layer 3

Test Case Id	Selection Ref Ref: D.2 Test Suite Parameter
TC10002	
TC10004	
TC10005	
TC10006	
TC10010	
TC10011	
TC10012	
TC10015	
TC10024	
TC10026	
TC10027	
TC10028	
TC10029	
TC10037	IBCC
TC10038	IHLCC
TC20002	
TC10101	
TC10102	
TC10103	
TC10104	NOT EBS
TC10105	
TC10107	
TC10115	
TC10116	
TC10120	
TC10125	
TC10201	NOT EBS
TC10202	NOT EBS
TC10203	NOT EBS
TC10204	NOT EBS
TC10222	NOT EBS
TC10223	NOT EBS
TC20203	NOT EBS
TC20204	BXINF AND NOT EBS
TC10301	
TC10302	
TC10303	
TC20301	
TC10401	
TC10402	
TC20401	
TC10701	BAL AND U7_MAINT
TC10718	BAL AND U7_MAINT

Table D.1 (concluded): Test case selections for layer 3

Test Case Id	Selection Ref Ref: D.2 Test Suite Parameter
TC10801	
TC10802	
TC10805	
TC10901	BCP AND U9_MAINT
TC11003	
TC11004	
TC11005	
TC11007	
TC11008	
TC11021	
TC11028	
TC11029	
TC11031	
TC11032	
TC21003	
TC11101	
TC11103	
TC11105	
TC11107	
TC11118	
TC11903	
TC11904	
TC11906	
TC11908	
TC11909	
TC11920	
TC12501	OVR
TC12503	OVR
TC19003	NOT BDL

D.2 Layer 3 test suite

Suite overview

Test Suite Overview	
Suite Name:	TBR4_L3
Standards ref:	TBR4
PICS Proforma ref:	TBR4, annex A
PIXIT Proforma ref:	TBR4, annex E
PICS/PIXIT use:	
Test Method(s):	Remote Single Layer Test Method
Comments:	The Layer 3 test cases in the TBRs are based on the test cases from I-ETS 300 322 which is a conformance test suite for Layer 3. However, changes have been introduced in order not to use non-essential requirements in the TBR test cases. This means that an IUT passing a test case in the TBR test suite may not pass the corresponding test case in I-ETS 300 322. The ability to pass a test with the same test case identifier in I-ETS 300 322 provides an alternative means of verifying the requirement of the TBR. However, failure to pass the equivalent test in I-ETS 300 322 shall not be taken as an indication that the test in the TBR is also failed. An IUT is allowed to include messages and information elements which are not defined in clause 11 (Layer 3 requirements). In order to reflect this, these messages and information elements are included in part 2 and part 3 of this ATS. Testing shall be carried out at a temperature and humidity within the operational range of the terminal equipment. Structure of the test suite The following naming scheme has been used in order to identify test cases, test steps and default subtrees to indicate their position within the test suite hierarchy. <test case/step/default reference>::=TBR4_L3/<tg1>/<tg2>/<tg3>/<tg4>/<tg5>/<tcid> <tg1> ::= PS, AC, PR, PO, MS, DF, CS <tg2> ::= U00, U01, U02, U03, U04, U07, U08, U09, U10, U11, U19, U25, R00 <tg3> ::= V, I, S <tg4> ::= <PDU type> <tg5> ::= N, O, I, A <tcid>::= <test case/step/default identifier> <tg1> "Area" Test Case Group PS = Passive IUT behaviour AC = Active IUT behaviour PR = Preamble PO = Postamble DF = Default Behaviour MS = Miscellaneous UM = Unexpected Message CS = Check State

<tg2> "Starting State" Test Case Group
Identifies the state in which the test case starts. UAL is used for test steps for which a start state cannot be defined

<tg3> "Type" Test Case Group
V = Valid
I = Inopportune
S = Syntactically Invalid

<tg4> "PDU" Test Case Group
AL = ALERTING, CA = CONNECT ACKNOWLEDGE, CN = CONNECT, CP = CALL PROCEEDING, DI = DISCONNECT, ER = ERROR, IN = INFORMATION, NO = NOTIFY, RC = RELEASE COMPLETE RL = RELEASE, RS = RESTART, SA = SETUP ACKNOWLEDGE ST = STATUS, SU = SETUP

<tg5> "Reference" Test Case Group
N = NETs are the source of the base of the test case
I = ICOT is the source of the base of the test case
O = Other source is the base of the test case
A is used for test steps and default steps

<tcid> ::= <letter><letter><digit><digit><digit><digit><digit>
The two letters indicates whether it is a test case, test step or default step (TC for test case, PR for preamble, CS for check state, PO for postamble, UM for unexpected message and DF for default tree).
The first digit indicates the Area (1 for PS, 2 for AC, 3 for PR, 4 for PO, 5 for CS and UM and 6 for DF).
The two following digits indicates the starting state.
The two last digits indicates a sequence number.

EXAMPLE: TBR4_L3/PS/U03/V/DI/N/TC10303:
The test suite is TBR4_L3.
The test case tests passive IUT behaviour.
The test starts with IUT in state U3.
A valid PDU is sent to the IUT.
A DISCONNECT is sent to the IUT.
The source of the base of the test case is the NETs.
The test case identifier isTC10303.

Some of the coding rules described in subclause 11.3.5.1 cannot be expressed in TTCN but shall be considered when implementing this TBR:
a) Single octet information elements may appear at any point within a message
b) Information elements containing 'spare bits', indicated as being set to "0". In order to allow compatibility with future implementations, messages should not be rejected when the spare bit is set to "1".
c) An information element with content length=0 shall be interpreted by the receiver as equivalent to that information element being absent
d) The extension mechanism of octet groups has to be supported to allow future extensions

	e) It has to be specified for the Test Equipment if misplaced information element has to be ignored or not. f) If an information element is repeated in a message in which repetition is not permited, only the contents of the information element appearing first shall be handled. When repetition of the information element is permitted, only the contents of permitted information elements shall be handled. g) The procedures described in subclauses 11.4.6.5.1 "Mandatory information element missing" and 11.4.6.6.1 "Unrecognized information element" shall be implemented by the test equipment.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10002	TBR4_L3/PS/U00/V/RL/N/ TC10002	309	CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.
TC10004	TBR4_L3/PS/U00/V/ST/N/ TC10004	309	CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU indicating any state except the Null state N0, the IUT responds with either a RELEASE PDU or a RELEASE COMPLETE PDU with cause value 101.
TC10005	TBR4_L3/PS/U00/V/SU/N/ TC10005	310	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a valid SETUP PDU without the Sending complete information element, the IUT responds with any of a SETUP ACKNOWLEDGE, a CALL PROCEEDING, an ALERTING or a CONNECT PDU and moves to the relevant state Overlap Sending U25, Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.
TC10006	TBR4_L3/PS/U00/V/SU/N/ TC10006	311	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a valid SETUP PDU with the Sending complete information element, the IUT responds with any of a CALL PROCEEDING, an ALERTING or a CONNECT PDU and moves to the relevant state Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.
TC10008	TBR3_L3/PS/U00/V/SU/N/ TC10008	312	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a valid SETUP PDU containing an incompatible Bearer capability information element (mandatory parameter) the IUT: - responds with a RELEASE COMPLETE PDU; or ignores the SETUP PDU (broadcast datalink); - responds with a RELEASE COMPLETE PDU (point-to-point datalink).

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10010	TBR4_L3/PS/U00/I/DI/N/TC10010	313	CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that on receipt of an inpportune PDU (DISCONNECT), the IUT responds with a RELEASE PDU or a RELEASE COMPLETE PDU.
TC10011	TBR4_L3/PS/U00/I/SU/N/TC10011	314	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that on receipt of a repeated valid SETUP PDU with the same call reference as the initial SETUP PDU, the IUT does not respond to the second SETUP PDU and remains in the same state.
TC10012	TBR4_L3/PS/U00/S/ER/O/TC10012	315	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that on receipt of a PDU with an erroneous protocol discriminator coded other than '08'H, the IUT does not respond to the PDU and remains in the same state.
TC10015	TBR4_L3/PS/U00/S/ER/N/TC10015	316	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that on receipt of a PDU with mandatory information element missing, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.
TC10024	TBR4_L3/PS/U00/S/ER/O/TC10024	317	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 11 Ensure that on receipt of a PDU with invalid duplicated information elements, the IUT ignores the invalid duplication and processes the remaining contents of the PDU as valid.
TC10026	TBR4_L3/PS/U00/S/ER/O/TC10026	318	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14 Ensure that on receipt of a PDU with mandatory information element content error, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10027	TBR4_L3/PS/U00/S/ER/N/ TC10027	318	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 15 Ensure that on receipt of a PDU with unrecognised information element coded "comprehension required", the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.
TC10028	TBR4_L3/PS/U00/S/ER/N/ TC10028	319	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16 Ensure that the IUT on receipt of a compatible SETUP PDU with all the mandatory information elements correctly coded and an unrecognized optional information element with comprehension not required responds with either a SETUP_ACK, CALL PROCEEDING, ALERTING or CONNECT PDU and moves to the relevant state 25, 9, 7 or 8.
TC10029	TBR4_L3/PS/U00/S/ER/N/ TC10029	320	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 17 Ensure that on receipt of a SETUP PDU with non-mandatory information element content error the IUT processes the PDU and its remaining contents as valid and optionally sends a STATUS PDU with cause value 100.
TC10037	TBR4_L3/PS/U00/V/SU/N/ TC10037	321	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a valid SETUP PDU containing an incompatible Bearer capability information element (mandatory parameter) the IUT: - responds with a RELEASE COMPLETE PDU.
TC10038	TBR4_L3/PS/U00/V/SU/N/ TC10038	321	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a valid SETUP PDU containing an incompatible High layer compatibility information element (optional parameter) the IUT: - responds with a RELEASE COMPLETE PDU.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC20002	TBR4_L3/AC/U00/V/SU/N/TC20002	322	NULL STATE TESTS - STATE U0 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a valid SETUP PDU and enters the Call Initiated state U1.
TC10101	TBR4_L3/PS/U01/V/CP/N/TC10101	322	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CALL PROCEEDING PDU the IUT enters the Outgoing Call Proceeding state U3.
TC10102	TBR4_L3/PS/U01/V/RC/N/TC10102	323	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.
TC10103	TBR4_L3/PS/U01/V/RL/N/TC10103	323	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.
TC10104	TBR4_L3/PS/U01/V/SA/N/TC10104	324	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a SETUP ACKNOWLEDGE PDU the IUT enters the Overlap Sending state U2.
TC10105	TBR4_L3/PS/U01/V/ST/N/TC10105	324	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.
TC10107	TBR4_L3/PS/U01/I/CA/N/TC10107	325	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or STATUS ENQUIRY PDU and remains in the same state.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10115	TBR4_L3/PS/U01/S/ER/O/ TC10115	326	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 13 Ensure that on receipt of a CALL PROCEEDING PDU with mandatory information element missing the IUT only returns a STATUS PDU with cause value 96 and remains in the same state.
TC10116	TBR4_L3/PS/U01/S/ER/O/ TC10116	326	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14 Ensure that the IUT responds to the receipt of a CALL PROCEEDING PDU with mandatory information element with content error by sending a STATUS PDU with cause value 100 and remains in the same state.
TC10120	TBR4_L3/PS/U01/S/ER/N/ TC10120	327	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.
TC10125	TBR4_L3/PS/U01/I/RC/I/T C10125	328	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT does not respond to a RELEASE COMPLETE PDU with a call reference not in use and remains in the same state.
TC10201	TBR4_L3/PS/U02/V/AL/N/ TC10201	328	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of an ALERTING PDU the IUT enters the Call Delivered state U4.
TC10202	TBR4_L3/PS/U02/V/CN/N/ TC10202	329	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.
TC10203	TBR4_L3/PS/U02/V/CP/N/ TC10203	329	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CALL PROCEEDING PDU the IUT enters the Outgoing Call Proceeding state U3.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10204	TBR4_L3/PS/U02/V/DI/N/TC10204	330	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC10222	TBR4_L3/PS/U02/S/ER/O/TC10222	330	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 13 Ensure that on receipt of a DISCONNECT PDU with mandatory information element missing the IUT returns a RELEASE PDU and enters the Release Request state U19.
TC10223	TBR4_L3/PS/U02/S/ER/O/TC10223	331	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14 Ensure that the IUT responds to the receipt of a DISCONNECT PDU with mandatory information element with content error by sending a RELEASE PDU and enters the Release Request state U19.
TC20203	TBR4_L3/AC/U02/V/DI/N/TC20203	331	OVERLAP SENDING STATE TESTS - STATE U2 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
TC20204	TBR4_L3/AC/U02/V/IN/N/TC20204	332	OVERLAP SENDING STATE TESTS - STATE U2 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits an INFORMATION PDU and remains in the same state.
TC10301	TBR4_L3/PS/U03/V/AL/N/TC10301	332	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of an ALERTING PDU the IUT enters the Call Delivered state U4.
TC10302	TBR4_L3/PS/U03/V/CN/N/TC10302	333	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10303	TBR4_L3/PS/U03/V/DI/N/TC10303	334	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC20301	TBR4_L3/AC/U03/V/DI/N/TC20301	334	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
TC10401	TBR4_L3/PS/U04/V/CN/N/TC10401	335	CALL DELIVERED STATE TESTS - STATE U4 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.
TC10402	TBR4_L3/PS/U04/V/DI/N/TC10402	336	CALL DELIVERED STATE TESTS - STATE U4 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.
TC20401	TBR4_L3/AC/U04/V/DI/N/TC20401	336	CALL DELIVERED STATE TESTS - STATE U4 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
TC10701	TBR4_L3/PS/U07/V/DI/N/TC10701	337	CALL RECEIVED STATE TESTS - STATE U7 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.
TC10718	TBR4_L3/PS/U07/S/ER/O/TC10718	337	CALL RECEIVED STATE TESTS - STATE U7 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16 Ensure that on receipt of a DISCONNECT PDU with unrecognised information element (coded comprehension not required) the IUT sends a RELEASE PDU and enters the Release Request state U19.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC10801	TBR4_L3/PS/U08/V/CA/N/TC10801	338	CONNECT REQUEST STATE TEST - STATE U8 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT ACKNOWLEDGE PDU the IUT enters the Active state U10.
TC10802	TBR4_L3/PS/U08/V/DI/N/TC10802	338	CONNECT REQUEST STATE TEST - STATE U8 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC10901	TBR4_L3/PS/U09/V/DI/N/TC10901	339	INCOMING CALL PROCEEDING STATE TEST - STATE U9 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.
TC11001	TBR3_L4/PS/U10/V/DI/N/TC11001	339	ACTIVE STATE TESTS - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC11003	TBR4_L3/PS/U10/V/NO/N/TC11003	340	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a NOTIFY PDU the IUT does not respond and remains in the same state.
TC11004	TBR4_L3/PS/U10/V/RC/N/TC11004	340	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.
TC11005	TBR4_L3/PS/U10/V/RL/N/TC11005	341	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.
TC11007	TBR4_L3/PS/U10/V/ST/N/TC11007	341	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC11008	TBR4_L3/PS/U10/I/CN/N/TC11008	342	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 100, or with a STATUS ENQUIRY PDU and that no change of state occurs.
TC11021	TBR4_L3/PS/U10/S/ER/N/TC11021	343	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.
TC21003	TBR4_L3/AC/U10/V/DI/N/TC21003	344	ACTIVE STATE TEST - STATE U10 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
TC11101	TBR4_L3/PS/U11/V/DI/N/TC11101	344	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC11103	TBR4_L3/PS/U11/V/NO/N/TC11103	345	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a NOTIFY PDU the IUT does not respond or returns a STATUS PDU and remains in the same state.
TC11105	TBR4_L3/PS/U11/V/RL/N/TC11105	345	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC11107	TBR4_L3/PS/U11/I/CP/N/TC11107	346	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or with a STATUS ENQUIRY PDU, and remains in the same state.
TC11118	TBR4_L3/PS/U11/S/ER/O/TC11118	347	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16 Ensure that on receipt of a RELEASE PDU with unrecognized information element (coded comprehension not required) the IUT sends a RELEASE COMPLETE PDU and enters the Null state U0.
TC11903	TBR4_L3/PS/U19/V/RC/N/TC11903	347	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.
TC11904	TBR4_L3/PS/U19/V/RL/N/TC11904	348	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT does not respond and enters the Null state U0. This is a test of RELEASE collision handling.
TC11906	TBR4_L3/PS/U19/V/ST/N/TC11906	348	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.
TC11908	TBR4_L3/PS/U19/I/CP/N/TC11908	349	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or with a STATUS ENQUIRY PDU and remains in the same state.

Test Group or Case Identifier	Test Group or Case Reference	Page	Description
TC11909	TBR4_L3/PS/U19/S/ER/N/ TC11909	350	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.
TC11920	TBR4_L3/PS/U19/S/ER/O/ TC11920	351	DISCONNECT REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16 Ensure that on receipt of a RELEASE COMPLETE PDU with unrecognized information element (coded comprehension not required) the IUT does not respond and enters to the Null state U0.
TC12501	TBR4_L3/PS/U25/V/DI/N/T C12501	351	OVERLAP RECEIVING STATE TESTS - STATE U25 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
TC12503	TBR4_L3/PS/U25/V/IN/N/T C12503	352	OVERLAP RECEIVING STATE TESTS - STATE U25 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of an INFORMATION PDU with sufficient called number information the IUT responds with either a CALL PROCEEDING, ALERTING or CONNECT PDU and moves to the relevant state Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.
TC19003	TBR4_L3/PS/R00/V/RS/N/ TC19003	353	GLOBAL CALL REF. - STATE R0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensures that on receipt of a RESTART PDU the specified channel is returned to the Idle condition, the Call Reference is returned to the Null state and a RESTART ACKNOWLEDGE PDU is sent.

Test Step Identifier	Test Step Reference	Page	Description
PR30001	TBR4_L3/PR/U00/V/PR/A/PR30001	354	to bring the IUT to the state U0.
PR30101	TBR4_L3/PR/U01/V/PR/A/PR30101	355	to bring the IUT to the state U1.
PR30201	TBR4_L3/PR/U02/V/PR/A/PR30201	356	to bring the IUT to the state U2.
PR30301	TBR4_L3/PR/U03/V/PR/A/PR30301	357	to bring the IUT to the state U3.
PR30401	TBR4_L3/PR/U04/V/PR/A/PR30401	358	to bring the IUT to the state U4.
PR30701	TBR4_L3/PR/U07/V/PR/A/PR30701	358	to bring the IUT to the state U7.
PR30801	TBR4_L3/PR/U08/V/PR/A/PR30801	359	to bring the IUT to the state U8.
PR30901	TBR4_L3/PR/U09/V/PR/A/PR30901	360	to bring the IUT to the state U9.
PR31001	TBR4_L3/PR/U10/V/PR/A/PR31001	360	to bring the IUT to the state U10.
PR31101	TBR4_L3/PR/U11/V/PR/A/PR31101	361	to bring the IUT to the state U11.
PR31901	TBR4_L3/PR/U19/V/PR/A/PR31901	362	to bring the IUT to the state U19 via the states U6-U7 or U6-U8 or U6-U9 or U6-U25.
PR32501	TBR4_L3/PR/U25/V/PR/A/PR32501	363	to bring the IUT to the state U25.
PO49901	TBR4_L3/PO/UAL/V/PO/A/PO49901	363	to bring the IUT to the state U0.
CS50001	TBR4_L3/MS/U00/V/MS/A/CS50001	364	to check the IUT call state U0.
CS59901	TBR4_L3/MS/UAL/V/MS/A/CS59901	365	to check the IUT call state and the cause value.
UM59902	TBR4_L3/MS/UAL/V/MS/A/UM59902	366	allow without verdict the receipt of INFO, NOTIFY, STATUS ENQUIRY or any Q.932 PDU during the test body execution

Default Identifier	Default Reference	Page	Description
DF69901	TBR3_L3/DF/UAL/V/DF/A/DF69901	367	Default subtree for all test cases

Declarations Part

User Type Definitions			
Name	**Base Type**	**Definition**	**Comments**
GFP_MT_LIST	OCTETSTRING	('24'O, '28'O, '30'O, '31'O, '33'O, '37'O, '62'O, '64'O)	OCTETSTRING[1]; Message types defined in ETS 300 196, 11.2.1

User Operation Definition	
Operation Name:	INT_TO_BIT(intvalue, slength:INTEGER)
Result Type:	BITSTRING
Description: INT_TO_BIT(intvalue,slength) This operation converts a single INTEGER value to a single BITSTRING value. The resulting string is slength bits long. For example: INT_TO_BIT(7,4) = '0111'B INT_TO_BIT(99,7) = '1100011'	

User Operation Definition	
Operation Name:	BIT_TO_INT(bitvalue:BITSTRING)
Result Type:	INTEGER
Description: BIT_TO_INT(bitvalue) This operation converts a single BITSTRING value to a single INTEGER value. For example: BIT_TO_INT('0111'B) = 7 BIT_TO_INT('1100011'B) = 99	

Test Suite Parameters			
Name	**Type**	**PICS/PIXIT ref**	**Comments**
EBS	BOOLEAN	A15.2	TRUE if the IUT includes the Sending complete Information element in the outgoing SETUP message.
IBCC	BOOLEAN	A16.3	TRUE if Bearer capability information element is checked in the incoming SETUP PDU.
OVR	BOOLEAN	A16.12	TRUE if overlap receiving is implemented.
BXSET	BOOLEAN	E.7.1	<IUT!SETUP> TRUE for this version of the TBR
BXINF	BOOLEAN	E.7.2	<IUT!INFO>
BXCON	BOOLEAN	E.7.3	<IUT!CONN> TRUE for this version of the TBR.
BXDIS	BOOLEAN	E.7.4	<IUT!DISC> TRUE for this version of the TBR.
U7_MAINT	BOOLEAN	E.8.1	STATE U7 maintained: TRUE, if U7 > 3s and U7 ability = YES FALSE, if U7 < 3s or U7 ability = NO
U9_MAINT	BOOLEAN	E.8.2	STATE U9 maintained: TRUE, if U9 > 3s and U9 ability = YES FALSE, if U9 < 3s or U9 ability = NO
SU_HLC	BOOLEAN	E.8.4	TRUE if High layer compatibility value included in SETUP PDU.
SU_LLC	BOOLEAN	E.8.6	TRUE if Low layer compatibility value included in SETUP PDU.
BCP	BOOLEAN	E.8.8	TRUE if CALL PROCEEDING PDU is implemented.
BAL	BOOLEAN	E.8.9	TRUE if ALERTING PDU is implemented.
BCA	BOOLEAN	E.8.10	TRUE if CONNECT ACKNOWLEDGE PDU is mplemented.
BCAPV	OCTETSTRING	E.8.11	
IBCAP	OCTETSTRING	E.8.12	
HLCV	OCTETSTRING	E.8.13	
IHLC1	OCTETSTRING	E.8.14	
LLCV	OCTETSTRING	E.8.15	
LIPN	OCTETSTRING	E.8.17	Called party number length
IPN	OCTETSTRING	E.8.17	Called party number value
CDPN_OCTET3	OCTETSTRING	E.8.17	Octet 3 of the Called party number Information element.
CGPNV	OCTETSTRING	E.8.21	
CGPSV	OCTETSTRING	E.8.21	
UUIV	OCTETSTRING	E.8.21	
CH_NUM	BITSTRING	E.8.22	BITSTRING[7]

Test Suite Constants			
Name	**Type**	**Value**	**Comments**
EMPTY	OCTETSTRING	"O	

Test Case Variables			
Name	**Type**	**Value**	**Comments**
CREF	BITSTRING	'000000000000001'B	call reference value BITSTRING[15]
C	INTEGER	0	used as retransmission counter
ECV	BITSTRING	''B	Expected Cause value BITSTRING[7]
STAT_TRANSM	BOOLEAN	FALSE	used to handle the reception of STATUS PDUs
REST	BOOLEAN	FALSE	used to handle the reception of RESTART PDUs
r_bch_num	BITSTRING	''B	B-channel to be reset, BITSTRING[7]
bch_num	BITSTRING	''B	B-channel used for call, BITSTRING[7]
NOT_FL	BITSTRING	'0'B	used to invert flag

PCO Type Declarations			
Name	**Type**	**Role**	**Comments**
L	SAP	LT	SAP at the lower tester controlling and observing the exchange of call control PDUs (messages) on the ISDN layer 3 D-channel. The lower tester is the user of the data link layer service.

Timer Declarations			
Timer Name	**Duration**	**Units**	**Comments**
TWAIT	189	sec	any LT is waiting for IUT initiated test event (timer used for test synchronization)
TAC	32	sec	any LT is waiting for IUT initiated test event (timer used for test synchronization)
TNOAC	2	sec	any LT is controlling IUT inactivity (timer used for test synchronization)

Abbreviation Declarations		
Abbreviation	**Expansion**	**Comments**
ALERT	DL_DAT_RQ <MUN ^ ALERT>	send ALERTING PDU
CALL_PROC	DL_DAT_RQ <MUN ^ CALL_PROC>	send CALL PROCEEDING PDU
CON_CON	DL_DAT_RQ <MUN ^ CON_CON>	send CONGESTION CONTROL PDU
CONN	DL_DAT_RQ <MUN ^ CONN>	send CONNECT PDU
CONN_ACK	DL_DAT_RQ <MUN ^ CONN_ACK>	send CONNECT ACKNOWLEDGE PDU
DISC	DL_DAT_RQ <MUN ^ DISC>	send DISCONNECT PDU
INFO	DL_DAT_RQ <MUN ^ INFO>	send INFORMATION PDU
NOTIFY	DL_DAT_RQ <MUN ^ NOTIFY>	send NOTIFY PDU
PROG	DL_DAT_RQ <MUN ^ PROG>	send PROGRESS PDU
REL	DL_DAT_RQ <MUN ^ REL>	send RELEASE PDU
REL_COM	DL_DAT_RQ <MUN ^ REL_COM>	send RELEASE COMPLETE PDU
RESTART	DL_DAT_RQ <MUN ^ RESTART>	send RESTART PDU
RESTART_ACK	DL_DAT_RQ <MUN ^ RESTART_ACK>	send RESTART ACKNOWLEDGE PDU
SETUP_P	DL_DAT_RQ <MUN ^ SETUP>	send SETUP via point-to-point
SETUP_ACK	DL_DAT_RQ <MUN ^ SETUP_ACK>	send SETUP ACKNOWLEDGE PDU
STATUS	DL_DAT_RQ <MUN ^ STATUS>	send STATUS PDU
ST_ENQ	DL_DAT_RQ <MUN ^ ST_ENQ>	send STATUS ENQUIRY PDU
USER_INFO	DL_DAT_RQ <MUN ^ USER_INFO>	send USER INFORMATION PDU
ERROR	DL_DAT_RQ <MUN ^ ERROR>	send ERROR PDU
ALERTr	DL_DAT_IN <MUN ~ ALERT>	receive ALERTING PDU
CALL_PROCr	DL_DAT_IN <MUN ~ CALL_PROC>	receive CALL PROCEEDING PDU
CON_CONr	DL_DAT_IN <MUN ~ CON_CON>	receive CONGESTION CONTROL PDU
CONNr	DL_DAT_IN <MUN ~ CONN>	receive CONNECT PDU
CONN_ACKr	DL_DAT_IN <MUN ~ CONN_ACK>	receive CONNECT_ACKNOWLEDGE PDU
DISCr	DL_DAT_IN <MUN ~ DISC>	receive DISCONNECT PDU
INFOr	DL_DAT_IN <MUN ~ INFO>	receive INFORMATION PDU
GFP_MSGr	DL_DAT_IN <MUN ~ GFP_MSG>	receive GFP PDU
NOTIFYr	DL_DAT_IN <MUN ~ NOTIFY>	receive NOTIFY PDU
PROGr	DL_DAT_IN <MUN ~ PROG>	receive PROGRESS PDU
RELr	DL_DAT_IN <MUN ~ REL>	receive RELEASE PDU
REL_COMr	DL_DAT_IN <MUN ~ REL_COM>	receive RELEASE COMPLETE PDU
RESTARTr	DL_DAT_IN <MUN ~ RESTART>	receive RESTART PDU
RESTART_ACKr	DL_DAT_IN <MUN ~ RESTART_ACK>	receive RESTART ACKNOWLEDGE PDU
SETUPr	DL_DAT_IN <MUN ~ SETUP>	receive SETUP PDU
SETUP_ACKr	DL_DAT_IN <MUN ~ SETUP_ACK>	receive SETUP ACKNOWLEDGE PDU
STATUSr	DL_DAT_IN <MUN ~ STATUS>	receive STATUS PDU
ST_ENQr	DL_DAT_IN <MUN ~ ST_ENQ>	receive STATUS_ENQUIRY PDU

ASP Type Declaration		
ASP Name:	**PCO Type:**	**Comments:**
DL_EST_RQ(DL_ESTABLISH_Request)	SAP	CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to request the establishment of multiple frame operation (L3 ---> L2)

ASP Type Declaration		
ASP Name: DL_EST_IN(DL_ESTABLISH_Indication)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to indicate the establishment of multiple frame operation (L2 ---> L3)

ASP Type Declaration		
ASP Name: DL_EST_CO(DL_ESTABLISH_Confirm)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to confirm the establishment of multiple frame operation (L2 ---> L3)

ASP Type Declaration		
ASP Name: DL_REL_RQ(DL_RELEASE_Request)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to request the termination of an established multiple frame operation (L3 ---> L2)

ASP Type Declaration		
ASP Name: DL_REL_IN(DL_RELEASE_Indication)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to indicate the termination of an established multiple frame operation or to report an unsuccessful establishment attempt (L2 ---> L3)

ASP Type Declaration		
ASP Name: DL_REL_CO(DL_RELEASE_Confirm)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to confirm the termination of an established multiple frame operation (L2 ---> L3)

ASP Type Declaration		
ASP Name: DL_DAT_RQ(DL_DATA_Request)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to request the transmission of layer-3 PDUs (L3 ---> L2)
Service Parameter Information		
Field Name	**Type**	**Comments**
MUN(Message Unit)	OCTETSTRING	contains network layer (peer-to-peer message) PDU. acknowledged operation used.

ASP Type Declaration		
ASP Name: DL_DAT_IN(DL_DATA_Indication)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to indicate the re-ceipt of layer-3 PDUs (L2 ---> L3)
Service Parameter Information		
Field Name	**Type**	**Comments**
MUN(Message Unit)	OCTETSTRING	contains network layer (peer-to-peer message) PDU. acknowledged operation used.

ASP Type Declaration		
ASP Name: DL_UDAT_RQ(DL_UNIT_DATA-Request)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to request the transmission of layer-3 PDUs using unacknowledged operation (L3 ---> L2)
Service Parameter Information		
Field Name	**Type**	**Comments**
MUN(Message Unit)	OCTETSTRING	contains network layer (peer-to-peer message) PDU. Unacknowledged operation is only used on basic access interface structures to provide point-to-multipoint operation.

ASP Type Declaration		
ASP Name: DL_UDAT_IN(DL_UNIT_DATA_Indication)	**PCO Type:** SAP	**Comments:** CEId: = (SAPI,CES) mapped onto DLCI: = (SAPI,TEI) ASP is used to indicate the re-ceipt of layer-3 PDUs using unacknowledged operation (L3 ---> L2)
Service Parameter Information		
Field Name	**Type**	**Comments**
MUN(Message Unit)	OCTETSTRING	contains network layer (peer-to-peer message) PDU. Unacknowledged operation used.

PDU Type Declaration		
PDU Name: ALERT	**PCO Type:** SAP	**Comments:** ALERTing u <-> n Ref. to subclause 11.2.1, table 11.2
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[3]
MT	OCTETSTRING [1]	Message type, M
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, note 1, OCTETSTRING[2..5]
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
UUI	OCTETSTRING [2 .. 131]	User-user information, O

PDU Type Declaration		
PDU Name: CALL_PROC	**PCO Type:** SAP	**Comments:** CALL PROCeeding u <-> n local Ref. to subclause 11.2.2, table 11.3
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, O, note 1, OCTETSTRING[2..3]
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: CONN	**PCO Type:** SAP	**Comments:** CONNect u <-> n Ref. to subclause 11.2.3, table 11.4
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, O, note 1, OCTETSTRING[2..3]
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
CODN	OCTETSTRING [2 .. 24]	Connected number, O
CODS	OCTETSTRING [2 .. 23]	Connected subaddress, O
LLC	OCTETSTRING [2 .. 16]	Low layer compatibillity, O
UUI	OCTETSTRING [2 .. 131]	User-user information, O

PDU Type Declaration		
PDU Name: CONN_ACK	**PCO Type:** SAP	**Comments:** CONNect ACKnowledge u <-> n local Ref. to subclause 11.2.4, table 11.5
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, O, note OCTETSTRING[2..3]
FAC	OCTETSTRING [2 .. 254]	Facility, O
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: DISC	**PCO Type:** SAP	**Comments:** DISConnect u <-> n Ref. to subclause 11.2.5, table 11.6
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
CAU	GROUP	Cause, O, OCTETSTRING[4..32]
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
UUI	OCTETSTRING [2 .. 131]	User-user information, O

PDU Type Declaration		
PDU Name: INFO	**PCO Type:** SAP	**Comments:** INFOrmation u <-> n local Ref. to subclause 11.2.6, table 11.7
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
SCI	OCTETSTRING [1]	Sending complete, O
CAU	GROUP	Cause, O, OCTETSTRING[2..32]
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
FAC	OCTETSTRING [2 .. 254]	Facility, O
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
KPF	OCTETSTRING [2 .. 34]	Keypad facility (n ->u), O
CDPN	GROUP	Called party number, O, OCTETSTRING[2..23]

PDU Type Declaration		
PDU Name: NOTIFY	**PCO Type:** SAP	**Comments:** NOTIFY u <-> n access Ref. to subclause 11.2.7, table 11.8
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
NOID	GROUP	Notification indicator, M, OCTETSTRING[3]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: GFP_MSG	**PCO Type:** SAP	**Comments:** u -> n Ref. to Recommendation: ETS 300 196, 11.2.1
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2..3]
MT	GFP_MT_LIST	Message type, M
IE_LIST	OCTETSTRING	

PDU Type Declaration		
PDU Name: REL	**PCO Type:** SAP	**Comments:** RELease u <-> n local Ref. to subclause 11.2.9, table 11.10
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
CAU	GROUP	Cause, O, note 2, OCTETSTRING[2..32]
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
FAC	OCTETSTRING [2 .. 254]	Facility, O
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
UUI	OCTETSTRING [2 .. 131]	User-user information, O

PDU Type Declaration		
PDU Name: REL_COM	**PCO Type:** SAP	**Comments:** RELease COMplete u <-> n local Ref. to subclause 11.2.10, table 11,11
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[3]
MT	OCTETSTRING [1]	Message type, M
CAU	GROUP	Cause,O, note 2, OCTETSTRING[2..32]
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
FAC	OCTETSTRING [2 .. 254]	Facility, O
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
UUI	OCTETSTRING [2 .. 131]	User-user info (u->n), O

PDU Type Declaration		
PDU Name: RESTART	**PCO Type:** SAP	**Comments:** RESTART u <-> n local Ref. to subclause 11.2.21.1, table 11.23
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
CHI	GROUP	Channel identification, O, note 2, OCTETSTRING[2..3]
RI	GROUP	Restart indicator,M, OCTETSTRING[3]

PDU Type Declaration		
PDU Name: RESTART_ACK	**PCO Type:** SAP	**Comments:** RESTART ACKnoledge u <-> n local Ref. to subclause 11.2.21.2, table 11.24
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[3]
MT	OCTETSTRING [1]	Message type, M
CHI	GROUP	Channel identification, O, note 2, OCTETSTRING[2..5]
RI	GROUP	Restart indicator, M, OCTETSTRING[3]

PDU Type Declaration		
PDU Name: SETUP	**PCO Type:** SAP	**Comments:** SETUP u <-> n Ref. to subclause 11.2.14, table 11.15; ETS 300 267
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
SCI	OCTETSTRING [1]	Sending complete information, O
BCAP	OCTETSTRING [4 .. 13]	Bearer capability, M
BCAP	OCTETSTRING [4 .. 13]	Bearer capability, O
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, O, note 2, OCTETSTRING[2..3]
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NSF	OCTETSTRING [2 .. 254]	Network-specific facilities, O
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]
KPF	OCTETSTRING [2 .. 34]	Keypad facility n ->u, O
CGPN	OCTETSTRING [2 .. 24]	Calling party number, O
CGPS	OCTETSTRING [2 .. 23]	Calling party subaddress, O
CDPN	GROUP	Called party number, O, OCTETSTRING[2..23]
CDPS	OCTETSTRING [2 .. 23]	Called party subaddress, O
TNS	OCTETSTRING [2 .. 254]	Transit network selection, O
LLC	OCTETSTRING [0 .. 16]	Low layer compatibility, O
HLC	OCTETSTRING [0 .. 4]	High layer compatibility, O
HLC_2	OCTETSTRING [0 .. 4]	High layer compatibility, O
UUI	OCTETSTRING [2 .. 131]	User-user information, O

PDU Type Declaration		
PDU Name: SETUP_ACK	**PCO Type:** SAP	**Comments:** SETUP ACKnowledge u <-> n local Ref. to subclause 11.2.15, table 11.16
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
EFAC	OCTETSTRING [2 .. 254]	Extended facility, O
CHI	GROUP	Channel identification, O, note 1, OCTETSTRING[2..3]
FAC	OCTETSTRING [2 .. 254]	Facility, O
PI	GROUP	Progress indicator, O, OCTETSTRING[2..4]
NOID	GROUP	Notification indicator, O, OCTETSTRING[2..258]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: STATUS	**PCO Type:** SAP	**Comments:** STATUS u <-> n local Ref. to subclause 11.2.16, table 11.17
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
CAU	GROUP	Cause, M, OCTETSTRING[2..32]
CST	GROUP	Call state, M, OCTETSTRING[3]
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: ST_ENQ	**PCO Type:** SAP	**Comments:** STatus_ENQuiry u <-> n local Ref. to subclause 11.2.17, table 11.18
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator, M
CR	GROUP	Call reference, M, OCTETSTRING[2]
MT	OCTETSTRING [1]	Message type, M
DSP	GROUP	Display (n ->u), O, OCTETSTRING[2..34]

PDU Type Declaration		
PDU Name: ERROR	**PCO Type:** SAP	**Comments:** n -> u local
PDU Field Information		
Field Name	**Type**	**Comments**
PD	OCTETSTRING [1]	Protocol discriminator
CR	GROUP	Call reference OCTETSTRING[3]
MT	OCTETSTRING [1]	Message type
SCI	OCTETSTRING [1]	Sending complete information
BCAP	OCTETSTRING [4 .. 13]	Bearer capability n ->u
CHI	GROUP	Channel identification OCTETSTRING[2..5]
FAC	OCTETSTRING [2 .. 254]	Facility
PI	GROUP	Progress indicator OCTETSTRING[2..4]
NSF	OCTETSTRING [2 .. 254]	Network specific facilities
DSP	GROUP	Display OCTETSTRING[2..34]
KPF	OCTETSTRING [2 .. 34]	Keypad facility n ->u
CGPN	OCTETSTRING [2 .. 24]	Calling party number
CGPS	OCTETSTRING [2 .. 23]	Calling party subaddr.
CDPN	GROUP	Called party number OCTETSTRING[2..23]
CDPS	OCTETSTRING [2 .. 23]	Called party subaddr.
TNS	OCTETSTRING [2 .. 254]	Transit network selection
LLC	OCTETSTRING [0 .. 16]	Low layer compatibility
HLC	OCTETSTRING [0 .. 4]	High layer compatibility
MD	OCTETSTRING [1]	More data
UUI	OCTETSTRING [2 .. 131]	User-user information

PDU Field Group Type Declaration	
Field Group Name: CAU	**Comments:** Info Element CAUse Ref. to subclause 11.3.5.10

PDU Field Information		
Field Name	**Type**	**Comments**
CAU_I	OCTETSTRING [1]	Identifier
CAU_L	OCTETSTRING [1]	Length
CAU_E3_LOC	OCTETSTRING [1]	Location
CAU_E4_CV	GROUP	Cause Value OCTETSTRING[1]
CAU_DI	OCTETSTRING	Diagnostics

PDU Field Group Type Declaration	
Field Group Name: CAU_E4_CV	**Comments:** Info Element CAUse Octet 4

PDU Field Information		
Field Name	**Type**	**Comments**
CAU_E4_CV1	BITSTRING [1]	Extension bit
CAU_E4_CV2	BITSTRING [7]	Cause value

PDU Field Group Type Declaration		
Field Group Name: CDPN	**Comments:** Info Element Called Party Number Ref. to subclause 11.3.5.8	
PDU Field Information		
Field Name	**Type**	**Comments**
CDPN_I	OCTETSTRING [1]	Identifier
CDPN_L	OCTETSTRING [1]	Length
CDPN_E3_NPI	OCTETSTRING [1]	Numbering plan identification
CDPN_E4_ND	OCTETSTRING [1 .. 20]	Number digits

PDU Field Group Type Declaration		
Field Group Name: CHI	**Comments:** Info Element CHannel Identification Ref. to subclause 11.3.5.11	
PDU Field Information		
Field Name	**Type**	**Comments**
CHI_I	OCTETSTRING [1]	Identifier
CHI_L	OCTETSTRING [1]	Length
CHI_E3_P1	BITSTRING [4]	First nibble of Channel selection
CHI_E3_PE	BITSTRING [1]	Preferred/Exclusive Bit
CHI_E3_P3	BITSTRING [3]	Last three bit of Channel selection
CHI_E4	OCTETSTRING [1 .. 2]	Channel type
CHI_E5_CH1	BITSTRING [1]	Used as an extension bit
CHI_E5_CH2	BITSTRING [7]	Channel number

PDU Field Group Type Declaration		
Field Group Name: CR	**Comments:** Call Reference Ref. to subclause 11.3.3	
PDU Field Information		
Field Name	**Type**	**Comments**
CR_L	OCTETSTRING [1]	Length
CR_F	BITSTRING [1]	Flag
CR_R	BITSTRING [15]	Call reference value

PDU Field Group Type Declaration		
Field Group Name: CST	**Comments:** Info Element Call STate Ref. to subclause 11.3.5.7	
PDU Field Information		
Field Name	**Type**	**Comments**
CST_I	OCTETSTRING [1]	Identifier
CST_L	OCTETSTRING [1]	Length
CST_CSV	GROUP	Call state value

PDU Field Group Type Declaration		
Field Group Name: CST_CSV	**Comments:** Info Element Call STate octet 3	
PDU Field Information		
Field Name	**Type**	**Comments**
CST_CSV1	BITSTRING [2]	Coding standard
CST_CSV2	BITSTRING [6]	Call state value/global interface state value

PDU Field Group Type Declaration		
Field Group Name: DSP	**Comments:** Info Element DiSPlay Ref. to subclause 4.5.15 of ETS 300 102-1	
PDU Field Information		
Field Name	**Type**	**Comments**
DSP_I	OCTETSTRING [1]	Identifier
DSP_L	OCTETSTRING [1]	Length
DSP_DI	OCTETSTRING [0 .. 34]	Display information

PDU Field Group Type Declaration		
Field Group Name: NOID	**Comments:** Info Element NOtification InDicator Ref. to subclause 11.3.5.14	
PDU Field Information		
Field Name	**Type**	**Comments**
NOID_I	OCTETSTRING [1]	Identifier
NOID_L	OCTETSTRING [1]	Length
NOID_E3_ND	OCTETSTRING [0 .. 258]	Notification description

PDU Field Group Type Declaration		
Field Group Name: PI	**Comments:** Info Element Progress Indicator Ref. to subclause 11.3.5.15	
PDU Field Information		
Field Name	**Type**	**Comments**
PI_I	OCTETSTRING [1]	Identifier
PI_L	OCTETSTRING [1]	Length
PI_E3_LOC	OCTETSTRING [1]	Location
PI_E4_PD	OCTETSTRING [1]	Progress description

PDU Field Group Type Declaration		
Field Group Name: RI	**Comments:** Info Element Restart Indicator Ref. to subclause 11.3.5.16	
PDU Field Information		
Field Name	**Type**	**Comments**
RI_I	OCTETSTRING [1]	Identifier
RI_L	OCTETSTRING [1]	Length
RI_CL	BITSTRING [5]	Octet 3, bits 4 to 8
RI_CL1	BITSTRING [3]	Octet 3, Class

PDU Field Group Type Declaration		
Field Group Name: UE	**Comments:** Unrecognized optional info Element	
PDU Field Information		
Field Name	**Type**	**Comments**
UE_UEI	OCTETSTRING [1]	Identifier
UE_L	OCTETSTRING [1]	Length
UE_A	OCTETSTRING [1]	Additional octet

Constraints Part

PDU Constraint Declaration	
PDU Name: ALERT(ALERTING)	**Constraint Name:** AL1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000001'B
EFAC	*
CHI	*
FAC	*
PI	*
NOID	*
DSP	-
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: ALERT(ALERTING)	**Constraint Name:** AL2
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000001'B
EFAC	-
CHI	-
FAC	-
PI	-
NOID	-
DSP	-
UUI	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: CALL_PROC(CALL PROCEEDING)	**Constraint Name:** CP1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000010'B
EFAC	*
CHI	*
FAC	*
PI	*
NOID	*
DSP	-
Comments: PDU with "don't care" values (LT <--- IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: CALL_PROC(CALL PROCEEDING)	**Constraint Name:** CP2
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000010'B
EFAC	-
CHI	CHI5
FAC	-
PI	-
NOID	-
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: CALL_PROC(CALL PROCEEDING)	**Constraint Name:** CP3
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000010'B
EFAC	-
CHI	CHI5
FAC	-
PI	-
NOID	-
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: CONN(CONNECT)	**Constraint Name:** CN1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000111'B
EFAC	*
CHI	*
FAC	*
PI	*
NOID	*
DSP	-
CODN	*
CODS	*
LLC	*
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; LLC optional LT and IUT parameter; LLCV is a test suite parameter;	

PDU Constraint Declaration	
PDU Name: CONN(CONNECT)	**Constraint Name:** CN2
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000111'B
EFAC	-
CHI	-
FAC	-
PI	-
NOID	-
DSP	-
CODN	-
CODS	-
LLC	-
UUI	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; LLC optional LT and IUT parameter; LLCV is a test suite parameter;	

PDU Constraint Declaration	
PDU Name: CONN(CONNECT)	**Constraint Name:** CN3
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000111'B
EFAC	-
CHI	-
FAC	-
PI	-
NOID	-
DSP	-
CODN	-
CODS	-
LLC	-
UUI	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; LLC optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: CONN_ACK(CONNECT ACKNOWLEDGE)	**Constraint Name:** CA1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00001111'B
EFAC	*
CHI	-
FAC	*
NOID	*
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); "*" replaced with "-"; PDU with "don't care" values (LT <--- IUT); CHI available for supplementary services (n--->u); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: CONN_ACK(CONNECT ACKNOWLEDGE)	**Constraint Name:** CA3
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00001111'B
EFAC	-
CHI	-
FAC	-
NOID	-
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); CHI available for supplementary services (n--->u); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: DISC(DISCONNECT)	**Constraint Name:** DI1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01000101'B
CAU	*
EFAC	*
FAC	*
PI	-
NOID	*
DSP	-
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: DISC(DISCONNECT)	**Constraint Name:** DI2(FLAG:BITSTRING; CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01000101'B
CAU	CAU2(CVAL)
EFAC	-
FAC	-
PI	-
NOID	-
DSP	-
UUI	-
Comments: PDU without optional parameters (LT ---> IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: INFO(INFORMATION)	**Constraint Name:** IN1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01111011'B
SCI	*
CAU	-
EFAC	*
FAC	*
NOID	*
DSP	-
KPF	*
CDPN	?
Comments: PDU with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter; CPDN optional LT and IUT parameter used during overlap procedures;	

PDU Constraint Declaration	
PDU Name: INFO(INFORMATION)	**Constraint Name:** IN3(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01111011'B
SCI	'10100001'B
CAU	-
EFAC	-
FAC	-
NOID	-
DSP	DSP1
KPF	-
CDPN	CDPN1
Comments: PDU with optional parameters (LT ---> IUT); DSP optional LT parameter; no IUT parameter; CPDN optional LT and IUT parameter used during overlap procedures;	

PDU Constraint Declaration	
PDU Name: INFO(INFORMATION)	**Constraint Name:** IN4
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR32
MT	'01111011'B
SCI	*
CAU	-
EFAC	*
FAC	*
NOID	*
DSP	-
KPF	*
CDPN	*
Comments: PDU with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter; CPDN optional LT and IUT parameter used during overlap procedures;	

PDU Constraint Declaration	
PDU Name: GFP_MSG	**Constraint Name:** MSG
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR32
MT	?
IE_LIST	*
Comments: PDU with a valid CREF. Used for test cases where PDUs shall be absorbed by the tester (LT <--- IUT);	

PDU Constraint Declaration	
PDU Name: NOTIFY(NOTIFY)	**Constraint Name:** NO2(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01101110'B
NOID	NOID2
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); NOID mandatory LT and IUT parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: NOTIFY(NOTIFY)	**Constraint Name:** NO3
Field Value Information	
Field Name	**Value**
PD CR MT NOID DSP	'00001000'B CR32 '01101110'B NOID1 -
Comments: PDU without optional parameters (LT <--- IUT); NOID mandatory LT and IUT parameter; NOID1 with "don't care" value; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: REL(RELEASE)	**Constraint Name:** RL1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD CR MT CAU EFAC FAC NOID DSP UUI	'00001000'B CR18(FLAG) '01001101'B * * * * - *
Comments: PDU with "don't care" values (LT <--- IUT); CAU optional LT and IUT parameter; mandatory if RELEASE PDU is 1st clearing PDU or as a result of T305 expiry; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: REL(RELEASE)	**Constraint Name:** RL3(FLAG:BITSTRING; CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
PD CR MT CAU EFAC FAC NOID DSP UUI	'00001000'B CR18(FLAG) '01001101'B CAU2(CVAL) - - - - -
Comments: PDU with optional parameters (LT ---> IUT); CAU optional LT and IUT parameter; mandatory if RELEASE PDU is 1st clearing PDU or as a result of T305 expiry; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: REL_COM(RELEASE COMPLETE)	**Constraint Name:** RC1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01011010'B
CAU	*
EFAC	*
FAC	*
NOID	*
DSP	-
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); CAU optional LT and IUT parameter; mandatory in the 1st clearing message; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: REL_COM(RELEASE COMPLETE)	**Constraint Name:** RC2(FLAG:BITSTRING; CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01011010'B
CAU	CAU2(CVAL)
EFAC	-
FAC	-
NOID	-
DSP	-
UUI	-
Comments: PDU with optional parameters (LT ---> IUT); FLAG and CVAL are used as constraints parameter; RC2(FLAG,CVAL); CAU optional LT and IUT parameter; mandatory in the 1st clearing message; DSP optional LT parameter; no IUT parameter; UUI optional LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART(RESTART)	**Constraint Name:** RST1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01000110'B
CHI	*
RI	RI3
Comments: PDU without optional parameters (LT <--- IUT); CHI mandatory if RI is "indicated channels"; DSP optional LT parameter; no IUT parameter; RI mandatory LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART(RESTART)	**Constraint Name:** RST3(FLAG:BITSTRING; CLV:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01000110'B
CHI	CHI8
RI	RI1(CLV)
Comments: PDU without optional parameters (LT <--- IUT); CHI mandatory if RI is "indicated channels"; DSP optional LT parameter; no IUT parameter; RI mandatory LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART(RESTART)	**Constraint Name:** RST4
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR24
MT	'01000110'B
CHI	*
RI	?
Comments: PDU without optional parameters (LT <--- IUT); CHI mandatory if RI is "indicated channels"; DSP optional LT parameter; no IUT parameter; RI mandatory LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART(RESTART)	**Constraint Name:** RST5(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01000110'B
CHI	CHI10
RI	RI4

PDU Constraint Declaration	
PDU Name: RESTART_ACK(RESTART ACKNOWLEDGE)	**Constraint Name:** RSA2(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01001110'B
CHI	CHI10
DSP	-
RI	RI4
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory if RI is "indicated channels"; DSP optional LT parameter; no IUT parameter; RI mandatory LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART_ACK(RESTART ACKNOWLEDGE)	**Constraint Name:** RSA5(FLAG:BITSTRING; CLV:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01001110'B
CHI	-
DSP	-
RI	RI1(CLV)
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory if RI is "indicated channels"; DSP optional LT parameter; no IUT parameter; RI indicates 'single interface' or 'all interfaces'; mandatory LT and IUT parameter;	

PDU Constraint Declaration	
PDU Name: RESTART_ACK(RESTART ACKNOWLEDGE)	**Constraint Name:** RSA6(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01001110'B
CHI	CHI11
DSP	-
RI	RI4

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR21
MT	'00000101'B
SCI	*
BCAP	?
BCAP_2	*
EFAC	*
CHI	*
FAC	*
PI	*
NSF	*
NOID	*
DSP	-
KPF	*
CGPN	*
CGPS	*
CDPN	*
CDPS	*
TNS	*
LLC	*
HLC	*
HLC_2	*
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU2
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	BCAPV
BCAP_2	-
EFAC	-
CHI	CHI5
FAC	-
PI	-
NSF	-
NOID	-
DSP	-
KPF	-
CGPN	CGPNV
CGPS	CGPSV
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
HLC_2	-
UUI	UUIV
Comments: PDU with optional parameters SCI and CDPN (LT ---> IUT); BCAPV is used as test suite parameter; DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU3
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	-
BCAP	BCAPV
BCAP_2	-
EFAC	-
CHI	CHI5
FAC	-
PI	-
NSF	-
NOID	-
DSP	-
KPF	-
CGPN	CGPNV
CGPS	CGPSV
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
HLC_2	-
UUI	UUIV
Comments: PDU with optional parameters and CDPN (LT ---> IUT); BCAPV is used as test suite parameter; DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU4
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	IBCAP
BCAP_2	-
EFAC	-
CHI	CHI5
FAC	-
PI	-
NSF	-
NOID	-
DSP	-
KPF	-
CGPN	CGPNV
CGPS	CGPSV
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
HLC_2	-
UUI	UUIV
Comments: PDU with incompatible BCAP element (LT ---> IUT); IBCAP is used as test suite parameter; DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU5
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	BCAPV
BCAP_2	-
EFAC	-
CHI	CHI5
FAC	-
PI	-
NSF	-
NOID	-
DSP	-
KPF	-
CGPN	CGPNV
CGPS	CGPSV
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	IHLC1
HLC_2	-
UUI	UUIV
Comments: PDU with incompatible HLC element (LT ---> IUT); BCAPV and IHLC1 are used as test suite parameters; DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU6
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	-
BCAP	BCAPV
BCAP_2	-
EFAC	-
CHI	CHI5
FAC	-
PI	-
NSF	-
NOID	-
DSP	-
KPF	-
CGPN	CGPNV
CGPS	CGPSV
CDPN	-
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
HLC_2	-
UUI	UUIV
Comments: PDU with optional parameters and without CDPN (LT ---> IUT); BCAPV is used as test suite parameter; DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP(SETUP)	**Constraint Name:** SU9
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR21
MT	'00000101'B
SCI	*
BCAP	?
BCAP_2	*
EFAC	*
CHI	CHI9
FAC	*
PI	*
NSF	*
NOID	*
DSP	-
KPF	*
CGPN	*
CGPS	*
CDPN	*
CDPS	*
TNS	*
LLC	*
HLC	*
HLC_2	*
UUI	*
Comments: PDU with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter; SCI, PI, CGPN, CGPS, CPDN, CDPS, TNS, LLC, HLC, UUI optional LT and IUT parameters; KPF optional IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP_ACK(SETUP ACKNOWLEDGE)	**Constraint Name:** SUA1
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00001101'B
EFAC	*
CHI	*
FAC	*
PI	*
NOID	*
DSP	-
Comments: PDU with "don't care" values (LT <--- IUT); PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: SETUP_ACK(SETUP ACKNOWLEDGE)	**Constraint Name:** SUA2
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00001101'B
EFAC	-
CHI	CHI5
FAC	-
PI	-
NOID	-
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); CHI mandatory parameter, if in 1st PDU in response to SETUP PDU unless user accepts the specific B-channel; PI is used in connection with interworking or in band information patterns; optional parameter; DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: STATUS(STATUS)	**Constraint Name:** ST1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01111101'B
CAU	CAU1
CST	CST1
DSP	-
Comments: PDU without optional parameters; CAU1 and CST1 with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: STATUS(STATUS)	**Constraint Name:** ST2(FLAG:BITSTRING; CVAL:INTEGER; CSTV:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01111101'B
CAU	CAU2(CVAL)
CST	CST2(CSTV)
DSP	-
Comments: PDU without optional parameters (LT ---> IUT); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: STATUS(STATUS)	**Constraint Name:** ST3(FLAG:BITSTRING; CVAL:INTEGER; CSTV:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01111101'B
CAU	CAU4(CVAL)
CST	CST2(CSTV)
DSP	-
Comments: PDU without optional parameters; CAU4 with "don't care" valuesn (LT <--- IUT); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: STATUS(STATUS)	**Constraint Name:** ST5(CVAL:INTEGER; CSTV:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR24
MT	'01111101'B
CAU	CAU3(CVAL)
CST	CST2(CSTV)
DSP	-

PDU Constraint Declaration	
PDU Name: ST_ENQ(STATUS ENQUIRY)	**Constraint Name:** SQ1(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01110101'B
DSP	-
Comments: PDU without optional parameters (LT <---> IUT); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: ST_ENQ(STATUS ENQUIRY)	**Constraint Name:** SQ3
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR32
MT	'01110101'B
DSP	-
Comments: PDU without optional parameters; CR32 with "don't care" values (LT <--- IUT); DSP optional LT parameter; no IUT parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR1
Field Value Information	
Field Name	**Value**
PD	'11111111'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	BCAPV
CHI	CHI5
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: SETUP PDU with invalid protocol discriminator (LT ---> IUT); BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR4
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	-
CHI	CHI5
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: SETUP PDU without BCAP (mandatory information element is missing) (LT ---> IUT);	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR5
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000100'B
SCI	-
BCAP	-
CHI	-
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	-
CDPS	-
TNS	-
LLC	-
HLC	-
MD	-
UUI	-
Comments: PDU with unknown message type (LT ---> IUT);	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR7
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000100'B
SCI	-
BCAP	-
CHI	-
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	-
CDPS	-
TNS	-
LLC	-
HLC	-
MD	-
UUI	-
Comments: PDU with unknown message type (LT ---> IUT);	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR20
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000010'B
CHI	-
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	-
CDPS	-
TNS	-
LLC	-
HLC	-
MD	-
UUI	-
Comments: Syntactically Invalid CALL PROCEEDING PDU (LT ---> IUT); mandatory information element CHI missing;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR21
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR17
MT	'00000010'B
CHI	CHI2
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	-
CDPS	-
TNS	-
LLC	-
HLC	-
MD	-
UUI	-
Comments: Syntactically Invalid CALL PROCEEDING PDU (LT ---> IUT); mandatory information element CHI with content error;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR50(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01000101'B
CHI	-
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	-
CDPS	-
TNS	-
LLC	-
HLC	-
MD	-
Comments: Syntactically Invalid DISCONNECT PDU (LT ---> IUT); mandatory information element CAU missing; FLAG is used as constraints parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR52(FLAG:BITSTRING; CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR18(FLAG)
MT	'01000101'B
UE	UE2
CAU	CAU2(CVAL)
FAC	-
PI	-
DSP	-
UUI	-
Comments: Syntactically Invalid DISCONNECT PDU (LT ---> IUT); unrecognized information element UE; comprehension not required; FLAG and CVAL are used as constraints parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR53(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD CR MT CAU FAC PI DSP UUI	'00001000'B CR18(FLAG) '01000101'B CAU6 - - - -
Comments: Syntactically Invalid DISCONNECT PDU (LT ---> IUT); mandatory information element CAU with content error; FLAG is used as constraints parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR66(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD CR MT UE CAU FAC DSP UUI	'00001000'B CR18(FLAG) '01001101'B UE2 CAU8 - - -
Comments: Syntactically Invalid RELEASE PDU (LT ---> IUT); unrecognized information element UE; comprehension not required; FLAG is used as constraints parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR81(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD CR MT UE CAU FAC DSP UUI	'00001000'B CR18(FLAG) '01011010'B UE2 CAU7 - - -
Comments: Syntactically Invalid RELEASE COMPLETE PDU (LT ---> IUT); REL_COM / unrecognized information element UE; comprehension not required; FLAG is used as constraints parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR107
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	-
BCAP	BCAPV
CHI	CHI5
FAC	-
PI	-
NSF	-
DSP	DSP1
DSP_2	DSP1
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: Syntactically Invalid SETUP PDU (LT ---> IUT); duplicate information elements; repetition not permitted; BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR109
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
UE	UE1
SCI	'10100001'B
BCAP	BCAPV
CHI	CHI5
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: Syntactically Invalid SETUP PDU (LT ---> IUT); unrecognized non-mandatory information element UE; comprehension required; BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR110
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
UE	UE2
SCI	-
BCAP	BCAPV
CHI	CHI5
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: Syntactically Invalid SETUP PDU (LT ---> IUT); unrecognized information element UE; comprehension not required; BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR111
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	'10100001'B
BCAP	BCAPV
CHI	CHI2
FAC	-
PI	-
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: Syntactically Invalid SETUP PDU (LT ---> IUT); mandatory information element CHI with content error; BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR112
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR19
MT	'00000101'B
SCI	-
BCAP	BCAPV
CHI	CHI5
FAC	-
PI	PI5
NSF	-
DSP	-
KPF	-
CGPN	-
CGPS	-
CDPN	CDPN1
CDPS	-
TNS	-
LLC	LLCV
HLC	HLCV
UUI	-
Comments: Syntactically Invalid SETUP PDU (LT ---> IUT); non-mandatory information element PI with content error; BCAPV is used as test suite parameter;	

PDU Constraint Declaration	
PDU Name: ERROR	**Constraint Name:** ERR201(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
PD	'00001000'B
CR	CR20(FLAG)
MT	'01110101'B
DSP	-
Comments: STATUS ENQUIRY PDU used as unexpected PDU	

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU1
Field Value Information	
Field Name	**Value**
CAU_I	'00001000'B
CAU_L	?
CAU_E3_LOC	?
CAU_E4_CV	?
CAU_DI	*

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU2(CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B '00000010'B '10000010'B CAU_E41(CVAL) -

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU3(CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B '00000010'B '10000000'B CAU_E41(CVAL) -

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU4(CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B ? ? CAU_E41(CVAL) *

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU6
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B '00000010'B '10000010'B CAU_E42 -

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU7
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B '00000010'B '10000010'B CAU_E43 -

PDU Field Group Constraint Declaration	
Field Group Name: CAU	**Constraint Name:** CAU8
Field Value Information	
Field Name	**Value**
CAU_I CAU_L CAU_E3_LOC CAU_E4_CV CAU_DI	'00001000'B '00000010'B '10000010'B CAU_E44 -

PDU Field Group Constraint Declaration	
Field Group Name: CAU_E4_CV	**Constraint Name:** CAU_E41(CVAL:INTEGER)
Field Value Information	
Field Name	**Value**
CAU_E4_CV1 CAU_E4_CV2	'1'B INT_TO_BIT(CVAL, 7)

PDU Field Group Constraint Declaration	
Field Group Name: CAU_E4_CV	**Constraint Name:** CAU_E42
Field Value Information	
Field Name	**Value**
CAU_E4_CV1 CAU_E4_CV2	'1'B '0000000'B

PDU Field Group Constraint Declaration	
Field Group Name: CAU_E4_CV	**Constraint Name:** CAU_E43
Field Value Information	
Field Name	**Value**
CAU_E4_CV1 CAU_E4_CV2	'1'B '0011111'B

PDU Field Group Constraint Declaration	
Field Group Name: CAU_E4_CV	**Constraint Name:** CAU_E44
Field Value Information	
Field Name	**Value**
CAU_E4_CV1 CAU_E4_CV2	'1'B '0010000'B

PDU Field Group Constraint Declaration	
Field Group Name: CDPN	**Constraint Name:** CDPN1
Field Value Information	
Field Name	**Value**
CDPN_I CDPN_L CDPN_E3_NPI CDPN_E4_ND	'01110000'B LIPN CDPN_OCTET3 IPN
Comments: LIPN and IPN are test suite parameters	

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI2
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000001'B
CHI_E3_P1	'1111'B
CHI_E3_PE	'1'B
CHI_E3_P3	'111'B
CHI_E4	-
CHI_E5_CH1	-
CHI_E5_CH2	-

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI5
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000011'B
CHI_E3_P1	'1010'B
CHI_E3_PE	'1'B
CHI_E3_P3	'001'B
CHI_E4	'10000011'B
CHI_E5_CH1	'1'B
CHI_E5_CH2	bch_num

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI8
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000011'B
CHI_E3_P1	'1010'B
CHI_E3_PE	'?'B
CHI_E3_P3	'001'B
CHI_E4	'10000011'B
CHI_E5_CH1	'1'B
CHI_E5_CH2	?

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI9
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000011'B
CHI_E3_P1	'1010'B
CHI_E3_PE	'1'B
CHI_E3_P3	'001'B
CHI_E4	'10000011'B
CHI_E5_CH1	'1'B
CHI_E5_CH2	?

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI10
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000011'B
CHI_E3_P1	'1010'B
CHI_E3_PE	'1'B
CHI_E3_P3	'001'B
CHI_E4	'10000011'B
CHI_E5_CH1	'1'B
CHI_E5_CH2	r_bch_num
Comments: LT ----> IUT Used in RESTART PDU. Indicates a specific B-channel to be restarted.	

PDU Field Group Constraint Declaration	
Field Group Name: CHI	**Constraint Name:** CHI11
Field Value Information	
Field Name	**Value**
CHI_I	'00011000'B
CHI_L	'00000011'B
CHI_E3_P1	'1010'B
CHI_E3_PE	'1'B
CHI_E3_P3	'001'B
CHI_E4	'10000011'B
CHI_E5_CH1	'1'B
CHI_E5_CH2	r_bch_num
Comments: IUT -----> LT Used in RESTART ACKNOWLEDGE PDU. Indicates specific B-channel which has been restarted.	

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR17
Field Value Information	
Field Name	**Value**
CR_L	'00000010'B
CR_F	'1'B
CR_R	CREF

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR18(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
CR_L	'00000010'B
CR_F	FLAG
CR_R	CREF

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR19
Field Value Information	
Field Name	**Value**
CR_L CR_F CR_R	'00000010'B '0'B CREF

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR20(FLAG:BITSTRING)
Field Value Information	
Field Name	**Value**
CR_L CR_F CR_R	'00000010'B FLAG '000000000000000'B

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR21
Field Value Information	
Field Name	**Value**
CR_L CR_F CR_R	'00000010'B '0'B *

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR24
Field Value Information	
Field Name	**Value**
CR_L CR_F CR_R	'00000010'B ? '000000000000000'B

PDU Field Group Constraint Declaration	
Field Group Name: CR	**Constraint Name:** CR32
Field Value Information	
Field Name	**Value**
CR_L CR_F CR_R	'00000010'B ? CREF

PDU Field Group Constraint Declaration	
Field Group Name: CST	**Constraint Name:** CST1
Field Value Information	
Field Name	**Value**
CST_I CST_L CST_CSV	'00010100'B '00000001'B ?

PDU Field Group Constraint Declaration	
Field Group Name: CST	**Constraint Name:** CST2(CSTV:INTEGER)
Field Value Information	
Field Name	**Value**
CST_I CST_L CST_CSV	'00010100'B '00000001'B CSV1(CSTV)

PDU Field Group Constraint Declaration	
Field Group Name: CST_CSV	**Constraint Name:** CSV1(CSTV:INTEGER)
Field Value Information	
Field Name	**Value**
CST_CSV1 CST_CSV2	'00'B INT_TO_BIT(CSTV, 6)

PDU Field Group Constraint Declaration	
Field Group Name: DSP	**Constraint Name:** DSP1
Field Value Information	
Field Name	**Value**
DSP_I DSP_L DSP_DI	'00101000'B '00000001'B '00110001'B

PDU Field Group Constraint Declaration	
Field Group Name: NOID	**Constraint Name:** NOID1
Field Value Information	
Field Name	**Value**
NOID_I NOID_L NOID_E3_ND	'00100111'B '00000001'B ?

PDU Field Group Constraint Declaration	
Field Group Name: NOID	**Constraint Name:** NOID2
Field Value Information	
Field Name	**Value**
NOID_I NOID_L NOID_E3_ND	'00100111'B '00000001'B '10000000'B

PDU Field Group Constraint Declaration	
Field Group Name: PI	**Constraint Name:** PI5
Field Value Information	
Field Name	**Value**
PI_I PI_L PI_E3_LOC PI_E4_PD	'00011110'B '00000010'B '10000010'B '11111111'B

PDU Field Group Constraint Declaration	
Field Group Name: RI	**Constraint Name:** RI1(CLV:INTEGER)
Field Value Information	
Field Name	**Value**
RI_I RI_L RI_CL RI_CL1	'01111001'B '00000001'B '10000'B INT_TO_BIT(CLV, 3)

PDU Field Group Constraint Declaration	
Field Group Name: RI	**Constraint Name:** RI3
Field Value Information	
Field Name	**Value**
RI_I RI_L RI_CL RI_CL1	'01111001'B '00000001'B '10000'B ?

PDU Field Group Constraint Declaration	
Field Group Name: RI	**Constraint Name:** RI4
Field Value Information	
Field Name	**Value**
RI_I RI_L RI_CL RI_CL1	'01111001'B '00000001'B '10000'B '000'B

PDU Field Group Constraint Declaration	
Field Group Name: UE	**Constraint Name:** UE1
Field Value Information	
Field Name	**Value**
UE_UEI UE_L UE_A	'00000001'B '00000001'B '00000000'B

PDU Field Group Constraint Declaration	
Field Group Name: UE	**Constraint Name:** UE2
Field Value Information	
Field Name	**Value**
UE_UEI UE_L UE_A	'10000000'B - -

Dynamic Part

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U00/V/RL/N/TC10002				
Identifier:	TC10002				
Purpose:	CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!REL START TAC		RL3(0, 16)		valid RELEASE PDU
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(1)
4	+CS50001(0)				state=0? (2)
5	?TIMEOUT TAC			(F)	TAC timeout
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) Valid RELEASE COMPLETE PDU. (2) The subtree CS50001 is used for checking the IUT state. Reference to requirements : subclause 11.4.6.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U00/V/ST/N/TC10004				
Identifier:	TC10004				
Purpose:	CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU indicating any state except the Null state N0, the IUT responds with either a RELEASE PDU or a RELEASE COMPLETE PDU with cause value 101.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!STATUS START TAC		ST2(0, 81, 2)		valid STATUS PDU (1)
3	L?RELr CANCEL TAC	L1	RL1(1)		valid RELEASE PDU
4	L!REL_COM		RC2(0, 101)	P	(2)
5	L?REL_COMr CANCEL TAC		RC1(1)	P	(2)
6	?TIMEOUT TAC			(F)	no response
7	+PO49901(0)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				
Extended Comments: (1) A STATUS PDU with call state <> 0 is send to the IUT. (2) Valid RELEASE COMPLETE PDU. Reference to requirements : subclause 11.4.6.8.(a)					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/V/SU/N/TC10005
Identifier: TC10005
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a valid SETUP PDU without the Sending complete information element, the IUT responds with any of a SETUP ACKNOWLEDGE, a CALL PROCEEDING, an ALERTING or a CONNECT PDU and moves to the relevant state Overlap Sending U25, Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU3		SETUP (1)
3	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	
4	+CS59901(25, 0)				state=25? (2)
5	L?CALL_PROCr CANCEL TAC		CP1	(P)	
6	+CS59901(9, 0)				state=9? (2)
7	L?ALERTr CANCEL TAC		AL1	(P)	
8	+CS59901(7, 0)				state=7? (2)
9	L?CONNr CANCEL TAC		CN1	(P)	
10	+CS59901(8, 0)				state=8? (2)
11	?TIMEOUT TAC			(F)	TAC timeout
12	+PO49901(0)				postamble to U0
13	+UM59902				unexpected message
14	GOTO L1				

Extended Comments:
(1) A valid and compatible SETUP PDU with only mandatory parameters is transmitted.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclauses 11.4.2.1, 11.4.2.4, 11.4.2.5.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/V/SU/N/TC10006
Identifier: TC10006
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a valid SETUP PDU with the Sending complete information element, the IUT responds with any of a CALL PROCEEDING, an ALERTING or a CONNECT PDU and moves to the relevant state Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU2		SETUP (1)
3	L?CALL_PROCr CANCEL TAC	L1	CP1	(P)	
4	+CS59901(9, 0)				state=9? (2)
5	L?ALERTr CANCEL TAC		AL1	(P)	
6	+CS59901(7, 0)				state=7? (2)
7	L?CONNr CANCEL TAC		CN1	(P)	
8	+CS59901(8, 0)				state=8? (2)
9	?TIMEOUT TAC			(F)	TAC timeout
10	+PO49901(0)				postamble to U0
11	+UM59902				unexpected message
12	GOTO L1				

Extended Comments:
(1) A valid and compatible SETUP PDU with the Sending complete information element is transmitted.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclauses 11.4.2.1, 11.4.2.5.1

Test Case Dynamic Behaviour

Reference: TBR3_L3/PS/U00/V/SU/N/TC10008
Identifier: TC10008
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a valid SETUP PDU containing an incompatible Bearer capability information element (mandatory parameter) the IUT:
- responds with a RELEASE COMPLETE PDU; or ignores the SETUP PDU (broadcast datalink);
- responds with a RELEASE COMPLETE PDU (point-to-point datalink).

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	[BDL = TRUE]				parameter (1)
3	L!SETUP START TAC		SU4		(2)
4	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(3)
5	+CS50001(0)				state=0? (4)
6	?TIMEOUT TAC			(P)	TAC timeout
7	+CS50001(0)				state=0? (4)
8	+UM59902				unexpected message
9	GOTO L1				
10	[BDL = FALSE]				parameter (1)
11	L!SETUP_P START TAC		SU4		(2)
12	L?REL_COMr CANCEL TAC	L2	RC1(1)	(P)	(3)
13	+CS50001(0)				state=0? (4)
14	?TIMEOUT TAC			(F)	TAC timeout
15	+PO49901(0)				
16	+UM59902				unexpected message
17	GOTO L2				

Extended Comments:
(1) The global boolean variable BDL is FALSE by point-to-point data link and TRUE by broadcasting link use.
(2) A valid SETUP PDU with an incompatible bearer capability information element is transmitted.
(3) Valid RELEASE COMPLETE PDU.
(4) The subtree CS50001(0) is used for checking the IUT state.

Reference to requirements : subclause 11.4.2.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/I/DI/N/TC10010
Identifier: TC10010
Purpose: CALLED USER TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS

Ensure that on receipt of an inpportune PDU (DISCONNECT), the IUT responds with a RELEASE PDU or a RELEASE COMPLETE PDU.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!DISC START TAC		DI2(0, 16)		inopportune PDU
3	L?RELr CANCEL TAC	L1	RL1(1)		valid RELEASE PDU
4	L!REL_COM		RC2(0, 81)	P	(1)
5	L?REL_COMr CANCEL TAC		RC1(1)	P	(1)
6	?TIMEOUT TAC			(F)	TAC timeout
7	+PO49901(0)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				

Extended Comments:
(1) Valid RELEASE COMPLETE PDU.

Reference to requirements : subclause 11.4.6.2(a)

Test Case Dynamic Behaviour	
Reference:	TBR4_L3/PS/U00/I/SU/N/TC10011
Identifier:	TC10011
Purpose:	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that on receipt of a repeated valid SETUP PDU with the same call reference as the initial SETUP PDU, the IUT does not respond to the second SETUP PDU and remains in the same state.
Default:	DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU2		SETUP
3	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	
4	L!SETUP_P START TNOAC		SU2		SETUP
5	+LOCAL_TREE2	L2			
6	L?CALL_PROCr		CP1	(P)	
7	+LOCAL_TREE2	L3			
8	?TIMEOUT TNOAC			(P)	
9	+CS59901(9, 0)				
10	+UM59902				unexpected message
11	GOTO L3				
12	?TIMEOUT TNOAC			(P)	no IUT response
13	+CS59901(25, 0)				state=25? (1)
14	+UM59902				unexpected message
15	GOTO L2				
16	L?CALL_PROCr CANCEL TAC		CP1	(P)	
17	L!SETUP_P START TNOAC		SU2		SETUP
18	+LOCAL_TREE2	L4			
19	?TIMEOUT TNOAC			(P)	no IUT response
20	+CS59901(9, 0)				state=9? (1)
21	+UM59902				unexpected message
22	GOTO L4				
23	L?ALERTr CANCEL TAC		AL1	(P)	
24	L!SETUP_P START TNOAC		SU2		SETUP
25	+LOCAL_TREE1	L5			
26	?TIMEOUT TNOAC			(P)	no IUT response
27	+CS59901(7, 0)				state=7? (1)
28	+UM59902				unexpected message
29	GOTO L5				
30	L?CONNr CANCEL TAC		CN1	(P)	
31	L!SETUP_P START TNOAC		SU2		SETUP
32	?TIMEOUT TNOAC	L6		(P)	no IUT response
33	+CS59901(8, 0)				state=8? (1)
34	+UM59902				unexpected message
35	GOTO L6				
36	?TIMEOUT TAC			(F)	T timeout

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No	Behaviour Description	L	Cref	V	C
37	+PO49901(0)				postamble to U0
38	+UM59902				unexpected message
39	GOTO L1				
40					
41	**LOCAL_TREE1**				
42	L?CONNr		CN1	(P)	
43	?TIMEOUT TNOAC	L7		(P)	
44	+CS59901(8, 0)				state=8? (1)
45	+UM59902				unexpected message
46	GOTO L7				
47					
48	**LOCAL_TREE2**				
49	+LOCAL_TREE1				
50	L?ALERTr		AL1	(P)	
51	+LOCAL_TREE1				
52	?TIMEOUT TNOAC	L8		(P)	
53	+CS59901(7, 0)				state=7? (1)
54	+UM59902				unexpected message
55	GOTO L8				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.2(d)

Test Case Dynamic Behaviour	
Reference:	TBR4_L3/PS/U00/S/ER/O/TC10012
Identifier:	TC10012
Purpose:	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS Ensure that on receipt of a PDU with an erroneous protocol discriminator coded other than '08'H, the IUT does not respond to the PDU and remains in the same state.
Default:	DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!ERROR START TNOAC		ERR1		invalid PDU (1)
3	?TIMEOUT TNOAC	L1		(P)	TNOAC timeout
4	+CS50001(0)				state=0? (2)
5	+UM59902				unexpected message
6	GOTO L1				

Extended Comments:
(1) A SETUP PDU with erroneous protocol discriminator transmitted.
(2) The subtree CS50001 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/S/ER/N/TC10015
Identifier: TC10015
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS

Ensure that on receipt of a PDU with mandatory information element missing, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!ERROR START TAC		ERR4		invalid PDU (1)
3	?REL_COM CANCEL TAC	L1	RC1(1)	(P)	(3)
4	+CS50001(0)				state=0? (2)
5	?TIMEOUT TAC			(F)	TAC timeout
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) SETUP PDU without bearer capability information element is used.
(2) The subtree CS50001 is used for checking the IUT state.
(3) Valid RELEASE COMPLETE PDU.

Reference to requirements : subclause 11.4.6.5.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/S/ER/O/TC10024
Identifier: TC10024
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 11

Ensure that on receipt of a PDU with invalid duplicated information elements, the IUT ignores the invalid duplication and processes the remaining contents of the PDU as valid.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!ERROR START TAC		ERR107		invalid SETUP
3	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	
4	+CS59901(25, 0)				state=25? (2)
5	L?CALL_PROCr CANCEL TAC		CP1	(P)	
6	+CS59901(9, 0)				state=9? (2)
7	L?ALERTr CANCEL TAC		AL1	(P)	
8	+CS59901(7, 0)				state=7? (2)
9	L?CONNr CANCEL TAC		CN1	(P)	
10	+CS59901(8, 0)				state=8? (2)
11	?TIMEOUT TAC			(F)	TAC timeout
12	+PO49901(0)				postamble to U0
13	+UM59902				unexpected message
14	GOTO L1				

Extended Comments:
(1) BDL is TRUE for a broadcast data link and FALSE for a point-to-point data link.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.4

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U00/S/ER/O/TC10026				
Identifier:	TC10026				
Purpose:	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14 Ensure that on receipt of a PDU with mandatory information element content error, the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!ERROR START TAC		ERR111		invalid SETUP (1)
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(2)
4	+CS50001(0)				state=0? (3)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) An invalid SETUP PDU with a mandatory information element content error is used. (2) Valid RELEASE COMPLETE PDU. (3) The subtree CS50001 is used for checking the IUT state. Reference to requirements : subclause 11.4.6.5.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U00/S/ER/N/TC10027				
Identifier:	TC10027				
Purpose:	INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 15 Ensure that on receipt of a PDU with unrecognised information element coded "comprehension required", the IUT responds with a RELEASE COMPLETE PDU and remains in the same state.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!ERROR START TAC		ERR109		invalid SETUP (1)
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(2)
4	+CS50001(0)				state=0? (3)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) An invalid SETUP PDU containing an unrecognized optional information element with comprehension required coded as '01'H. (2) Valid RELEASE COMPLETE PDU. (3) The subtree CS50001 is used for checking the IUT state. Reference to requirements : subclause 11.4.6.6.1					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/S/ER/N/TC10028
Identifier: TC10028
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16

Ensure that the IUT on receipt of a compatible SETUP PDU with all the mandatory information elements correctly coded and an unrecognized optional information element with comprehension not required responds with either a SETUP_ACK, CALL PROCEEDING, ALERTING or CONNECT PDU and moves to the relevant state 25, 9, 7 or 8.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	(STAT_TRANSM ::= FALSE, ECV ::= 99)				
3	L!ERROR START TAC		ERR110		invalid SETUP (1)
4	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	valid PDU
5	+CS59901(25, 0)				state=25? (2)
6	L?CALL_PROCr CANCEL TAC		CP1	(P)	valid PDU
7	+CS59901(9, 0)				state=9? (2)
8	L?ALERTr CANCEL TAC		AL1	(P)	valid PDU
9	+CS59901(7, 0)				state=7? (2)
10	L?CONNr CANCEL TAC		CN1	(P)	valid PDU
11	+CS59901(8, 0)				state=8? (2)
12	L?STATUSr [(STAT_TRANSM = FALSE) AND (STATUS.CAU.CAU_E4_CV2 = ECV)]		ST1(1)	(P)	valid STATUS PDU
13	(STAT_TRANSM ::= TRUE)				
14	GOTO L1				
15	?TIMEOUT TAC			(F)	no response
16	+PO49901(0)				postamble to U0
17	+UM59902				unexpected message
18	GOTO L1				

Extended Comments:
(1) An invalid SETUP PDU containing an unrecognized optional information element with comprehension not required coded as '80'H.
(2) The subtree CS59901 is used for checking the IUT relevant states.

Reference to requirements : subclause 11.4.6.6.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/S/ER/N/TC10029
Identifier: TC10029
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 17

Ensure that on receipt of a SETUP PDU with non-mandatory information element content error the IUT processes the PDU and its remaining contents as valid and optionally sends a STATUS PDU with cause value 100.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	(STAT_TRANSM ::= FALSE, ECV ::= 100)				
3	L!ERROR START TAC		ERR112		invalid SETUP (1)
4	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	valid PDU
5	+CS59901(25, 0)				state=25? (2)
6	L?CALL_PROCr CANCEL TAC		CP1	(P)	valid PDU
7	+CS59901(9, 0)				state=9? (2)
8	L?ALERTr CANCEL TAC		AL1	(P)	valid PDU
9	+CS59901(7, 0)				state=7? (2)
10	L?CONNr CANCEL TAC		CN1	(P)	valid PDU
11	+CS59901(8, 0)				state=8? (2)
12	L?STATUSr [(STAT_TRANSM = FALSE) AND (STATUS.CAU.CAU_E4_CV2 = ECV)]		ST1(1)	(P)	valid STATUS PDU
13	(STAT_TRANSM ::= TRUE)				
14	GOTO L1				
15	?TIMEOUT TAC			(F)	no response
16	+PO49901(0)				postamble to U0
17	+UM59902				unexpected message
18	GOTO L1				

Extended Comments:
(1) A SETUP PDU with an invalid Progress indicator information element is used.
(2) The subtree CS59901 is used for checking the expected IUT states.

Reference to requirements : subclause 11.4.6.6.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/V/SU/N/TC10037
Identifier: TC10037
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a valid SETUP PDU containing an incompatible Bearer capability information element (mandatory parameter) the IUT:
- responds with a RELEASE COMPLETE PDU.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP START TAC		SU4		(1)
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(2)
4	+CS50001(0)				state=0? (3)
5	?TIMEOUT TAC			(F)	TAC timeout
6	+PO49901(0)				
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) A valid SETUP PDU with an incompatible bearer capability information element is transmitted.
(2) Valid RELEASE COMPLETE PDU.
(3) The subtree CS50001 is used for checking the IUT state.

Reference to requirements : subclause 11.4.2.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U00/V/SU/N/TC10038
Identifier: TC10038
Purpose: INCOMING CALL HANDLING TESTS - STATE U0 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a valid SETUP PDU containing an incompatible High layer compatibility information element (optional parameter) the IUT:
- responds with a RELEASE COMPLETE PDU.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP START TAC		SU5		(1)
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(2)
4	+CS50001(0)				state=0? (3)
5	?TIMEOUT TAC			(F)	TAC timeout
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) A valid SETUP PDU with an incompatible High layer compatibility information element is transmitted.
(2) Valid RELEASE COMPLETE PDU.
(3) The subtree CS50001 is used for checking the IUT state.

Reference to requirements : subclause 11.4.2.2

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/AC/U00/V/SU/N/TC20002				
Identifier:	TC20002				
Purpose:	NULL STATE TESTS - STATE U0 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a valid SETUP PDU and enters the Call Initiated state U1.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	< IUT ! SETUP >		SU1		wait for SETUP PDU
3	START TWAIT				
4	L?SETUPr [(SETUP.BCAP = BCAPV) AND ((SU_LLC = TRUE) AND (SETUP.LLC = LLCV) OR (SU_LLC = FALSE) AND (SETUP.LLC = EMPTY)) AND ((SU_HLC = TRUE) AND (SETUP.HLC = HLCV) OR (SU_HLC = FALSE) AND (SETUP.HLC = EMPTY))] (CREF ::= SETUP.CR.CR_R) CANCEL TWAIT	L1	SU1	(P)	valid SETUP PDU
5	+CS59901(1, 1)				state=1? (1)
6	?TIMEOUT TWAIT			I	no response
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/V/CP/N/TC10101				
Identifier:	TC10101				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CALL PROCEEDING PDU the IUT enters the Outgoing Call Proceeding state U3.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	L!CALL_PROC		CP2		(1)
3	+CS59901(3, 1)				state=3? (2)
Extended Comments: (1) Valid CALL PROCEEDING PDU. Reference to requirements : subclause 11.4.1.3.1					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U01/V/RC/N/TC10102
Identifier: TC10102
Purpose: CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30101				preamble to U1
2	L!REL_COM START TNOAC		RC2(1, 65)		(1)
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(1)				state=0? (2)
5	+UM59902				unexpected message
6	GOTO L1				

Extended Comments:
(1) Valid RELEASE COMPLETE PDU.

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U01/V/RL/N/TC10103
Identifier: TC10103
Purpose: CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30101				preamble to U1
2	L!REL START TAC		RL3(1, 16)		valid RELEASE PDU
3	L?REL_COMr CANCEL TAC	L1	RC1(0)	(P)	(1)
4	+CS50001(1)				state=0? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) Valid RELEASE COMPLETE PDU.
(2) The subtree CS50001(1) is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/V/SA/N/TC10104				
Identifier:	TC10104				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a SETUP ACKNOWLEDGE PDU the IUT enters the Overlap Sending state U2.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	L!SETUP_ACK START TNOAC		SUA2		(1)
3	?TIMEOUT TNOAC	L1		(P)	
4	+CS59901(2, 1)				state=2? (2)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) Valid SETUP ACKNOWLEDGE PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/V/ST/N/TC10105				
Identifier:	TC10105				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	L!STATUS START TNOAC		ST2(1, 111, 0)		
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(1)				state=0? (1)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) The subtree CS50001(1) is used for checking the IUT state. Reference to requirements : subclause 11.4.6.8(c)					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U01/I/CA/N/TC10107
Identifier: TC10107
Purpose: CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS

Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or STATUS ENQUIRY PDU and remains in the same state.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30101				preamble to U1
2	L!CONN_ACK START TAC		CA3		inopportune PDU
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 1) AND ((STATUS.CAU.CAU_E4_CV2 = 98) OR (STATUS.CAU.CAU_E4_CV2 = 101))] CANCEL TAC	L1	ST1(0)	(P)	valid STATUS PDU
4	+CS59901(1, 1)				
5	L?ST_ENQr CANCEL TAC		SQ1(0)	(P)	
6	L!STATUS		ST2(1, 30, 1)		
7	+CS59901(1, 1)				state = 1?
8	?TIMEOUT TAC			(F)	no response
9	+PO49901(1)				postamble to U0
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/S/ER/O/TC10115				
Identifier:	TC10115				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 13 Ensure that on receipt of a CALL PROCEEDING PDU with mandatory information element missing the IUT only returns a STATUS PDU with cause value 96 and remains in the same state.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	L!ERROR START TAC		ERR20		(1)
3	L?STATUSr [(STATUS.CAU.CAU_E4_CV2 = 96) AND (STATUS.CST.CST_CSV2 = 1)] CANCEL TAC	L1	ST1(0)	(P)	
4	+CS59901(1, 1)				state=1? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) Valid CALL PROCEEDING PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.6.5.1					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/S/ER/O/TC10116				
Identifier:	TC10116				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14 Ensure that the IUT responds to the receipt of a CALL PROCEEDING PDU with mandatory information element with content error by sending a STATUS PDU with cause value 100 and remains in the same state.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	L!ERROR START TAC		ERR21		invalid PDU (1)
3	L?STATUSr CANCEL TAC	L1	ST3(0, 100, 1)	(P)	valid STATUS PDU
4	+CS59901(1, 1)				state=1?
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) An invalid CALL PROCEEDING PDU with an invalid channel identification information element is used. Reference to requirements : subclause 11.4.6.5.2					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U01/S/ER/N/TC10120
Identifier: TC10120
Purpose: CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS

Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30101				preamble to U1
2	L!ERROR START TAC		ERR7		invalid PDU (1)
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 1) AND ((STATUS.CAU.CAU_E4_CV2 = 97) OR (STATUS.CAU.CAU_E4_CV2 = 98))] CANCEL TAC	L1	ST1(0)	(P)	valid STATUS PDU
4	+CS59901(1, 1)				
5	L?ST_ENQr CANCEL TAC		SQ1(0)	(P)	
6	L!STATUS		ST2(1, 30, 1)		
7	+CS59901(1, 1)				state = 1?
8	?TIMEOUT TAC			(F)	no response
9	+PO49901(1)				postamble to U0
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:
(1) PDU with invalid message type is used.

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U01/I/RC/I/TC10125				
Identifier:	TC10125				
Purpose:	CALL INITIATED STATE TESTS - STATE U1 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond and remains in the same state.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30101				preamble to U1
2	(C ::= BIT_TO_INT (CREF) + 1, CREF ::= INT_TO_BIT (C, 7))				call ref not in use
3	L!REL_COMr START TNOAC		RC2(1, 16)		(1)
4	(C ::= BIT_TO_INT (CREF) - 1, CREF ::= INT_TO_BIT (C, 7))				call ref in use
5	?TIMEOUT TNOAC	L1		(P)	no response
6	+CS59901(1, 1)				state=1? (2)
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) Valid RELEASE COMPLETE PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.6.2(c)					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U02/V/AL/N/TC10201				
Identifier:	TC10201				
Purpose:	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of an ALERTING PDU the IUT enters the Call Delivered state U4.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30201				preamble to U2
2	L!ALERT		AL2		valid ALERTING PDU
3	+CS59901(4, 1)				state=4? (1)
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.4					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U02/V/CN/N/TC10202				
Identifier:	TC10202				
Purpose:	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30201				preamble to U2
2	[BCA = FALSE]				parameter (1)
3	L!CONN		CN2		valid CONNECT PDU
4	+CS59901(10, 1)				state=10? (2)
5	[BCA = TRUE]				
6	L!CONN START TAC		CN2		valid CONNECT PDU
7	L?CONN_ACKr CANCEL TAC	L1	CA1	(P)	ignore
8	+CS59901(10, 1)				state=10? (2)
9	?TIMEOUT TAC			(F)	no response
10	+PO49901(1)				postamble to U0
11	+UM59902				unexpected message
12	GOTO L1				
Extended Comments: (1) The test suite parameter BCA has the value TRUE if the sending of CONNECT ACKNOWLEDGE PDU is implemented. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U02/V/CP/N/TC10203				
Identifier:	TC10203				
Purpose:	OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CALL PROCEEDING PDU the IUT enters the Outgoing Call Proceeding state U3.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30201				preamble to U2
2	L!CALL_PROC		CP2		(1)
3	+CS59901(3, 1)				state=3? (2)
Extended Comments: (1) Valid CALL PROCEEDING PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.3.2					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U02/V/DI/N/TC10204
Identifier: TC10204
Purpose: OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30201				preamble to U2
2	L!DISC START TAC		DI2(1, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U02/S/ER/O/TC10222
Identifier: TC10222
Purpose: OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 13

Ensure that on receipt of a DISCONNECT PDU with mandatory information element missing the IUT returns a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30201				preamble to U2
2	L!ERROR START TAC		ERR50(1)		invalid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (1)
5	?TIMEOUT TAC			(F)	
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.5.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U02/S/ER/O/TC10223
Identifier: TC10223
Purpose: OVERLAP SENDING STATE TESTS - STATE U2 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 14

Ensure that the IUT responds to the receipt of a DISCONNECT PDU with mandatory information element with content error by sending a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30201				preamble to U2
2	L!ERROR START TAC		ERR53(1)		invalid PDU (1)
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) An invalid DISCONNECT PDU with an invalid cause information element is used.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.5.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/AC/U02/V/DI/N/TC20203
Identifier: TC20203
Purpose: OVERLAP SENDING STATE TESTS - STATE U2 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30201				preamble to U2
2	< IUT ! DISC >		DI1(0)		
3	START TWAIT				(1)
4	L?DISCr CANCEL TWAIT	L1	DI1(0)	(P)	valid DISCONNECT PDU
5	+CS59901(11, 1)				state=11? (2)
6	?TIMEOUT TWAIT			(I)	no response
7	+PO49901(1)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				

Extended Comments:
(1) Wait for a DISCONNECT PDU.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/AC/U02/V/IN/N/TC20204				
Identifier:	TC20204				
Purpose:	OVERLAP SENDING STATE TESTS - STATE U2 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits an INFORMATION PDU and remains in the same state.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30201				preamble to U2
2	< IUT ! INFO >		IN1(0)		
3	START TWAIT				(1)
4	L?INFOr CANCEL TWAIT	L1	IN1(0)	(P)	
5	+CS59901(2, 1)				state=2? (2)
6	?TIMEOUT TWAIT			(I)	no response
7	+PO49901(1)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				
Extended Comments: (1) Wait for an INFORMATION PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U03/V/AL/N/TC10301				
Identifier:	TC10301				
Purpose:	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of an ALERTING PDU the IUT enters the Call Delivered state U4.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30301				preamble to U3
2	L!ALERT		AL2		valid ALERTING PDU
3	+CS59901(4, 1)				state=4? (1)
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.1.4					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U03/V/CN/N/TC10302
Identifier: TC10302
Purpose: OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30301				preamble to U3
2	[BCA = FALSE]				parameter (1)
3	L!CONN		CN2		valid CONNECT PDU
4	+CS59901(10, 1)				state=10? (2)
5	[BCA = TRUE]				
6	L!CONN START TAC		CN2		valid CONNECT PDU
7	L?CONN_ACKr CANCEL TAC	L1	CA1	(P)	(3)
8	+CS59901(10, 1)				state=10? (2)
9	?TIMEOUT TAC			(F)	TAC timeout
10	+PO49901(1)				postamble to U0
11	+UM59902				unexpected message
12	GOTO L1				

Extended Comments:
(1) The test suite parameter BCA has the value TRUE if the sending of CONNECT ACKNOWLEDGE PDU is supported.
(2) The subtree CS59901 is used for checking the IUT state.
(3) Valid CONNECT ACKNOWLEDGE PDU.

Reference to requirements : subclause 11.4.1.5

Test Case Dynamic Behaviour	
Reference:	TBR4_L3/PS/U03/V/DI/N/TC10303
Identifier:	TC10303
Purpose:	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
Default:	DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30301				preamble to U3
2	L!DISC START TAC		DI2(1, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour	
Reference:	TBR4_L3/AC/U03/V/DI/N/TC20301
Identifier:	TC20301
Purpose:	OUTGOING CALL PROCEEDING STATE TESTS - STATE U3 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.
Default:	DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30301				preamble to U3
2	< IUT ! DISC >		DI1(0)		
3	START TWAIT				(1)
4	L?DISCr CANCEL TWAIT	L1	DI1(0)	(P)	valid DISCONNECT PDU
5	+CS59901(11, 1)				state=11? (2)
6	?TIMEOUT TWAIT			(I)	no response
7	+PO49901(1)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				

Extended Comments:
(1) Wait for a DISCONNECT PDU.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.3

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U04/V/CN/N/TC10401
Identifier: TC10401
Purpose: CALL DELIVERED STATE TESTS - STATE U4 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that on receipt of a CONNECT PDU the IUT enters the Active state U10.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30401				preamble to U4
2	[BCA = FALSE]				parameter (1)
3	L!CONN		CN2		valid CONNECT PDU
4	+CS59901(10, 1)				state=10? (2)
5	[BCA = TRUE]				
6	L!CONN START TAC		CN2		valid CONNECT PDU
7	L?CONN_ACKr CANCEL TAC	L1	CA1	(P)	(3)
8	+CS59901(10, 1)				state=10? (2)
9	?TIMEOUT TAC			(F)	TAC timeout
10	+PO49901(1)				postamble to U0
11	+UM59902				unexpected message
12	GOTO L1				

Extended Comments:
(1) The test suite parameter BCA has the value TRUE if the sending of CONNECT ACKNOWLEDGE PDU is supported.
(2) The subtree CS59901 is used for checking the IUT state.
(3) Valid CONNECT ACKNOWLEDGE PDU.

Reference to requirements : subclause 11.4.1.5

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U04/V/DI/N/TC10402				
Identifier:	TC10402				
Purpose:	CALL DELIVERED STATE TESTS - STATE U4 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30401				preamble to U4
2	L!DISC START TAC		DI2(1, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.3.4.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/AC/U04/V/DI/N/TC20401				
Identifier:	TC20401				
Purpose:	CALL DELIVERED STATE TESTS - STATE U4 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30401				preamble to U4
2	< IUT ! DISC >		DI1(0)		
3	START TWAIT				(1)
4	L?DISCr CANCEL TWAIT	L1	DI1(0)	(P)	valid DISCONNECT PDU
5	+CS59901(11, 1)				state=11? (2)
6	?TIMEOUT TWAIT			(I)	no response
7	+PO49901(1)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				
Extended Comments: (1) Wait for a DISCONNECT PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.3.3					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U07/V/DI/N/TC10701
Identifier: TC10701
Purpose: CALL RECEIVED STATE TESTS - STATE U7 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS

Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30701				preamble to U7
2	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U07/S/ER/O/TC10718
Identifier: TC10718
Purpose: CALL RECEIVED STATE TESTS - STATE U7 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16

Ensure that on receipt of a DISCONNECT PDU with unrecognised information element (coded comprehension not required) the IUT sends a RELEASE PDU and enters the Release Request state U19.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30701				preamble to U7
2	L!ERROR START TAC		ERR52(0, 16)		invalid PDU (1)
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) An invalid DISCONNECT PDU containing an unrecognized information element with comprehension not required coded as '80'H.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.6.1

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U08/V/CA/N/TC10801				
Identifier:	TC10801				
Purpose:	CONNECT REQUEST STATE TEST - STATE U8 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a CONNECT ACKNOWLEDGE PDU the IUT enters the Active state U10.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30801				preamble to U8
2	L!CONN_ACK		CA1		(1)
3	+CS59901(10, 0)				state=10? (2)

Extended Comments:
(1) Valid CONNECT ACKNOWLEDGE PDU.
(2) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.2.7

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U08/V/DI/N/TC10802				
Identifier:	TC10802				
Purpose:	CONNECT REQUEST STATE TEST - STATE U8 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30801				preamble to U8
2	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U09/V/DI/N/TC10901
Identifier: TC10901
Purpose: INCOMING CALL PROCEEDING STATE TEST - STATE U9 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that the IUT responds to a DISCONNECT PDU with a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30901				preamble to U9
2	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour

Reference: TBR3_L4/PS/U10/V/DI/N/TC11001
Identifier: TC11001
Purpose: ACTIVE STATE TESTS - STATE U10 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31001				preamble to U10
2	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U10/V/NO/N/TC11003				
Identifier:	TC11003				
Purpose:	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a NOTIFY PDU the IUT does not respond and remains in the same state.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	L!NOTIFY START TNOAC		NO2(0)		valid NOTIFY PDU
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS59901(10, 0)				state=10? (1)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.7					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U10/V/RC/N/TC11004				
Identifier:	TC11004				
Purpose:	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	L!REL_COM START TNOAC		RC2(0, 16)		(1)
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (2)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) Valid RELEASE COMPLETE PDU. (2) The subtree CS50001(0) is used for checking the IUT state. Reference to requirements : subclause 11.4.6.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U10/V/RL/N/TC11005				
Identifier:	TC11005				
Purpose:	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	L!REL START TAC		RL3(0, 16)		valid RELEASE PDU
3	L?REL_COMr CANCEL TAC	L1	RC1(1)	(P)	(1)
4	+CS50001(0)				state=0? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) Valid RELEASE COMPLETE PDU. (2) The subtree CS50001(0) is used for checking the IUT state. Reference to requirements : subclause 11.4.6.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U10/V/ST/N/TC11007				
Identifier:	TC11007				
Purpose:	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	L!STATUS START TNOAC		ST2(0, 111, 0)		
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (1)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) The subtree CS50001(0) is used for checking the IUT state. Reference to requirements : subclause 11.4.6.8(c)					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U10/I/CN/N/TC11008				
Identifier:	TC11008				
Purpose:	ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 100, or with a STATUS ENQUIRY PDU and that no change of state occurs.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	L!CONN START TAC		CN3		inopportune PDU
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 10) AND ((STATUS.CAU.CAU_E4_CV2 = 98) OR (STATUS.CAU.CAU_E4_CV2 = 101))] CANCEL TAC	L1	ST1(1)	(P)	valid STATUS PDU
4	+CS59901(10, 0)				
5	L?ST_ENQr CANCEL TAC		SQ1(1)	(P)	
6	L!STATUS		ST2(0, 30, 10)		
7	+CS59901(10, 0)				state = 10?
8	?TIMEOUT TAC			(F)	no response
9	+PO49901(0)				postamble to U0
10	+UM59902				unexpected message
11	GOTO L1				
Extended Comments: Reference to requirements : subclause 11.4.6.3					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U10/S/ER/N/TC11021
Identifier: TC11021
Purpose: ACTIVE STATE TEST - STATE U10 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS

Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.

Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31001				preamble to U10
2	L!ERROR START TAC		ERR5		invalid PDU (1)
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 10) AND ((STATUS.CAU.CAU_E4_CV2 = 97) OR (STATUS.CAU.CAU_E4_CV2 = 98))] CANCEL TAC	L1	ST1(1)	(P)	valid STATUS PDU
4	+CS59901(10, 0)				
5	L?ST_ENQr CANCEL TAC		SQ1(1)	(P)	
6	L!STATUS		ST2(0, 30, 10)		
7	+CS59901(10, 0)				state = 10?
8	?TIMEOUT TAC			(F)	no response
9	+PO49901(0)				
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:
(1) A PDU with invalid message type is used.

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/AC/U10/V/DI/N/TC21003				
Identifier:	TC21003				
Purpose:	ACTIVE STATE TEST - STATE U10 - ACTIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that the IUT transmits a DISCONNECT PDU and enters the Disconnect Request state U11.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31001				preamble to U10
2	< IUT ! DISC >		DI1(1)		
3	START TWAIT				(1)
4	L?DISCr CANCEL TWAIT	L1	DI1(1)	(P)	valid DISCONNECT PDU
5	+CS59901(11, 0)				state=11? (2)
6	?TIMEOUT TWAIT			(I)	no response
7	+PO49901(0)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L1				
Extended Comments: (1) Wait for a DISCONNECT PDU. (2) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.3.3					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U11/V/DI/N/TC11101				
Identifier:	TC11101				
Purpose:	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31101				preamble to U11
2	L!DISC START TAC		DI2(1, 16)		valid DISCONNECT PDU
3	L?RELr CANCEL TAC	L1	RL1(0)	(P)	valid RELEASE PDU
4	+CS59901(19, 1)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.3.4.2					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U11/V/NO/N/TC11103				
Identifier:	TC11103				
Purpose:	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a NOTIFY PDU the IUT does not respond or returns a STATUS PDU and remains in the same state.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31101				preamble to U11
2	L!NOTIFY START TNOAC		NO2(1)		
3	L?STATUSr [STATUS.CST.CST_CSV2 = 11] CANCEL TNOAC	L1	ST1(0)	(P)	valid STATUS PDU
4	+CS59901(11, 1)				state=11? (1)
5	?TIMEOUT TNOAC			(P)	no response
6	+CS59901(11, 1)				state=11? (1)
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) The subtree CS59901 is used for checking the IUT state. Reference to requirements : subclause 11.4.7					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U11/V/RL/N/TC11105				
Identifier:	TC11105				
Purpose:	DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT responds with a RELEASE COMPLETE PDU and enters the Null state U0.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31101				preamble to U11
2	L!REL START TAC		RL3(1, 16)		valid RELEASE PDU
3	L?REL_COMr CANCEL TAC	L1	RC1(0)	(P)	(1)
4	+CS50001(1)				state=0? (2)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				
Extended Comments: (1) Valid RELEASE COMPLETE PDU. (2) The subtree CS50001(1) is used for checking the IUT state. Reference to requirements : subclause 11.4.3.3					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U11/I/CP/N/TC11107
Identifier: TC11107
Purpose: DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR
INOPPORTUNE TEST EVENTS

Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or with a STATUS ENQUIRY PDU, and remains in the same state.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR31101				preamble to U11
2	L!CALL_PROC START TAC		CP2		inopportune PDU
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 11) AND ((STATUS.CAU.CAU_E4_CV2 = 98) OR (STATUS.CAU.CAU_E4_CV2 = 101))] CANCEL TAC	L1	ST1(0)	(P)	valid STATUS PDU
4	+CS59901(11, 1)				
5	L?ST_ENQr CANCEL TAC		SQ1(0)	(P)	
6	L!STATUS		ST2(1, 30, 11)		
7	+CS59901(11, 1)				state = 11?
8	?TIMEOUT TAC			(F)	no response
9	+PO49901(1)				postamble to U0
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U11/S/ER/O/TC11118
Identifier: TC11118
Purpose: DISCONNECT REQUEST STATE TESTS - STATE U11 - PASSIVE IUT BEHAVIOUR
SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16

Ensure that on receipt of a RELEASE PDU with unrecognized information element (coded comprehension not required) the IUT sends a RELEASE COMPLETE PDU and enters the Null state U0.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR31101				preamble to U11
2	L!ERROR START TAC		ERR66(1)		invalid PDU (1)
3	L?REL_COMr CANCEL TAC	L1	RC1(0)	(P)	(2)
4	+CS50001(1)				state=0? (3)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(1)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) An invalid RELEASE PDU containing an unrecognized information element with comprehension not required coded as '80'H.
(2) Valid RELEASE COMPLETE PDU.
(3) The subtree CS50001(1) is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.6.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U19/V/RC/N/TC11903
Identifier: TC11903
Purpose: RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that on receipt of a RELEASE COMPLETE PDU the IUT does not respond but returns to the Null state U0.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31901				preamble to U19
2	L!REL_COM START TNOAC		RC2(0, 16)		(1)
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (2)
5	+UM59902				unexpected message
6	GOTO L1				

Extended Comments:
(1) Valid RELEASE COMPLETE PDU.
(2) The subtree CS50001(0) is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.3

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U19/V/RL/N/TC11904				
Identifier:	TC11904				
Purpose:	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a RELEASE PDU the IUT does not respond and enters the Null state U0. This is a test of RELEASE collision handling.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31901				preamble to U19
2	L!REL START TNOAC		RL3(0, 16)		valid RELEASE PDU
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (1)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) The subtree CS50001(0) is used for checking the IUT state. Reference to requirements : subclause 11.4.3.5					

Test Case Dynamic Behaviour					
Reference:	TBR4_L3/PS/U19/V/ST/N/TC11906				
Identifier:	TC11906				
Purpose:	RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR VALID TEST EVENTS Ensure that on receipt of a STATUS PDU specifying the Null state N0, the IUT enters the Null state U0.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR31901				preamble to U19
2	L!STATUS START TNOAC		ST2(0, 111, 0)		
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (1)
5	+UM59902				unexpected message
6	GOTO L1				
Extended Comments: (1) The subtree CS50001(0) is used for checking the IUT state. Reference to requirements : subclause 11.4.6.8(c)					

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U19/I/CP/N/TC11908
Identifier: TC11908
Purpose: RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR INOPPORTUNE TEST EVENTS

Ensure that the IUT responds to an inopportune PDU with a STATUS PDU with cause value 98 or 101, or with a STATUS ENQUIRY PDU and remains in the same state.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31901				preamble to U19
2	L!CALL_PROC START TAC		CP3		inopportune PDU
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 19) AND ((STATUS.CAU.CAU_E4_CV2 = 98) OR (STATUS.CAU.CAU_E4_CV2 = 101))] CANCEL TAC	L1	ST1(1)		valid STATUS PDU
4	L!REL_COM		RC2(0, 16)	P	
5	L?ST_ENQr CANCEL TAC		SQ1(1)	(P)	
6	L!STATUS		ST2(0, 30, 19)		
7	+CS59901(19, 0)				state = 19?
8	?TIMEOUT TAC			(F)	no response
9	L!REL_COM		RC2(0, 16)		
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U19/S/ER/N/TC11909
Identifier: TC11909
Purpose: RELEASE REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR SYNTACTICALLY INVALID TEST EVENTS

Ensure that the IUT responds to a syntactically invalid message type with a STATUS PDU with cause value 98 or 97, or with a STATUS ENQUIRY PDU and remains in the same state.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31901				preamble to U19
2	L!ERROR START TAC		ERR5		invalid PDU (1)
3	L?STATUSr [(STATUS.CST.CST_CSV2 = 19) AND ((STATUS.CAU.CAU_E4_CV2 = 97) OR (STATUS.CAU.CAU_E4_CV2 = 98))] CANCEL TAC	L1	ST1(1)		valid STATUS PDU
4	L!REL_COM		RC2(0, 16)	P	
5	L?ST_ENQr CANCEL TAC		SQ1(1)	(P)	
6	L!STATUS		ST2(0, 30, 19)		
7	+CS59901(19, 0)				state = 19?
8	?TIMEOUT TAC			(F)	no response
9	L!REL_COM		RC2(0, 16)		
10	+UM59902				unexpected message
11	GOTO L1				

Extended Comments:
(1) A PDU with invalid message type is used.

Reference to requirements : subclause 11.4.6.3

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U19/S/ER/O/TC11920
Identifier: TC11920
Purpose: DISCONNECT REQUEST STATE TESTS - STATE U19 - PASSIVE IUT BEHAVIOUR
SYNTACTICALLY INVALID TEST EVENTS - ERROR CATEGORY 16

Ensure that on receipt of a RELEASE COMPLETE PDU with unrecognized information element (coded comprehension not required) the IUT does not respond and enters to the Null state U0.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31901				preamble to U19
2	L!ERROR START TNOAC		ERR81(0)		invalid PDU (1)
3	?TIMEOUT TNOAC	L1		(P)	no response
4	+CS50001(0)				state=0? (2)
5	+UM59902				unexpected message
6	GOTO L1				

Extended Comments:
(1) An invalid RELEASE COMPLETE PDU containing an unrecognized optional information element with comprehension not required coded as '80'H.
(2) The subtree CS50001(0) is used for checking the IUT state.

Reference to requirements : subclause 11.4.6.6.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U25/V/DI/N/TC12501
Identifier: TC12501
Purpose: OVERLAP RECEIVING STATE TESTS - STATE U25 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that on receipt of a DISCONNECT PDU the IUT responds with a RELEASE PDU and enters the Release Request state U19.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR32501				preamble to U25
2	L!DISC START TAC		DI2(0, 16)		
3	L?RELr CANCEL TAC	L1	RL1(1)	(P)	valid RELEASE PDU
4	+CS59901(19, 0)				state=19? (1)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclause 11.4.3.4.2

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/U25/V/IN/N/TC12503
Identifier: TC12503
Purpose: OVERLAP RECEIVING STATE TESTS - STATE U25 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensure that on receipt of an INFORMATION PDU with sufficient called number information the IUT responds with either a CALL PROCEEDING, ALERTING or CONNECT PDU and moves to the relevant state Incoming Call Proceeding U9, Call Received U7 or Connect Request U8.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR32501				preamble to U25
2	L!INFO START TAC		IN3(0)		valid INFORMATION PDU
3	L?CALL_PROCr CANCEL TAC	L1	CP1	(P)	
4	+CS59901(9, 0)				state=9? (1)
5	L?ALERTr CANCEL TAC		AL1	(P)	
6	+CS59901(7, 0)				state=7? (1)
7	L?CONNr CANCEL TAC		CN1	(P)	
8	+CS59901(8, 0)				state=8? (1)
9	?TIMEOUT TAC			(F)	no response
10	+PO49901(0)				postamble to U0
11	+UM59902				unexpected message
12	GOTO L1				

Extended Comments:
(1) The subtree CS59901 is used for checking the IUT state.

Reference to requirements : subclauses 11.4.2.4, 11.4.2.5.1

Test Case Dynamic Behaviour

Reference: TBR4_L3/PS/R00/V/RS/N/TC19003
Identifier: TC19003
Purpose: GLOBAL CALL REF. - STATE R0 - PASSIVE IUT BEHAVIOUR
VALID TEST EVENTS

Ensures that on receipt of a RESTART PDU the specified channel is returned to the Idle condition, the Call Reference is returned to the Null state and a RESTART ACKNOWLEDGE PDU is sent.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR31001				preamble to U10
2	L!RESTART START TAC(120)		RST5(0)		(1)
3	L?RESTART_ACKr CANCEL TAC	L1	RSA6(1)	(P)	(2)
4	+CS50001(0)				(3)
5	?TIMEOUT TAC			(F)	no response
6	+PO49901(0)				postamble to U0
7	+UM59902				unexpected message
8	GOTO L1				

Extended Comments:
(1) Set the B-channel to be restarted equal to the B-channel used by the IUT.
(2) Valid RESTART ACKNOWLEDGE PDU.
(3) The test step CS50001(0) is used for checking the IUT state U0.

Reference to requirements : subclause 11.4.8

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U00/V/PR/A/PR30001				
Identifier:	PR30001				
Purpose:	to bring the IUT to the state U0.				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	(bch_num ::= CH_NUM)				
2	L!DL_REL_RQ START TAC				layer2 release
3	L?DL_REL_CO CANCEL TAC			(P)	UA or DM received (1)
4	L!DL_EST_RQ START TAC				(2)
5	L?DL_EST_CO CANCEL TAC	L1		(P)	UA received (3)
6	L?DL_REL_IN START TNOAC				DM received (4)
7	L?DL_EST_IN CANCEL TAC, CANCEL TNOAC			(P)	(5)
8	?TIMEOUT TNOAC				
9	L!DL_EST_RQ				re-establishment
10	GOTO L1				
11	L?OTHERWISE			I	
12	L?DL_EST_IN			(P)	(6)
13	GOTO L1				(7)
14	?TIMEOUT TAC			I	no response
15	L?OTHERWISE			I	invalid event
16	?TIMEOUT TAC			I	no response
17	L?OTHERWISE			I	invalid event

Extended Comments:
(1) layer 2 released.
(2) This DL-ESTABLISH-REQUEST primitive is issued in any case and requires a confirmation by means of DL-ESTABLISH-CONFIRM primitive. The layer2 of the test tool will send SABME from either states 4, 7 or 8.
(3) UA received and DL-ESTABLISH-CONFIRM primitive is issued to layer3 (Data link established).
(4) IUT still busy.
(5) SABME received by layer2, DL-ESTABLISH-INDICATION primitive is issued to layer3 and UA is sent by layer2 (Data link established).
(6) SABME received by layer2 (state 4.0), DL-ESTABLISH-INDICATION primitive is issued to layer3 and UA is sent by layer2 (Data link established).
(7) Since the DL-ESTABLISH-REQUEST primitive is already issued, DL-ESTABLISH-CONFIRM primitive is required.
The layer 2 of the IUT shall have a TEI assigned value before the execution of this preamble.
The procedure to assign the TEI value to the IUT is matter for the test laboratory.

Test Step Dynamic Behaviour

Reference: TBR4_L3/PR/U01/V/PR/A/PR30101
Identifier: PR30101
Purpose: to bring the IUT to the state U1.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	< IUT ! SETUP >		SU9		wait for SETUP PDU
3	(bch_num ::= CH_NUM) START TWAIT				
4	L?SETUPr (CREF ::= SETUP.CR.CR_R, bch_num ::= SETUP.CHI.CHI_E5_CH2) CANCEL TWAIT	L1	SU9	(P)	bch_num is changed
5	[BXINF AND SETUP.SCI = EMPTY]			(P)	
6	[BXINF AND NOT SETUP.SCI = EMPTY]			F	
7	L?SETUPr (CREF ::= SETUP.CR.CR_R) CANCEL TWAIT		SU1	(P)	valid SETUP PDU
8	[BXINF AND SETUP.SCI = EMPTY]			(P)	
9	[BXINF AND NOT SETUP.SCI = EMPTY]			F	
10	?TIMEOUT TWAIT			I	
11	+UM59902				unexpected message
12	GOTO L1				

Extended Comments:

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U02/V/PR/A/PR30201				
Identifier:	PR30201				
Purpose:	to bring the IUT to the state U2.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	< IUT ! SETUP >		SU9		wait for SETUP PDU
3	(bch_num ::= CH_NUM) START TWAIT				
4	L?SETUPr (CREF ::= SETUP.CR.CR_R, bch_num ::= SETUP.CHI.CHI_E5_CH2) CANCEL TWAIT	L1	SU9	(P)	bch_num is changed
5	[BXINF AND SETUP.SCI = EMPTY]			(P)	
6	L!SETUP_ACK		SUA2		(1)
7	[BXINF AND NOT SETUP.SCI = EMPTY]			F	
8	L?SETUPr (CREF ::= SETUP.CR.CR_R) CANCEL TWAIT		SU1	(P)	valid SETUP PDU
9	[BXINF AND SETUP.SCI = EMPTY]			(P)	
10	L!SETUP_ACK		SUA2		(1)
11	[BXINF AND NOT SETUP.SCI = EMPTY]			F	
12	?TIMEOUT TWAIT			I	no response
13	+UM59902				unexpected message
14	GOTO L1				

Extended Comments:
(1) Valid SETUP ACKNOWLEDGE PDU.

Test Step Dynamic Behaviour

Reference: TBR4_L3/PR/U03/V/PR/A/PR30301
Identifier: PR30301
Purpose: to bring the IUT to the state U3.
Default: DF69901(1)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	< IUT ! SETUP >		SU9		wait for SETUP PDU
3	(bch_num ::= CH_NUM) START TWAIT				
4	L?SETUPr (CREF ::= SETUP.CR.CR_R, bch_num ::= SETUP.CHI.CHI_E5_CH2) CANCEL TWAIT	L1	SU9	(P)	bch_num is changed
5	[EBS]				
6	L!CALL_PROC		CP2		(1)
7	[NOT EBS]				
8	L!SETUP_ACK START TWAIT		SUA2		
9	< IUT ! INFO >		IN1(0)		(2)
10	L?INFOr CANCEL TWAIT	L2	IN1(0)	(P)	valid INFORMATION PDU
11	L!CALL_PROC		CP2		(1)
12	?TIMEOUT TWAIT			(I)	no response
13	+PO49901(1)				postamble to U0
14	+UM59902				unexpected message
15	GOTO L2				
16	L?SETUPr (CREF ::= SETUP.CR.CR_R) CANCEL TWAIT		SU1	(P)	valid SETUP PDU
17	[EBS]				
18	L!CALL_PROC		CP2		(1)
19	[NOT EBS]				
20	L!SETUP_ACK START TWAIT		SUA2		
21	< IUT ! INFO >		IN1(0)		(2)
22	L?INFOr CANCEL TWAIT	L3	IN1(0)	(P)	valid INFORMATION PDU
23	L!CALL_PROC		CP2		(1)
24	?TIMEOUT TWAIT			(I)	no response
25	+PO49901(1)				postamble to U0
26	+UM59902				unexpected message
27	GOTO L3				
28	?TIMEOUT TWAIT			I	no response
29	+UM59902				unexpected message
30	GOTO L1				

Extended Comments:
(1) Wait for a CALL PROCEEDING PDU.
(2) Wait for an INFORMATION PDU.

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U04/V/PR/A/PR30401				
Identifier:	PR30401				
Purpose:	to bring the IUT to the state U4.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30301				preamble to U3
2	L!ALERT		AL2		valid ALERTING PDU
Extended Comments:					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U07/V/PR/A/PR30701				
Identifier:	PR30701				
Purpose:	to bring the IUT to the state U7.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU2		SETUP (1)
3	L?ALERTr CANCEL TAC	L1	AL1	(P)	valid ALERTING PDU
4	L?CALL_PROCr START TAC		CP1	(P)	(2)
5	L?ALERTr CANCEL TAC	L2	AL1	(P)	valid ALERTING PDU
6	?TIMEOUT TAC			(F)	no response
7	+PO49901(0)				postamble to U0
8	+UM59902				unexpected message
9	GOTO L2				
10	?TIMEOUT TAC			(F)	no response
11	+PO49901(0)				
12	+UM59902				unexpected message
13	GOTO L1				
Extended Comments:					
(1) A valid SETUP PDU with the sending complete information element is transmitted.					
(2) Valid CALL PROCEEDING PDU.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U08/V/PR/A/PR30801				
Identifier:	PR30801				
Purpose:	to bring the IUT to the state U8.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!SETUP_P START TWAIT		SU2		SETUP (1)
3	< IUT ! CONN >		CN1		wait for CONNECT PDU
4	L?CONNr CANCEL TWAIT	L1	CN1	(P)	valid CONNECT PDU
5	L?ALERTr		AL1		valid ALERTING PDU
6	L?CONNr CANCEL TWAIT	L2	CN1	(P)	valid CONNECT PDU
7	?TIMEOUT TWAIT			(I)	no response
8	+PO49901(0)				postamble to U0
9	+UM59902				unexpected message
10	GOTO L2				
11	L?CALL_PROCr		CP1		(2)
12	L?CONNr CANCEL TWAIT	L3	CN1	(P)	valid CONNECT PDU
13	L?ALERTr		AL1		valid ALERTING PDU
14	L?CONNr CANCEL TWAIT	L4	CN1	(P)	valid CONNECT PDU
15	?TIMEOUT TWAIT			(I)	no response
16	+PO49901(0)				postamble to U0
17	+UM59902				unexpected message
18	GOTO L4				
19	?TIMEOUT TWAIT			(I)	no response
20	+PO49901(0)				postamble to U0
21	+UM59902				unexpected message
22	GOTO L3				
23	?TIMEOUT TWAIT			(I)	no response
24	+PO49901(0)				postamble to U0
25	+UM59902				unexpected message
26	GOTO L1				

Extended Comments:
(1) A valid SETUP PDU with the sending complete information element is transmitted.
(2) Valid CALL PROCEEDING PDU.

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U09/V/PR/A/PR30901				
Identifier:	PR30901				
Purpose:	to bring the IUT to the state U9.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU2		SETUP (1)
3	L?CALL_PROCr CANCEL TAC	L1	CP1	(P)	(2)
4	?TIMEOUT TAC			(F)	no response
5	+PO49901(0)				postamble to U0
6	+UM59902				unexpected message
7	GOTO L1				
Extended Comments: (1) A valid SETUP PDU with the sending complete information element is transmitted. (2) Valid CALL PROCEEDING PDU.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U10/V/PR/A/PR31001				
Identifier:	PR31001				
Purpose:	to bring the IUT to the state U10.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30801				preamble to U8
2	L!CONN_ACK		CA1		(1)
Extended Comments: (1) Valid CONNECT ACKNOWLEDGE PDU.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U11/V/PR/A/PR31101				
Identifier:	PR31101				
Purpose:	to bring the IUT to the state U11.				
Default:	DF69901(1)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	< IUT ! SETUP >		SU9		wait for SETUP PDU
3	(bch_num ::= CH_NUM) START TWAIT				
4	L?SETUPr (CREF ::= SETUP.CR.CR_R, bch_num ::= SETUP.CHI.CHI_E5_CH2) CANCEL TWAIT	L1	SU9	(P)	bch_num is changed
5	[EBS]				
6	L!CALL_PROC		CP2		
7	+SUBTREE				
8	[NOT EBS]				
9	L!SETUP_ACK		SUA2		(1)
10	+SUBTREE				
11	L?SETUPr (CREF ::= SETUP.CR.CR_R) CANCEL TWAIT		SU1	(P)	valid SETUP PDU
12	[EBS]				
13	L!CALL_PROC		CP2		
14	+SUBTREE				
15	[NOT EBS]				
16	L!SETUP_ACK		SUA2		(1)
17	+SUBTREE				
18	?TIMEOUT TWAIT			I	no response
19	+UM59902				unexpected message
20	GOTO L1				
21	**SUBTREE**				
22	< IUT ! DISC >		DI1(0)		
23	START TWAIT				
24	L?DISCr CANCEL TWAIT	L2	DI1(0)	(P)	valid DISCONNECT PDU
25	?TIMEOUT TWAIT			(I)	no response
26	+PO49901(1)				postamble to U0
27	+UM59902				unexpected message
28	GOTO L2				
Extended Comments: (1) Wait for a DISCONNECT PDU.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/PR/U19/V/PR/A/PR31901				
Identifier:	PR31901				
Purpose:	to bring the IUT to the state U19 via the states U6-U7 or U6-U8 or U6-U9 or U6-U25.				
Default:	DF69901(0)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU3		SETUP
3	L?ALERTr CANCEL TAC	L1	AL1	(P)	valid ALERTING PDU
4	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
5	+LOCAL_TREE_2	L2			
6	+UM59902				unexpected message
7	GOTO L2				
8	L?CONNr CANCEL TAC		CN1	(P)	valid CONNECT PDU
9	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
10	+LOCAL_TREE_1	L3			
11	+UM59902				unexpected message
12	GOTO L3				
13	L?CALL_PROCr CANCEL TAC		CP1	(P)	(1)
14	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
15	+LOCAL_TREE_3	L4			
16	+UM59902				unexpected message
17	GOTO L4				
18	L?SETUP_ACKr CANCEL TAC		SUA1	(P)	(2)
19	L!DISC START TAC		DI2(0, 16)		valid DISCONNECT PDU
20	L?CALL_PROCr	L5	CP1	(P)	(1)
21	+LOCAL_TREE_3	L6			
22	+UM59902				unexpected message
23	GOTO L6				
24	+LOCAL_TREE_3				
25	+UM59902				unexpected message
26	GOTO L5				
27	?TIMEOUT TAC			(F)	no response
28	+PO49901(0)				postamble to U0
29	+UM59902				unexpected message
30	GOTO L1				
31	**LOCAL_TREE_1**				
32	L?RELr CANCEL TAC		RL1(1)	(P)	
33	?TIMEOUT TAC			(F)	
34	+PO49901(0)				postamble to U0
35	**LOCAL_TREE_2**				
36	L?CONNr		CN1		
37	+LOCAL_TREE_1	L7			
38	+UM59902				unexpected message

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No	Behaviour Description	L	Cref	V	C
39	GOTO L7				
40	+LOCAL_TREE_1				
41	**LOCAL_TREE_3**				
42	L?ALERTr		AL1		
43	+LOCAL_TREE_2	L8			
44	+UM59902				unexpected message
45	GOTO L8				
46	+LOCAL_TREE_2				

Extended Comments:
(1) Valid CALL PROCEEDING PDU.
(2) Valid SETUP ACKNOWLEDGE PDU.

Test Step Dynamic Behaviour

Reference: TBR4_L3/PR/U25/V/PR/A/PR32501
Identifier: PR32501
Purpose: to bring the IUT to the state U25.
Default: DF69901(0)

No	Behaviour Description	L	Cref	V	C
1	+PR30001				preamble to U0
2	L!SETUP_P START TAC		SU6		valid SETUP (1)
3	L?SETUP_ACKr CANCEL TAC	L1	SUA1	(P)	(2)
4	?TIMEOUT TAC			(F)	no response
5	+PO49901(0)				postamble to U0
6	+UM59902				unexpected message
7	GOTO L1				

Extended Comments:
(1) A valid SETUP PDU without optional parameters is transmitted.
(2) Valid SETUP ACKNOWLEDGE PDU.

Test Step Dynamic Behaviour

Reference: TBR4_L3/PO/UAL/V/PO/A/PO49901
Identifier: PO49901(FL:BITSTRING)
Purpose: to bring the IUT to the state U0.

No	Behaviour Description	L	Cref	V	C
1	[REST = FALSE]	L1			
2	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
3	L!REL START TAC		RL3(FL, 16)		valid RELEASE PDU
4	L?REL_COMr CANCEL TAC	L2	RC1(NOT_FL)	R	(2)
5	?TIMEOUT TAC			I	o response
6	+UM59902				unexpected message
7	GOTO L2				
8	L?OTHERWISE			I	nvalid event
9	[REST = TRUE]				
10	L!RESTART_ACK (REST ::= FALSE)		RSA2(1)		
11	GOTO L1				

Extended Comments:
(1) The formal parameter FL is used as call reference flag bit.
(2) Valid RELEASE COMPLETE PDU.

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/MS/U00/V/MS/A/CS50001				
Identifier:	CS50001(FL:BITSTRING)				
Purpose:	to check the IUT call state U0.				
Default:	DF69901(FL)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
2	L!ST_ENQ START TAC	L1	SQ1(FL)		checking PDU
3	L?RELr [REL.CAU.CAU_E4_CV2 = 81] CANCEL TAC	L2	RL1(NOT_FL)		valid RELEASE PDU
4	L!REL_COM		RC2(FL, 81)	P	(1)
5	L?REL_COMr [REL_COM.CAU.CAU_E4_CV2 = 81] CANCEL TAC		RC1(NOT_FL)	P	(1)
6	L?STATUSr [(STAT_TRANSM = FALSE) AND (STATUS.CAU.CAU_E4_CV2 = ECV)]		ST1(NOT_FL)	(P)	valid STATUS PDU
7	(STAT_TRANSM ::= TRUE)				
8	GOTO L2				
9	L?DL_REL_IN CANCEL TAC				
10	L!DL_EST_RQ (C ::= C + 1) START TAC				
11	L?DL_EST_CO CANCEL TAC, START TNOAC				
12	[C < 2]				
13	GOTO L2				
14	[C = 2]				
15	CANCEL TNOAC			(I)	
16	+PO49901(0)				
17	?TIMEOUT TAC			I	
18	?TIMEOUT TNOAC				no response
19	GOTO L1				postamble to U0
20	?TIMEOUT TAC			(F)	no response
21	+PO49901(0)				postamble to U0
22	+UM59902				unexpected message
23	GOTO L2				
Extended Comments: (1) Valid RELEASE COMPLETE PDU.					

Test Step Dynamic Behaviour					
Reference:	TBR4_L3/MS/UAL/V/MS/A/CS59901				
Identifier:	CS59901(ES:INTEGER; FL:BITSTRING)				
Purpose:	to check the IUT call state and the cause value.				
Default:	DF69901(FL)				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
2	L!ST_ENQ START TAC		SQ1(FL)		valid ST_ENQ (3)
3	+SUBTREE_1(ES, FL)	L1			
4	L?CALL_PROCr [ES = 25] (ES ::= 9)		CP1	(P)	(4)
5	+SUBTREE_1(ES, FL)	L2			
6	L?ALERTr (ES ::= 7)		AL1	(P)	ignore ALERTING PDU
7	+SUBTREE_1(ES, FL)	L3			
8	L?CONNr (ES ::= 8)		CN1	(P)	ignore CONNECT PDU
9	+SUBTREE_1(ES, FL)	L4			
10	+SUBTREE_2(ES, FL)				
11	GOTO L4				
12	+SUBTREE_2				
13	GOTO L3				
14	L?CONNr (ES ::= 8)		CN1	(P)	ignore CONNECT PDU
15	+SUBTREE_1(ES, FL)	L5			
16	+SUBTREE_2(ES, FL)				
17	GOTO L5				
18	+SUBTREE_2(ES, FL)				
19	GOTO L2				
20	L?ALERTr [(ES = 25) OR (ES = 9)] (ES ::= 7)		AL1	(P)	ignore ALERTING PDU
21	+SUBTREE_1(ES, FL)	L6			
22	L?CONNr (ES ::= 8)		CN1	(P)	ignore CONNECT PDU
23	+SUBTREE_1(ES, FL)	L7			
24	+SUBTREE_2(ES, FL)				
25	GOTO L7				
26	+SUBTREE_2(ES, FL)				
27	GOTO L6				
28	L?CONNr [(ES = 25) OR (ES = 9) OR (ES = 7)] (ES ::= 8)		CN1	(P)	ignore CONNECT PDU
29	+SUBTREE_1(ES, FL)	L8			
30	+SUBTREE_2(ES, FL)				
31	GOTO L8				
32	+SUBTREE_2(ES, FL)				
33	GOTO L1				
34	**SUBTREE_1(ES:INTEGER; FL:BITSTRING)**				
35	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
36	L?STATUSr [(STATUS.CST.CST_CSV = ES) AND ((STATUS.CAU.CAU_E4_CV2 = 30) OR (STATUS.CAU.CAU_E4_CV2 = 97) OR (STATUS.CAU.CAU_E4_CV2 = 98))] CANCEL TAC		ST1(NOT_FL)	(P)	valid STATUS PDU
37	[ES <> 19]				
38	+PO49901(FL)				postamble to U0
39	[ES = 19]				

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No	Behaviour Description	L	Cref	V	C
40	L!REL_COM		RC2(FL, 16)	P	
41	**SUBTREE_2(ES:INTEGER; FL:BITSTRING)**				
42	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
43	?TIMEOUT TAC			(F)	no response
44	[ES <> 19]				
45	+PO49901(FL)				postamble to U0
46	[ES = 19]				
47	L!REL_COM		RC2(FL, 16)	F	
48	L?STATUSr [(STAT_TRANSM = FALSE) AND (STATUS.CAU.CAU_E4_CV2 = ECV)]		ST1(NOT_FL)	(P)	valid STATUS PDU
49	(STAT_TRANSM ::= TRUE)				
50	+UM59902				unexpected message

Extended Comments:
(1) The formal parameter FL is used as call reference flag bit.
(2) The formal parameter ES is used as expected IUT call state.
(3) Valid STATUS ENQUIRY PDU.
(4) Ignore CALL PROCEEDING PDU.

Test Step Dynamic Behaviour

Reference: TBR4_L3/MS/UAL/V/MS/A/UM59902
Identifier: UM59902
Purpose: allow without verdict the receipt of INFO, NOTIFY, STATUS ENQUIRY or any Q.932 PDU during the test body execution

No	Behaviour Description	L	Cref	V	C
1	L?INFOr		IN4		
2	L?NOTIFYr		NO3		
3	L?ST_ENQr		SQ3		
4	L?GFP_MSGr		MSG		

Extended Comments:

Reference to requirements : ETS 300 102, Q.932

Test Step Dynamic Behaviour					
Reference:	TBR3_L3/DF/UAL/V/DF/A/DF69901				
Identifier:	DF69901(FL:BITSTRING)				
Purpose:	Default subtree for all test cases				
No	**Behaviour Description**	**L**	**Cref**	**V**	**C**
1	(C ::= 1 - BIT_TO_INT (FL), NOT_FL ::= INT_TO_BIT (C, 1))				
2	L?DL_REL_IN	L4		(I)	DL failure
3	[REST = FALSE]	L1		R	
4	[REST = TRUE]				
5	L!DL_EST_RQ START TAC				
6	L?DL_EST_CO CANCEL TAC			(P)	
7	L!RESTART_ACK (REST ::= FALSE)		RSA2(1)		
8	GOTO L1				
9	?TIMEOUT TAC			R	no response
10	L?OTHERWISE			R	invalid event
11	L?DL_EST_IN			(I)	DL reset
12	[REST = FALSE]	L2			
13	L!REL START TAC		RL3(FL, 16)		valid RELEASE PDU
14	L?REL_COMr CANCEL TAC		RC1(NOT_FL)	R	(1)
15	?TIMEOUT TAC			R	no response
16	+UM59902				unexpected message
17	GOTO L2				
18	L?OTHERWISE			R	invalid event
19	[REST = TRUE]				
20	L!RESTART_ACK (REST ::= FALSE)		RSA2(1)		
21	GOTO L2				
22	L?RESTARTr [RESTART.RI.RI_CL1 = 6]		RST1(0)	(I)	single interface
23	L!RESTART_ACK		RSA5(1, 6)	R	
24	L?RESTARTr [RESTART.RI.RI_CL1 = 7]		RST1(0)	(I)	all interfaces
25	L!RESTART_ACK		RSA5(1, 7)	R	
26	L?RESTARTr (r_bch_num ::= RESTART.CHI.CHI_E5_CH2) START TWAIT		RST3(0, 0)	(I)	indicated channels
27	L!RESTART_ACK		RSA2(1)		
28	GOTO L4				
29	?TIMEOUT TWAIT START TAC				
30	L?RESTARTr (r_bch_num ::= RESTART.CHI.CHI_E5_CH2) CANCEL TAC		RST3(0, 0)	(I)	indicated channels
31	L!RESTART_ACK		RSA2(1)	R	
32	?TIMEOUT TAC			R	
33	L?OTHERWISE			(F)	
34	[REST = FALSE]	L3			
35	L!REL START TAC		RL3(FL, 16)		valid RELEASE PDU
36	L?REL_COMr CANCEL TAC		RC1(NOT_FL)	R	(1)
37	?TIMEOUT TAC			R	no response
38	+UM59902				unexpected message
39	GOTO L3				
40	L?OTHERWISE			R	invalid event
41	[REST = TRUE]				
42	L!RESTART_ACK (REST ::= FALSE)		RSA2(1)		
43	GOTO L3				

Extended Comments:
(1) Valid RELEASE COMPLETE PDU.

Annex E (informative): Protocol Implementation eXtra Information for Testing (PIXIT)

E.1 Introduction

In order to test a TE, information relating to the implementation and its testing environment in addition to that provided by the TBR-RT is needed. The form containing such extra information is called a Protocol Implementation eXtra Information for Testing (PIXIT). The PIXIT contained in this annex is intended to provide a standard layout for the provision of such information by suppliers to test laboratories. Test laboratories may choose to ask for further information or to request the information in a different format.

E.2 References

The PIXIT item references, if any, generally are the associated TBR clause numbers.

E.3 Proforma structure and contents

The PIXIT proformas are tables containing pre-printed text and empty table space intended to be used by the supplier for explanations, specification of details etc.

The proforma "Environmental Test Conditions" is intended to indicate the environmental conditions to be used during testing.

NOTE: If no environmental value or range is indicated by the client, the test laboratory will use a value within the ranges pre-printed in the proforma.

E.4 Table/item identification

Each pre-printed item in a PIXIT table is provided with a serial number in the left hand table column called "Item". This provides a unique identifier of the item, distinguishing it from TBR-RT items.

E.5 Guidance on completing the PIXIT

For each layer to be tested, the associated PIXIT proformas should be completed by the supplier.

The information provided in the PIXIT should be consistent with information provided in the corresponding TBR-RT.

E.6 Environmental test conditions

Table E.1: Environmental test conditions

Ambient temperature range °C	Relative humidity range %	Air pressure range kPa	Power Supply	
			Voltage V	Frequency Hz
If no values/ranges are indicated above, values in the following ranges will be used				
21 - 25°C for layer 1 15 - 35°C for layers 2 and 3	10 - 75	86 - 106	within ± 5% of normal operating voltage	within ± 4% of normal operating frequency
OTHER TEST CONDITIONS (indicate any other condition that may be needed/useful during testing):				

E.7 Layer 1 PIXIT

Table E.2: Means of control and observation and test co-ordination procedures

Item No.	Reference	Item
E.1.1		Is the power supply an integrated part of the TE?
E.1.2	B.1.2.1 (1)	If the TE has the ability to loopback one or more timeslots, state how the loopback is established.
E.1.3	B.1.2.1 (2)	If the TE has the ability to transmit a PRBS 2^{11}-1 in a timeslot, state how to establish it.
E.1.4	B.1.2.1 a)	If some test equipment using the same chip set and interface components as in the TE is being provided for test purposes, and the test equipment can provide a loopback one or more timeslots, state how the loopback is established.
E.1.5	B.1.2.1 b)	If some test equipment using the same chip set and interface components as in the TE is being provided for test purposes, and the test equipment has the ability to transmit a PRBS 2^{11}-1 in a timeslot, state how to establish it.

Table E.2 (concluded): Means of control and observation and test co-ordination procedures

Item No.	Reference	Item
E.1.6	9.2.4	Where the TE can derive timing from more than one or the sources described in subclause 9.2.4, state how the TE can be configured for operation using each supported source of timing.
E.1.7	9.2.4	Where the TE can derive timing from source c) as described in subclause 9.2.4, describe the signal which the simulator shall provide to the TE to place the interface in the normal operating condition (e.g. the frame structure), and state which parts of the signal can contain a PRBS 2^{15}-1 pattern.
E.1.8	9.2.4	When the clock derives its timing from an external source, what is the clock synchronization time?
E.1.9		How long does the TE take to become operational when first powered up?
E.1.10	9.1.1	Where the TE is intended to be permanently connected to the network without the use of a cord, state the location of the interface point I_a and state the signal identification of the wires at that point.

Table E.3: Implemented values

There are no options on implemented values which it is necessary to declare for the purposes of layer 1 testing.

Table E.4: Supplier's additional information

Indicate any additional information necessary to successfully perform Layer 1 testing.

E.8 Layer 2 PIXIT

Table E.5: Additional layer 2 information

Item	Reference	Description
E.5.1	10.5.2	If non-automatic TEI assignment is used: - State the TEI value(s) implemented: - Explain the operation needed to assign a TEI: (note)
E.5.2	10.6.1	Does the IUT, when in state 4 and no I-frames are to be sent, remain in state 4 for more than 6 s.
E.5.3	10.6.1	Explain how the transmission of a SABME frame can be invoked by the user:
E.5.4	10.5.2	Explain how the transmission of an identity request frame can be invoked by the user:
NOTE: Only to be completed if it is possible for an operator to assign a non-automatic TEI value to the TE.		

Table E.6: Supplier's additional information

E.6.1	Indicate any additional information necessary to successfully perform layer 2 testing.

E.9 Layer 3 PIXIT

Table E.7: Test co-ordination information

Item.	Reference	Description
If the following procedures are supported on the terminal, explain how they can be invoked by the user		
E.7.1	11.4.1.1	Initiation of an outgoing call. Where the different options are available, state how to initiate a call - where all Called party number information is present in the SETUP message, and the SETUP message contains the Sending complete information element - where all Called party number information is present in the SETUP message, and the SETUP message does not contain the Sending complete information element - where not all Called party number information is present in the SETUP message, and the SETUP message contains the Sending complete information element
E.7.2	11.4.1.2	Sending additional Called party number information in INFORMATION messages (Overlap sending):
E.7.3	11.4.2.6	Answering of an incoming call: (i.e. sending a CONNECT mesage.)
E.7.4	11.4.3.3	Initiation of call clearing: (i.e. sending a DISCONNECT message.)
E.7.5	11.4.3.4.1	Continuation of call clearing from the Disconnect indication state:

Table E.8: Additional layer 3 information

Item	Reference	Description
E.8.1	11.1.1.7	If entering state U7, does the terminal remain in that state for at least 3 seconds?
E.8.2	11.1.9	If entering state U9, does the terminal remain in that state for at least 3 seconds?
E.8.3	11.3.5.5	State a value of the bearer capability used by the terminal in outgoing SETUP messages?
E.8.4	11.3.5.12	Does the terminal include the high layer compatibility information element in outgoing SETUP messages?
E.8.5	11.3.5.13	State a set of contents of the high layer compatibility used by the terminal in outgoing SETUP messages. (Only applicable if answer to E.8.4 is YES).
E.8.6	11.3.5.12	Does the terminal include the Low layer compatibility information element in outgoing SETUP messages?
E.8.7	11.3.5.13	State a set of contents of the Low layer compatibility used by the terminal in outgoing SETUP messages. (Only applicable if answer to E.8.6 is YES).
E.8.8	11.4.2.4, 11.4.2.5.1	Does the terminal support sending of the CALL PROCEEDING PDU?
E.8.9	11.4.2.4, 11.4.2.5.1	Does the terminal support sending of the ALERTING PDU?
E.8.10	11.4.1.5	Does the terminal support sending of the CONNECT ACKNOWLEDGE PDU?

Table E.8: Additional layer 3 information (continued)

E.8.11	11.3.5.5, 11.4.2.2.1	State a value of the Bearer capability information element which the TE will accept for the purpose of compatibility checking of incoming calls
E.8.12	11.3.5.5, 11.4.2.2.1	State a value of the Bearer capability information element which the TE will reject for the purpose of compatibility checking of incoming calls
E.8.13	11.3.5.12, 11.4.2.2.1	State a value of the High layer compatibility information element which the TE will accept for the purpose of compatibility checking of incoming calls
E.8.14	11.3.5.12, 11.4.2.2.1	State a value of the High layer compatibility information element which the TE will reject for the purpose of compatibility checking of incoming calls
E.8.15	11.3.5.13, 11.4.2.2.1	State a value of the Low layer compatibility information element which the TE will accept for the purpose of compatibility checking of incoming calls
E.8.16	11.3.5.13, 11.4.2.2.1	State a value of the Low layer compatibility information element which the TE will reject for the purpose of compatibility checking of incoming calls
E.8.17	11.3.5.8, 11.4.2.2.2	State a value of the Called party number information element which the TE will accept for the purpose of address checking of incoming calls
E.8.18	11.3.5.8, 11.4.2.2.2	State a value of the Called party number information element which the TE will reject for the purpose of address checking of incoming calls

Table E.8: Additional layer 3 information (concluded)

E.8.19	11.3.5.9, 11.4.2.2.2	State a value of the Called party subaddress information element which the TE will accept for the purpose of address checking of incoming calls
E.8.20	11.3.5.9, 11.4.2.2.2	State a value of the Called party subaddress information element which the TE will reject for the purpose of address checking of incoming calls
E.8.21	11.2.14	State any other optional information element contents which are necessary for the terminal to accept an incoming call.
E.4.22	11.3.5.11, 11.4.2	State a value of the Channel identification information element which the TE will accept for the purpose of answering incoming calls.

Annex F (informative): Justifications for the requirements in the TBR

F.1 Principles applicable to the whole TBR

F.1.1 General principles

The following general principles form the basis of whether a requirement is essential:

1) the only point at which conformance with the TBR is monitored is the network interface. Internal implementation of the TE is not constrained in any way. The network interface is described as a "Point of Control and Observation" (PCO) in ISO 9646. ISO 9646 stresses that the addition of a second PCO would, in effect, be the addition of a requirement on the equipment under test to provide it;

2) other interfaces (e.g. an interface for connection of other equipment, or the man-machine interface) may be used to stimulate the TE into performing actions whose effects at the user-network interface are monitored (i.e. such other interfaces may be used for control but not for observation);

3) the TE does not interwork with the network in the B-channels for the purpose of setting up, clearing etc. real or virtual connections as described in Article 4 (f). Therefore requirements relating to B-channels in the base standards are not included in the TBR. The TE uses the B-channels to interwork with the distant TE **via** the network. This is an Article 4 (g) issue which is outside the scope of this TBR and is the subject of Terminal TBRs such as TBR 8. This TBR therefore includes no requirement for the TE to be capable of any meaningful exchange of information in the B-channel of a call in the Active state.

F.1.2 Requirements vs. definitions

Generally, clauses that describe a state, frame, field, message, information element or system parameter are classed as definitions. Such definitions have only been included in the TBR where they are referred to, either directly or via other definitions, by essential requirements. These definitions are in addition to those included within clause 3 of the TBR.

Clauses that specify a change of state within the TE or an exchange of information across the interface are classed as requirements. The information exchanged by the TE is usually described by the definitions referred to above.

Only requirements have test cases attached to them, and only requirements are listed in the TBR-RT. Definitions are not testable *per se*.

F.1.3 Error conditions

The TBR assumes that (except for bit errors arising during transmission of the signal to the TE from the public exchange) the network operates without error according to the base standards. This has an effect on whether certain requirements of the base standard (particularly at layers 2 and 3) are essential. The principle followed is that where the base standard requires a specific response on the user side to a message which the network side is not permitted to send, the requirement is generally considered not to be essential.

In most cases, the requirements affected are those for the handling of various kinds of messages containing content errors from the network. However, some other requirements are also affected. These are listed individually in the tables below.

Nevertheless, some layer 3 error condition requirements from subclause 5.8 of ETS 300 102-1 have been retained in the TBR to account for the following possibilities:

- implementation in the network of an already defined supplementary service not supported by the TE;

- implementation in the network of a more recent version of ITU-T Recommendation Q.931/ETS 300 102-1 than the one on which this TBR is based;

- implementation in the network of a supplementary service not yet defined. This is difficult to determine for certain. However, there are a number of fairly well-established guidelines concerning the drafting of DSS1 protocols for supplementary services, and it is possible to state with some certainty that certain message types will not be used in the definition of supplementary services.

In general, the intention is to provide a reasonable degree of "future-proofing" of the terminal, to ensure that it remains compatible with reasonably foreseeable evolutions of the network.

F.1.4 General editorial changes to text from the base standards

The following general changes have been made when including text from the base standards within this TBR:

- deletion of requirements and definitions applicable only to the network side;

- deletion of the words "ETSI Requirement" wherever they occur;

- editorial changes to express text using the correct modal auxiliary verbs (i.e. using "is" for definitions, and "shall" for requirements);

- replacement of "this ETS" or "this Recommendation" with "this TBR" wherever appropriate;

- at the end of every requirement, relevant test cases are indicated;

- deletion of the word "optional(ly)" in expressions like "may optionally";

- deletion of references to deleted clauses and annexes.

F.1.5 Detailed list of changes with respect to the base standards

Detailed changes to requirements of individual clauses of the base standards are given in a series of tables below. The format of the tables is as follows.

The first column contains the clause number and clause title of the clause of the base standard.

The second column contains the clause number of this TBR which contains text on the same subject.

The third column contains the following:

- an "**X**" if no text from that clause has been included in the TBR;

- an "**H**" if the clause includes no text of its own, but is only clause heading for subclauses;

- a "**D**" if text has been included as a definition;

- an "**I**" if text has been included as a note or as introductory text to subsequent clauses;

- a reference to one or more paragraphs of **Article 4** of Directive 91/263/EEC if text has been included as a requirement. The reference is to the paragraph of the Directive under which the requirement is justified.

The fourth column includes any comment particular to that clause, including:

- for requirements, a justification for the clause being regarded as essential;
- a justification for changes made compared to the base standard. In particular, any technical changes (as opposed to merely editorial) are highlighted.

General changes in accordance with the principles described above are not listed on an individual basis.

F.1.6 Untested requirements

Certain requirements which have been regarded as essential, are not accompanied by a test. The reason for the absence of a test is generally that the requirement was not included in the NETs, that a test method is therefore not readily available, and that time and resources did not permit the development of a new test. Notes have been included in the affected requirements clauses, indicating which requirements are untested. A second edition of the TBR may result in such tests being included.

F.1.7 Primitives

The following principles have been used to determine which primitives are essential, and how the essential primitives should be tested:

1) a primitive is conceptual and internal to the TE. The issue of a primitive at one layer, and the corresponding response (internal or external) at the adjacent layer is essential if and only if it is part of a process in which the external response to an external stimulus is essential.

   The use of a particular primitive may be essential in relation to one external stimulus, but not in relation to another. The external stimulus and the external response are not necessarily at adjacent layers;

2) the network interface is the only Point of Control and Observation (PCO) for determining the result of a test;

3) points in addition to, or instead of, the network interface may be used for the stimulus of a TE during testing;

4) internal implementation of primitives is not essential and not tested.

It was agreed to include the primitives within the TBR in order to describe the necessary interactions between layers of the protocol.

Consensus could not be reached on which requirements for specific interactions between Layers 1 and 2 are essential. The principle issues are as follows.

PH-ACTIVATE INDICATION

Although there is a full specification at layer 1 of the circumstances in which the primitive is issued, there is no requirement in ETS 300 125 for actions on receipt of it. However, it is clear that Layers 2 and 3 cannot operate at all unless the activation of layer 1 has been detected. At basic access, the relevant tests have been included from the CTS test suite, which is intended for adoption by ETSI TM3 as an ETS.

PH-DEACTIVATE INDICATION

There is a full specification at layer 1 of the circumstances in which the primitive is issued. There are also requirements in ETS 300 125 for specific responses in certain states to "persistent deactivation". Tests from the CTS test suite have been included. A minority opinion was that, since there is no means of testing the actions on deactivation until re-activation has been achieved, and no specific requirement to recognize re-activation (see PH-ACTIVATE INDICACTION above), that any test involves the testing of requirements not included within the TBR.

MPH-ERROR INDICATION

No requirements for action on receipt of these primitives exists. The primitives have therefore been excluded from the TBR.

Specific exchanges of primitives between Layers 2 and 3 are not generally essential. See the reference to ETS 300 102-1, subclauses 5.8.8. and 5.8.9 below for details.

F.1.8 Supplementary services

Although a large number of supplementary services have been included within the scope of this TBR, this has not resulted in the addition of any further essential requirements. The main issues considered when coming to this conclusion are as follows.

B-channels

The ability to successfully select a B-channel during the initiation of a basic call is essential, because failure to select a B-channel may result in a basic call failure.

The ability to communicate in the selected B-channel is not tested and is not an essential requirement within Articles 4 (c) to 4 (f). Therefore the manipulation of the B-channel by supplementary services, causing communication to be interrupted and resumed, are not essential.

For justified cases, such ability may be essential within Article 4 (g). Article 4(g), however, is outside the scope of this TBR.

Operation of Supplementary services

For many supplementary services, most of the extra requirements are implemented by the networks. there is often little or no extra requirement applicable to the user side.

Basic Call states

The supplementary services do not affect the Call state as defined in ETS 300 102-1 by any methods other than those described in the requirements for Basic Call. No new requirements therefore need to be defined in this respect.

Auxiliary states and supplementary service states.

Often the supplementary services define "auxiliary states" and "supplementary service states" which can be entered independently or semi-independently of the Call state.

Supplementary services which do not affect the Call state are considered by definition not to be processing calls within the meaning of Article 4 (f).

Messages used in supplementary services

Messages (such as FACILITY or NOTIFY) and information elements (such as Facility or Notification indicator) do not affect the Basic Call. There are therefore no essential requirements which specify the circumstances in which such messages are sent by the TE. The TBR and test suites are intended to provide complete freedom for the use by the terminal of these messages.

Exceptional procedures

Several of the supplementary services modify the requirements of ETS 300 102-1, subclause 5.8 in respect of exceptional procedures. As far as possible the requirements for operation in response to exceptional procedures included and tested in this TBR are consistent with the terminal's implementation of any one or more supplementary services.

F.1.9 Differences in clauses 10 and 11 and the TBR-RT between TBR 3 and this TBR

The differences between the requirements for TBR 3 and this TBR are, in general, a result of the following:

a) call rearrangements only required for basic access;

b) incoming calls using the broadcast data link only required for basic access;

c) no point-to-multipoint condition for RESTART for primary rate access.

Specific changes to clauses are as follows:

- clause 10 only specifies primary rate access default window size;

- subclause 11.1 contains no specification of User and Network call states associated with call rearrangements in this TBR;

- subclause 11.2 contains no specification of the message types (RESUME, SUSPEND etc.) associated with call rearrangements in this TBR;

- the tables in subclause 11.3 contain no references to call rearrangement message types or information elements in this TBR;

- subclause 11.4.2 contains no requirements for incoming calls using point-to-multipoint configuration. Also there are no requirements in this TBR for support of SETUP message delivered by broadcast data link;

- subclause 11.4.4 contains no requirements in this TBR for call rearrangements;

- in subclause 11.4.8, Restart is mandatory for this TBR whereas conditional on point-to-point data link for TBR 3;

- in the TBR-RT, the call rearrangement condition and options for receipt of SETUP on broadcast data link are omitted. The requirements table for call rearrangements is omitted. Restart is mandatory for this TBR whereas conditional on point-to-point data link for TBR 3.

F1.10 Article 4(e) of the Directive

There are no requirements in this TBR justified under Article 4(e) because the access does not make use of the radio spectrum. However, Article 4(e) is included within the scope of the TBR, to make it clear that no other TBRs or other standards exist containing additional requirements under Article 4(e) applicable to TEs within the scope of this TBR.

F.2 Changes with respect to ETS 300 011

F.2.1 Layer 1 general principles

The following general principles are followed in these requirements.

F.2.2 Timing considerations

Synchronization with the input is not essential for the following reasons.

The main reason for synchronization is to avoid slips. Some slips in the D-channel can be tolerated by the network without causing significant misoperation. Slips in the B-channel for voice telephony are usually imperceptible to the user. Slips in the B-channel for data applications may cause corruption of the data. However, the avoidance or prevention of slips in the traffic carried is not an essential requirement for an access standard.

The essential requirement is therefore to ensure that the output clock accuracy is sufficient to keep the number of slips to a tolerable level, and to permit the network to decode correctly the signalling sent by the TE. 50 ppm has been selected as the figure which achieves this, being the maximum bit rate tolerance permitted by CCITT Recommendation G.703.

F.2.3 CRC-4 monitoring and E-bits

It is an essential requirement to transmit the MFAS and the CRC-4 information in bit 1 of TS0.

It is not strictly an essential requirement to transmit the E-bits according to the presence of errors in received sub-multiframes, because there is no consequent action by the network which affects call-processing. However, the requirement has been retained for the following reasons:

a) many layer 1 tests derived from ETS 300 011 use the presence of E = 1 in the output signal to indicate that the input signal, disturbed by various ways (e.g. jitter, longitudinal voltages) has been received by the TE without bit errors. It would be difficult to re-write these tests without reliance on the E-bits;

b) the TE already has, as an essential requirement, the monitoring of received CRC-4 sub-multiframes, and consequent actions in the event of receipt of a large number of errored sub-multiframes, to achieve security of Frame Alignment. The additional effort on the part of a TE to output the results of that monitoring into the E-bits is trivial, and unlikely to be omitted from any commercial implementation of a 2 048 kbit/s interface which implements CRC-4 monitoring.

F.2.4 Protection requirements

The requirements of clause 8 limit the common mode and transverse mode voltages at the TE output to the levels to which the network interface presentation is protected from electrical damage. Any voltages in excess of those specified could cause harm to the network (Article 4 (d)). Other requirements from ETS 300 046-3 [1] are concerned with protection of the terminal and are therefore outside the scope of this TBR.

F.2.5 Detailed list of changes with respect to ETS 300 011

Table F.1: Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
Foreword		X	This TBR has its own foreword.
1 Scope		X	This TBR has its own scope.
2 Normative references		X	This TBR has its own set of normative references.
3 Definitions		D	Relevant definitions are included.
4 Abbreviations		D	Relevant abbreviations are included.
5 Conformance		X	Conformance is to this TBR for the purposes of this TBR
6 Requirements		X	The text of the ITU-T (CCITT) Recommendations has been imported directly into this TBR as appropriate.
Table 1: Modifications and statements to CCITT Recommendation I.431		H	
1 Introduction		X	Informative only.

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
1.1 Scope and field of application		X	Addressed in TBR scope.
2 Type of configuration		X	Informative only.
2.1 Point-to-point		X	Informative.
2.2 Location of interface		D	Modified for the context of this TBR.
3 Functional characteristics		H	
3.1 Summary of functions (layer 1)	3.1	D	References to H_0-channels, H_1-channels, Power feeding deleted as N/A to TE.
3.2 Interchange circuits		X	Impossible for the TE to distinguish electrically between normal and reversed wiring.
3.3 Activation/ deactivation		X	Addressed in more detail elsewhere.
3.4 Operational functions	9.5	D	
3.4.1 Definition of signals at the interface	9.5.1	D	
3.4.2 Definitions of state tables at network and user sides.		X	Addressed in more detail elsewhere.
3.4.3 Layer 1 states on the user side of the interface	9.5.2	D	
3.4.4 Layer 1 states at the network side of the interface		X	Applicable to the NT.
3.4.5 Definition of primitive		X	The descriptions of primitives from ETS 300 125, Part 2, clause 4 are used, as these are more detailed and complete.
3.4.6 State tables	9.5.3	D	The requirement is addressed by subclause 5.9.2.
4 Interface at 1 544 kbit/s		X	Not applicable to Euro-ISDN.
5 Interface at 2 048 kbit/s		H	
5.1 Electrical characteristics		X	Addressed in more detail in references to CCITT Recommendation G.703.
5.2 Frame structure		H	
5.2.1 Number of bits per timeslot	9.4.2	D	
5.2.2 Number of timeslots per frame	9.4.3	D	

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
5.2.3 Assignments of bits in timeslot 0		4 (f)	Addressed in more detail in references to CCITT Recommendation G.704. References to the Sa bits are included as requirements. The Sa bit requirements are to set outgoing Sa bits always to 1, and to ignore any use of Sa bits in the input. While the requirement for outgoing Sa bits is not strictly essential at present because the network ignores the Sa bits received from the TE, it is included to avoid compatibility problems with future network implementations that may use the Sa bits. The requirement to ignore incoming Sa bits is included because some networks use the Sa bits for error monitoring within the network, and in some networks the Sa bits are not suppressed when the signal is passed to the user.
5.2.4 Timeslot assignment		H	
5.2.4.1 Frame alignment signal		X	Addressed in more detail in CCITT Recommendation G.704.
5.2.4.2 D-channel	9.4.9.1	4 (f)	Tested indirectly by the layer 2 and 3 tests. References to other uses of TS16 are not included as they are outside the scope of this TBR.
5.2.4.3 B-channel and H-channels	9.4.9.2	X	There are no layer 1 requirements which depend on the definition of a B-channel.
5.2.4.4 Bit sequence independence		D	
5.3 Timing considerations	9.2.3	4 (f)	See subclause F.2.2 in this annex.
5.4 Jitter		H	
5.4.1 General considerations		H	
5.4.2 Minimum tolerance to jitter and wander at TE inputs.	9.3.3	4 (f)	Requirements for input jitter tolerance are retained as being essential to control the number of bit errors in the signal received by the TE under normal operating conditions. Input jitter tolerance figures are based on the worst case assumption that the TE is connected to a low-Q network. Requirements below 20 Hz are not included as jitter at such low frequencies is not considered to be a significant cause of bit errors.
5.4.3 TE and NT2 output jitter.	9.2.4	H	

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
5.4.3.1 TE and NT2 with only one user-network		4 (f)	Necessary to control the number of bit errors received by the NT as a result of jitter. Output jitter figures are based on the worst case assumption of connection to a high-Q network. Reference to AIS in the requirement is deleted, as AIS is not used as an input signal in the test. Requirements for output jitter are included in the presence of input jitter at frequencies down to 1 Hz. This is because it was considered that certain implementations of digital phase-locked loops exhibit non-linearities in their performance in which the presence of low-frequency jitter in the synchronizing input can cause the output to contain significant jitter at higher frequencies.
5.4.3.2 TE and NT2 with more than one user-network		X	The more stringent requirements relating to multiple accesses are not essential with respect to Article 4 (f).
5.5 Tolerable longitudinal voltage	9.3.4	4 (f)	Necessary to operate correctly under reasonable conditions of longitudinal signals such as might be induced in the cable. Permits transformerless implementations. Test circuit is deleted as it is duplicated in the test clause. Requirements above 150 kHz have been omitted as they are addressed by ENV 55102-1 and ENV 55102-2, both of which are applied under the EMC Directive.
5.6 Output signal balance		X	May be addressed under the EMC Directive.
5.7 Impedance towards ground	9.2.2 & 9.3.5	4 (f)	The requirement guarantees the interworking between a transformerless implementation on one side of the interface with a transformer on the other side of the interface. The test configuration is deleted from the requirement, since it is repeated within the test cases of subclauses C.2.11.1. and C.2.11.2. The requirement was relaxed in the range 500 kHz to 1 MHz in order to enable the use of protection circuits without needing the use of extra hardware to compensate the capacitative characteristics of these circuits.
5.8 Interface procedures		H	
5.8.1 Codes for idle channels and idle slots		X	Since primary rate (unlike basic rate) is solely point-to-point, there is no harm done by any particular bit pattern in idle B-channels.

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
5.8.2 Interframe (layer 2) time fill		X	Since primary rate (unlike basic rate) is solely point-to-point, there is no harm done by any particular bit pattern in an idle D-channel, provided that the bit pattern does not simulate the existence of a layer 2 frame. Such a requirement is tested implicitly by the layer 2 tests and so is not included here.
5.8.3 Frame alignment and CRC-4 procedures		X	Addressed in more detail in references to CCITT Recommendation G.706 [2].
5.9 Maintenance at the interface		X	Informative only.
5.9.1 Definitions of maintenance signals	9.5.4.1	D	
5.9.2 Use of CRC procedure		H	
5.9.2.1 Introduction		X	First paragraph is addressed in more detail in the references to CCITT Recommendation G.706 [2]. The indents are informative.
5.9.2.2 Localization of the CRC functions in the subscriber access from the user point of view		H	
5.9.2.2.1 No CRC processing in the transmission link		X	Not applicable to TE.
5.9.2.2.2 CRC processing in the digital transmission link		X	Not applicable to TE.
5.9.3 Maintenance functions		H	
5.9.3.1 General requirements		X	Addressed in more detail in subsequent clauses.
5.9.3.2 Maintenance functions on the user side		H	
5.9.3.2.1 Anomalies and defect detection	9.5.4.2.1	4 (f)	It is necessary to advise the network that the TE is no longer able to process calls, so that the network can clear active calls, and no longer charge for them.
5.9.3.2.2 Detection of defect indication signals	9.5.4.2.2	4 (f)	It is necessary to advise the network that the TE is no longer able to process calls, so that the network can clear active calls, and no longer charge for them.
5.9.3.2.3 Consequent actions	9.5.4.2.3	4 (f)	See above. Reference to AIS in note 1 deleted, since AIS is not sent by the TE.
5.9.3.3 Maintenance functions on the network side		H	
5.9.3.3.1 Defect detection		X	Applicable to the NT.

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
5.9.3.3.2 Detection of defect indication signals		X	Applicable to the NT.
5.9.3.3.3 Consequent actions		X	Applicable to the NT.
6 Interface connector		4 (f)	Addressed in more detail in the TBR in subclause 9.1.
7 Interface wiring		X	Not applicable to the TE.
8 Power feeding		H	
8.1 Provision of power		X	Not applicable to the TE.
8.2 Power available at the NT		X	Not applicable to the TE.
8.3 Feeding voltage		X	Not applicable to the TE.
8.4 Safety requirements		X	Not applicable to the TE.
Annex A Timeslot assignment for interfaces having only H_0-channels		X	Outside the scope of this TBR.
Annex B Timeslot assignment for 2 048 kbit/s interfaces having H_{11}-channels		X	Outside the scope of this TBR.
Appendix I Pulse mask for interface at 1 544 kbit/s		X	Not applicable to Euro-ISDN.
Table 2: Modifications and statements to CCITT Recommendation G.703		H	
1 to 5		X	Not applicable to Euro-ISDN.
6 Interface at 2 048 kbit/s		H	
6.1 General characteristics	9.2.5	4 (f)	Timing deleted. Addressed in more detail in subsequent clauses. Overvoltage requirements addressed by inclusion of requirements from ETS 300 046-3 [1]. Coding requirement included to ensure that both the AMI and the bipolar violation aspects of the HDB3 output are correctly coded.
6.2 Specifications at the output ports	9.2.1	4 (f)	Necessary to have output pulses of a defined type recognisable by the NT so that higher layer services can be supported.
6.3 Specification at the input ports		H	
6.3.1	9.3.2	4 (f)	Necessary to decode bits from the network correctly in order to support higher layer services. In this TBR the requirement is combined with that of subclause 6.3.4, since they are tested together in ETS 300 011.
6.3.2		X	Superseded by 5.4.2 of CCITT Recommendation I.431.
6.3.3	9.3.1	4 (f)	Limits the possibility of signal reflections that could give rise to bit errors.

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
6.3.4	9.3.2	4 (f)	Ensures adequate immunity against signal reflections that can arise due to impedance irregularities. The note is deleted as being informative only.
6.4 Earthing of the outer conductor of screen		X	Not applicable to 120 Ω option.
7 to 11		X	Not applicable to Euro-ISDN.
Annex A Definition of codes	3.1	4 (f)	Clause A.1 of CCITT Recommendation G.703 references to HDB3 included as a requirement. Necessary to operate the defined line code for the support of higher layer services.
Annex B Specification of the overvoltage		X	Overvoltage requirements addressed by inclusion of requirements from ETS 300 046-3 [1].
Table 3: Modifications and statements to CCITT Recommendation G.704		H	
1 General		X	Informative only.
2 Basic frame structures		H	
2.1, 2.2		X	Not applicable to Euro ISDN.
2.3 Basic frame structure at 2 048 kbit/s		H	
2.3.1 Frame length	9.4.1	D	
2.3.2 Allocation of bits numbers 1 to 8 of the frame	9.4.4	4 (f)	Necessary to operate using the defined TS0 structure in order to support higher layer services.
2.3.3 Description of the CRC4 procedure in bit 1 of the frame		H	
2.3.3.1 Special use of bit 1 of the frame.		4 (f)	Necessary to operate using the defined TS0 structure in order to support higher layer services. Requirements are based on the fact that the network implements CRC-4 monitoring, and that the terminal shall therefore implement the MFAS and CRC-4 bits in bit 1 of TS0 in order to be compatible with the network.
2.3.3.2	9.4.5	D	
2.3.3.3	9.4.6	D	The final paragraph is deleted as being outside the scope of this TBR.
2.3.3.4	9.4.8	4 (f)	See subclause F.2.3 in this annex.
2.3.3.5 Cyclic redundancy check			
2.3.3.5.1 Multiplication/division process.	9.4.7.1	D	
2.3.3.5.2 Encoding procedure	9.4.7.2	4 (f)	See subclause F.2.3 in this annex.

Table F.1 (continued): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
2.3.3.5.3 Decoding procedure	9.4.7.3	4 (f)	Included as a part of the requirements for security of frame alignment. See requirements in table 4 below.
2.4		X	Not applicable to 2 048 kbit/s interfaces.
3 and 4		X	Not applicable to 2 048 kbit/s interfaces.
5 Characteristics of frame structure carrying channels at various bit rates in 2 048 kbit/s interface		X	Outside the scope of this TBR.
6		X	Not applicable to 2 048 kbit/s interfaces.
Annex A Examples of CRC implementations using shift registers		X	Informative only.
Table 4: Modifications and statements to CCITT Recommendation G.706 [2]		H	
1 to 3		X	Not applicable to Euro-ISDN.
4 Frame alignment and CRC procedure at 2 048 kbit/s interface		H	
4.1 Loss and recovery of frame alignment		H	
4.1.1 Loss of frame alignment	9.5.5.1	4 (f)	Necessary to be aware of a loss of frame alignment so that the network and higher layers can be informed that call processing is no longer possible. Note 1 is not essential and is deleted and not tested. Note 2 is deleted, since it is addressed in more detail within 4.2. The text is reworded to describe a requirement for an identifiable response to a required stimulus.
4.1.2 Strategy for frame alignment recovery	9.5.5.2	4 (f)	Necessary to achieve frame alignment in order to carry higher layer services. The text is reworded to describe a requirement for an identifiable response to a required stimulus. The note is deleted, as being informative only.
4.2 CRC multiframe alignment using information in bit 1 of the basic frame	8.5.5.3	4 (f)	Necessary for security of frame alignment, to reduce the chances of aligning on spurious frame alignment signals in the B-channels. The text is reworded to describe a requirement for an identifiable response to a required stimulus. Note 2 is modified and made normative, since the network will always implement the MFAS.
4.3 CRC bit monitoring	9.5.5.4	4 (f)	CRC-4 provides further security against spurious imitations of the FAS and MFAS in the B-channels.
4.3.1 Monitoring procedure	9.5.5.4	4 (f)	See above.
4.3.2 Monitoring for false frame alignment	9.5.5.5	4 (d)	See above.

Table F.1 (concluded): Detailed list of changes with respect to ETS 300 011

Clause of ETS 300 011	Clause in this TBR	Status	Justification
4.3.3 Error performance monitoring using CRC4		X	Provision of error performance monitoring information to the TE user is outside the scope of this TBR.
5		X	Not applicable to Euro ISDN.
Annex A Background information on the use of CRC procedures		X	Informative only.
Annex A (normative): Application of the ETS 300 011 for PTNX interconnections (leased lines)		X	Not applicable to Euro-ISDN connections to public exchanges.
Annex B (normative): Application of ETS 300 011 to the S reference point		X	Outside the scope of this TBR.
Annex C (normative): Conformance test principles for the user and the network side of the interface	Annex B	4f	Tests included as far as the associated requirements are essential.
Annex D (informative): Characteristics of loopbacks		X	Not applicable to this TBR.
Annex E (informative): Bibliography		X	This TBR has its own bibliography.

F.3 Changes with respect to ETS 300 125

F.3.1 General

The September 1991 edition of ETS 300 125 has been used as the basis for the layer 2 requirements in this TBR. The changes made in the draft revision were taken into account wherever appropriate. It is intended that apparatus conforming to either version of ETS 300 125 will conform to this TBR.

F.3.2 Layer 2 response time

ETS 300 125 contains several clauses where a response is required "as soon as possible". ETS 300 125 does not specify how soon "as soon as possible" is. ETS 300 153, subclause 9.4 specifies "Layer 2 response time", consisting of a number of elements including "Layer 2 processing time" which is specified to be no more that 200 ms.

If the layer 2 response time is some unreasonably long time, such as 15 s, then the network, on attempting to establish multiple frame operation, will:

- send an SABME and start T200;

- retransmit the SABME N200 times on expiry of T200;

- enter the TEI assigned state.

Multiple frame operation is therefore impossible to achieve. This prevents the processing of calls in accordance with Article 4 (f). Some limit to layer 2 processing time is therefore essential.

An appropriate limit would be one which provides a reasonable guarantee of avoiding any retransmissions when there no contention for use of the D-channel, and a reasonable guarantee of only one network retransmission when there is worst-case contention for use of the D-channel.

Selection of the appropriate value is somewhat arbitrary, but the following values have been chosen:

500 ms for TEs operating in a point-to-point configuration as described in subclause 10.3;

200 ms for other TEs.

F.3.3 Detailed list of changes with respect to ETS 300 125

Table F.2: Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
Foreword		X	This TBR has its own foreword.
Scope		X	This TBR has its own scope.
PART 1: Application of CCITT Recommendation Q.920(I.440)		X	The whole of Part 1 is not included in this TBR as it is largely "modelling" material. The actual requirements are contained in Part 2 (Q.921).
PART 2: Application of CCITT Recommendation Q.921(I.441) ISDN user-network interface - Data link layer specification		H	
1 General		X	No requirement is added by this clause.
2 Frame structure for peer-to-peer communication		H	
2.1 General	10.1.1	I	Included as a note. The notes to figure 1/Q.921 have been taken from the second edition.
2.2 Flag sequence	10.1.2	D	The requirement is not included, addressed elsewhere.
2.3 Address field	10.1.3	D	The information concerning reservation of a single octet address for LAPB operation is not included, because the paragraph contains no requirements and support of LAPB operation is not within the scope of this TBR as it is not applicable to European networks. The note is not included for the same reasons.
2.4 Control field	10.1.4	D	

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
2.5 Information field	10.1.5	D	
2.6 Transparency	10.1.6	D	
2.7 FCS field	10.1.7	D	
2.8 Format convention		H	
2.8.1 Numbering Convention	10.1.8.1	D	
2.8.2 Order of bit transmission	10.1.8.2	D	
2.8.3 Field mapping convention	10.1.8.3	D	
2.9 Invalid frames	10.1.9	D	Item a) may occur in case of a bit error in the flag. Item b) is not included, will not occur in an error free network. Item c) is not included, will not occur in an error free network. Item d) will occur in case of a bit error in the frame. Item e) may occur if the network transmits a frame for LAPB operation. Item f) may occur if e.g. the network transmits a frame for packet communication (SAPI = 16). The requirement concerning action upon receipt of an invalid frame is not included, because it is covered by ETS 300 125, Part 2,subclause 5.8.4. The definition of an invalid frame has been extended to include frames with a TEI not currently supported by the TE.
2.10 Frame abort		X	It is not possible to determine whether a requirement to respond correctly to a Frame abort is essential, because the ETS does not state under what circumstances a network is permitted to issue a frame abort. It is therefore not possible to determine whether the receipt of Frame Abort is a normal operating condition for the TE. However, the subclause has been not included for the following reasons: 1) it was considered impracticable to devise an explicit test using existing commercially available test tools; 2) if a TE does not recognize a Frame abort, then it is likely that the frame will still be rejected as invalid for one of the reasons given in 2.9 (probably because of receipt of an invalid FCS); 3) ETS 300 153 includes no test of Frame Abort.
3 Elements of procedures and formats of fields for data link layer peer-to-peer communication		H	

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
3.1 General	10.2.1	I	Included as a note.
3.2 Address field format	10.2.2	D	
3.3 Address field variables	10.2.3	H	
3.3.1 Address field extension bit (EA)	10.2.3.1	D	
3.3.2 Command/Response field bit (C/R)	10.2.3.2	D	
3.3.3 Service Access Point Identifier (SAPI)	10.2.3.3	D	The note concerning further study of reservation of other values for SAPI is not included, because it has been deleted from the draft revision of the ETS.
3.3.4 Terminal Endpoint Identifier (TEI)	10.2.3.4	D	
3.3.4.1 TEI for broadcast data link connection	10.2.3.4.1	D	
3.3.4.2 TEI for point-to-point data link connection	10.2.3.4.2	D	
3.4 Control field formats	10.2.4	D	
3.4.1 Information transfer (I) format	10.2.4.1	D	
3.4.2 Supervisory (S) format	10.2.4.2	D	
3.4.3 Unnumbered (U) format	10.2.4.3	D	
3.5 Control field parameters and associated state variables		X	It only contains introductory text, and the text is repeated in 2.8.
3.5.1 Poll/Final bit	10.2.5.1	D	
3.5.2 Multiple frame operation - variables and sequence numbers		H	
3.5.2.1 Modulus	10.2.5.2.1	D	
3.5.2.2 Send state variable V(S)	10.2.5.2.2	D	
3.5.2.3 Acknowledge state variable V(A)	10.2.5.2.3	D	
3.5.2.4 Send sequence number N(S)	10.2.5.2.4	D	
3.5.2.5 Receive state variable V(R)	10.2.5.2.5	D	
3.5.2.6 Receive sequence number N(R)	10.2.5.2.6	D	
3.5.3 Unacknowledged operation - variables and parameters		X	Only contains a cross-reference to 5.9.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
3.6 Frame types		H	
3.6.1 Commands and responses	10.2.6.1	D	Some text is not included as it contains requirements which are repeated in more detail in 5.8.4 and 5.8.5. In table 5/Q.921 (Commands and responses - modulo 128) the rows defining FRMR and XID frames and the note concerning XID frames are not included, because these frames are not supported by European networks.
3.6.2 Information (I) command	10.2.6.2	D	
3.6.3 Set asynchronous balanced mode extended (SABME) command	10.2.6.3	D	Text containing requirements of the protocol surrounding the use of the SABME frame is not included, because it is duplicated in the layer 2 requirements.
3.6.4 DISConnect (DISC) command	10.2.6.4	D	Text containing requirements of the protocol surrounding the use of the DISC frame is not included, because it is duplicated in the layer 2 requirements.
3.6.5 Unnumbered Information (UI) command	10.2.6.5	D	
3.6.6 Receive Ready (RR) command/response	10.2.6.6	D	
3.6.7 REJect (REJ) command/response	10.2.6.7	D	Text containing requirements of the protocol surrounding the use of the REJ frame is not included, because it is duplicated in the layer 2 requirements.
3.6.8 Receive Not Ready (RNR) command/ response	10.2.6.8	D	
3.6.9 Unnumbered Acknowledgement (UA) response	10.2.6.9	D	
3.6.10 Disconnected Mode (DM) response	10.2.6.10	D	
3.6.11 Frame reject (FRMR) response		X	See arguments with respect to subclause 5.8.6.
3.6.12 Exchange identification (XID) command/response		X	Not supported in European networks.
4 Elements for layer-to-layer communication		H	
4.1 General		H	
4.1.1 Generic names	5.1	D	
4.1.1.1 DL-ESTABLISH	5.1.1	D	
4.1.1.2 DL-RELEASE	5.1.2	D	
4.1.1.3 DL-DATA	5.1.3	D	
4.1.1.4 DL-UNIT DATA	5.1.4	D	
4.1.1.5 MDL-ASSIGN	5.1.5	D	
4.1.1.6 MDL-REMOVE	5.1.6	D	

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
4.1.1.7 MDL-ERROR		D	
4.1.1.8 MDL-UNIT DATA	5.1.7	D	
4.1.1.9 MDL-XID		X	Not used in European networks.
4.1.1.10 PH-DATA	5.1.8	D	
4.1.1.11 PH-ACTIVATE	5.1.9	D	
4.1.1.12 PH-DEACTIVATE	5.1.10	D	
4.1.1.13 MPH-ACTIVATE (See Appendix III)		X	Not applicable to the user side.
4.1.1.14 MPH-DEACTIVATE (See Appendix III)		X	Not applicable to the user side.
4.1.1.15 MPH-INFORMATION		X	Not used in this TBR.
4.1.2 Primitive types	5.2	D	
4.1.2.1 REQUEST	5.2.1	D	
4.1.2.2 INDICATION	5.2.2	D	
4.1.2.3 RESPONSE	5.2.3	D	
4.1.2.4 CONFIRM	5.2.4	D	
4.1.3 Parameter definition		D	
4.1.3.1 Priority indicator	5.3.1	D	
4.1.3.2 Message unit	5.3.2	D	
4.2 Primitive procedures		X	Only definitions of primitive types are included within this TBR.
4.2.1 General		X	Only definitions of primitive types are included within this TBR.
4.2.2 Layer 3 - data link layer interactions		X	Only definitions of primitive types are included within this TBR.
5 Definition of the peer-to-peer procedures of the data link layer		X	The selection of requirements applicable to individual TEs will be handled by the TBR-RT.
5.1 Procedure for the use of the P/F bit		H	
5.1.1 Unacknowledged information transfer		X	Addressed in more detail in 5.2.2.
5.1.2 Acknowledged multiple frame information transfer		X	The requirement is fully addressed and tested in the following subclauses: - 5.5.1.2 for SABME, DISC & DM frames - 5.6.2 for I, RR and RNR frames - 5.6.4 and 5.8.1 for REJ frames.
5.2 Procedures for unacknowledged information transfer		H	
5.2.1 General		X	It is introductory and adds no requirement.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.2.2 Transmission of unacknowledged information	10.4.1	4 (f)	An inherent part of the layer 2 protocol. Persistent deactivation is defined in terms of receipt of PH-DEACTIVATE INDICATION, since this, according to the layer 1 requirements, is issued on persistent deactivation. The sentence describing the passing of information via the primitives is not included, because it is described in the definition part. The sentence concerning the conditions of use of PH-DEACTIVATE-INDICATION is not included, because it is not a requirement.
5.2.3 Receipt of unacknowledged information	10.4.2	4 (f)	An inherent part of the layer 2 protocol.
5.3 Terminal Endpoint Identifier (TEI) management procedures		H	
5.3.1 General	10.5.1	I	The requirement in the fourth paragraph concerning TEI removal when it is notified that the terminal is disconnected at the interface is addressed in more detail in subclause 5.3.4. The requirement in the fifth paragraph concerning TEI removal for internal reasons is not essential and furthermore not testable. The requirement is not included. The reference in the sixth paragraph to subclause 5.3.4.1 is not included. It contains no requirement. In the seventh paragraph, the sentence concerning possibility of the use of one or more TEI values is for information only and defines no requirements except that it shall be responsibility of the user to maintain the association between TEI and SAPI values. This is implicitly expressed elsewhere. The paragraph is not included. The eighth paragraph (just before the note) is not included because the first sentence describes when initiation of TEI assignment occurs. This is not a requirement for layer 2. The second sentence describes internal information transfer via a primitive. The third sentence states that TEI assignment procedure may be initiated by the terminal for its own reasons. None of them contains a requirement. The note is not included. It is in contradiction with the statement that a terminal may initiate TEI assignment for its own reasons.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.3.2 TEI assignment procedure	10.5.2	4 (f)	The TEI assignment procedure is an inherent part of the layer 2 protocol. Untestable requirements such as for Ri to be "randomly generated" are rephrased in more appropriate terms. The paragraph following the first note is not included. The content is repeated in the subclause just following. The subclause concerning comparison of the Ai in a received ID assign frame with already assigned TEI(s) (if any) is not included.
5.3.2.1 Expiry of timer T202	10.5.2.1	4 (f)	The TEI assignment procedure is an inherent part of the layer 2 protocol. The reference to subclause 5.9 is not included. It contains no requirement or essential information. Figure 9/Q.921 is not included. It does not define any requirements not stated in the text. It is for information only.
5.3.3 TEI check procedure		H	
5.3.3.1 Use of the TEI check procedure	10.5.3	I	The sentence indicating that TEI check procedure may optionally be invoked by a ID verify request by a terminal is not included. This is stated in the subclause describing ID verify procedure.
5.3.3.2 Operation of the TEI check procedure	10.5.3	4 (f)	Normal operating condition on the network side. Failure to respond will result in TEI removal. Figure 10/Q.921 is not included. It does not define any requirements not stated in the text. It is for information only.
5.3.4 TEI removal procedure		X	The first two paragraphs are applicable to the network side. The third paragraph is not included, as it largely repeats text already stated in 5.3.4.2. The reference to the MDL-REMOVE REQUEST primitive is included within 5.3.4.2. The final paragraph, describing further action after TEI removal for terminals using automatic TEI values is not essential, since immediate TEI assignment will occur on command from layer 3, if necessary, according to the layer 3 state, and deferred TEI assignment will also occur on command from layer 3 when there is some layer 3 activity requiring it. The entire TEI removal procedure is not applied to non-automatic TEIs in this TBR, because there is no requirement for a TE with a non-automatic TEI to be capable of removing it.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.3.4.1 Action taken by the data link layer entity receiving the MDL-REMOVE-REQUEST primitive	10.5.4.1	4 (f)	The requirement to respond to DL-RELEASE REQUEST is not included, as requirements for issuing the primitive are not specified in layer 3. The requirement to discard the UI queue is not included, because there is unlikely to be a UI queue to discard. The TE only sends UI-frames as part of the TEI management procedures.
5.3.4.2 Conditions for TEI removal	10.5.4.2	4 (f)	The requirement that for non-automatic TEI values, "an appropriate indication shall be made to the user" is not included, because it requires the availability of a second monitoring point (see F.1.1 above). The subclause is therefore not applied to TEs with non-automatic TEIs, because there is no requirement remaining. The requirement for TEI removal on receipt of a MPH-INFORMATION (disconnected) primitive is included. The majority opinion was that, where the TE with an automatic TEI does implement a connection detector, the TE should be required to discard its TEI on disconnection, because of the increased risk that a TE, when reconnected will have a TEI duplicating one already in use. There was a minority opinion that any disturbance was unlikely, temporary and correctable without human intervention by the existing procedures for recovery from duplicate TEI assignment. The optional condition in bullet four is not included. An optional requirement cannot be an essential requirement. If the requirement is not met, then duplicate TEI assignment may occur. The TEI check and TEI removal procedures will be invoked when the network detects this.
5.3.5 TEI identity verify procedure		H	
5.3.5.1 General	10.5.5.1	I	The fact that the requirement is optional is not included. This is adequately addressed in the TBR-RT.
5.3.5.2 Operation of the TEI identity verify procedure	10.5.5.2	4 (f)	The TEI ID Verify procedure is listed as optional both in the network and the user side. In case it is implemented, it is essential that it is implemented correctly, so that TEI removal will occur if necessary to recover from duplicate TEI assignment.
5.3.5.3 Expiry of timer T202	10.5.5.3	4 (f)	See above.
5.3.6 Formats and codes		H	
5.3.6.1 General	10.5.6.1	D	

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.3.6.2 Layer management entity identifier	10.5.6.2	D	
5.3.6.3 Reference number (Ri)	10.5.6.3	D	Some informative text added here based on 5.3.2 concerning the random generation of Ri.
5.3.6.4 Message type	10.5.6.4	D	
5.3.6.5 Action indicator (Ai)	10.5.6.5	D	
5.4 Automatic negotiation of data link layer parameters		X	Parameter negotiation is not implemented in European networks.
5.5 Procedures for establishment and release of multiple frame operation		H	
5.5.1 Establishment of multiple frame operation		X	No alternative to "extended multiple frame operation (modulo 128 sequencing)" is offered on the Euro-ISDN.
5.5.1.1 General	10.6.1.1	4 (f)	An inherent part of the layer 2 protocol. The requirement to ignore all frames other than unnumbered frames during establishment is essential. This situation can occur during re-establishment where unnumbered frames cross with the SABME.
5.5.1.2 Establishment procedures	10.6.1.2	4 (f)	An inherent part of the layer 2 protocol. The paragraph concerning discard of I queues and outstanding DL-DATA-REQUEST primitives in case of layer 3 initiated establishment is changed to a note. It is not possible to test it. The requirement in last sentence in second last paragraph concerning to ignore a DM F=0 is not included. It is a requirement always to use P=1 in mode setting commands (5.5.1.2). The F bit in the response from an error free network will always have the value 1. The receipt of DM F=0 is therefore not possible in an error free network. The last paragraph stating that a DL-RELEASE-REQUEST shall be serviced after data link layer initiated re-establishment is completed is not included, as requirements for issuing the primitive are not specified in layer 3.
5.5.1.3 Procedure on expiry of timer T200	10.6.1.3	4 (f)	Necessary to advise Layer 3 of failure to establish. The use of the primitive MDL-ERROR-INDICATION is not included. The action upon receipt of the primitive is not defined.
5.5.2 Information transfer		X	The subclause merely makes cross-references to other requirements.
5.5.3 Termination of multiple frame operation		H	

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.5.3.1 General		X	The subclause applies to a TE in the Disconnect request state. This state is only entered after the TE sends a DISC message to the network. The requirement to send a DISC is not included (see below).
5.5.3.2 Release procedure	10.6.2	4 (f)	Requirement to initiate a release (i.e. send DISC) on receipt of a DL-RELEASE-REQUEST is not included, since layer 3 includes no circumstances in which that primitive shall be issued. A network initiated DISC is considered a normal operating condition and therefore the TE shall respond appropriately.
5.5.3.3 Procedure on expiry of timer T200		X	The requirements only apply to the originator of the DISC command (see above).
5.5.4 TEI-assigned state		X	First bullet is not included. The requirement to transmit a DM as a response to a DISC command when in state 4 is not essential. An error free network will transmit the DISC in case of duplicate TEI assignment only. Second bullet is not included. The requirement is covered by 5.5.1. Third bullet is not included. It is a requirement always to use P=1 in mode setting commands (see 5.5.1.2). The F bit in the response from an error free network will always have the value 1. Fourth bullet is not included. The requirement is covered by 5.2. Fifth bullet is not included. The requirement is covered by 5.8.8. Sixth bullet is not included. An error free network will not transmit frames others than the ones mentioned. Therefore "other frame types" will never be received in an error free network.
5.5.5 Collision of unnumbered commands and responses		H	
5.5.5.1 Identical transmitted and received commands	10.6.3.1	4 (f)	The procedure for collision of SABME frames is essential. If it is not implemented the network will not receive a response to the SABME which it transmitted. This can result in a situation where the TEI value is lost. The procedure for collision of DISC is not included, as there is no requirement for the TE to be capable of sending a DISC.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.5.5.2 Different transmitted and received commands		X	There are two situations: 1. Network transmits SABME, TE transmits DISC This is not essential, as the requirement for a TE to transmit a DISC is not essential. 2. Network transmits DISC, TE transmits SABME The network will transmit a DM and expect a DM. If the DM is not received within timeout of T200 the network will retransmit the DISC. At this point the TE is in state 4 and will respond by transmitting a DM, which will cause the network to enter state 4. In this case it is not an essential requirement.
5.5.6 Unsolicited DM response and SABME or DISC command		X	First paragraph is not included. It contains information which may be useful. However, it contains no requirements. Second paragraph is not included. The requirement always to set the P bit to 1 in a SABME or DISC frame is stated in 5.5.1.2. Third paragraph with the requirement to ignore an incoming DM F=0 colliding with a SABME is essential. In case it is not ignored the DM is interpreted as a response to the SABME and the TE enters state 4. The network which transmitted the DM F=0 to start the establishment procedure receives the expected SABME and responds with a UA. The TE which is in state 4 receives the UA and either initiates ID verify procedure or removes TEI value. Hence the attempt from the network to establish the data link may result in loss of TEI value.
5.6 Procedures for information transfer in multiple frame operation	10.7	X	Only makes reference to its subclauses.
5.6.1 Transmitting I-frames	10.7.1	4 (f)	Inherent part of the layer 2 protocol. The requirement has been clarified to the effect that I-frames transmitted in accordance with this subclause are always transmitted with the P bit set to 0. This is clearly stated in the SDLs in ETS 300 125 but is not clear in the text of this subclause. I-frames are only transmitted with P=1 when re-transmitted in accordance with ETS 300 125 subclause 5.6.7.
5.6.2 Receiving I-frames	10.7.2	4 (f)	Inherent part of the layer 2 protocol.
5.6.2.1 P bit set to 1	10.7.2.1	4 (f)	Inherent part of the layer 2 protocol. The requirement concerning own receiver busy condition has been not included as not essential (see 5.6.6).
5.6.2.2 P bit set to 0	10.7.2.2	4 (f)	Inherent part of the layer 2 protocol. The requirement concerning own receiver busy condition has been not included as not essential (see 5.6.6).

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.6.3 Sending and receiving acknowledge-ments		H	
5.6.3.1 Sending acknowledge-ments	10.7.3.1	4 (f)	Inherent part of the layer 2 protocol.
5.6.3.2 Receiving acknowledge-ments	10.7.3.2	4 (f)	Inherent part of the layer 2 protocol. The last requirement is not included. It is covered by subclause 5.6.4.
5.6.4 Receiving REJ frames	10.7.4	4 (f)	Inherent part of the layer 2 protocol. The requirement in last bullet concerning notification of protocol violation is not included. The action taken is implementation dependent and is therefore not an essential requirement. The requirement in item 1) is not included, because it is implicit in other requirements. To do anything else would require the TE to issue a Frame Abort and immediately transmit the I-frame. Last sentence indicating that queued I-frames may be transmitted after retransmission of a requested I-frame is not included. It is not an essential requirement.
5.6.5 Receiving RNR frames	10.7.5	4 (f)	Inherent part of the layer 2 protocol. Note 1 is not included as it is already addressed by the definitions of the variables. The last sentence in the third bullet below subparagraph b) is not included. The requirement stated is that during the enquiry procedure, if a frame indicating clearance of the peer receiver busy condition is received, not to start retransmission of I-frames until expiry of T200 or receipt of the explicit response to the enquiry. This is not essential, since the peer entity will be ready to receive I-frames even before it transmits the enquiry response. The requirement concerning clearance of peer receiver busy condition in case of receipt of a SABME frame is not included. The requirement is stated in 5.5.1.2. The requirements concerning operation in the own receiver busy condition have been not included (see 5.6.6).

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.6.6 Data link layer own receiver busy condition		X	If a TE enters an own receiver busy condition, and does not implement the requirements of the ETS to advise the network side using an RNR frame, some I-frames may be lost. The procedures concerning the receipt of I-frames with N(S) sequence errors have been retained in the TBR as essential requirements, and would ensure the retransmission of any frames lost. No lasting failure to interwork with the network would therefore occur. In addition, the requirements are not testable. It is quite possible (and in many cases likely) that a TE will be designed in such a way that its capacity for processing incoming I-frames is greater than the capacity of the of the D-channel to transport them. In such a case, the TE will never enter the own receiver busy condition. For those TE which could enter the own receiver busy condition, the circumstances under which this occurs will vary significantly from TE to TE, according to implementations of frame handling rates and queue sizes. It is not practicable to devise tests which will be capable of exercising the own receiver busy condition under all possible circumstances under which it might occur.
5.6.7 Waiting acknowledgement	10.7.6	4 (f)	Inherent part of the layer 2 protocol.
5.7 Re-establishment of multiple frame operation		H	
5.7.1 Criteria for re-establishment		X	First bullet is not included. It is covered by subclause 5.5.1.2 Second bullet not included, since no requirements are specified at layer 3 for the issuing of DL-ESTABLISH REQUEST when layer 2 is already established. The third bullet is not included. It is covered by subclause 5.6.7. The fourth bullet is not included. It is covered by subclause 5.8.5. The fifth bullet is not included. The requirement concerning re-establishment in case of receipt of FRMR is not included. An error free network will not send a FRMR frame. The sixth bullet is not included. A DM response frame with the F bit set to 0 will never occur in an error free network. The seventh bullet concerning the receipt of a DM response with F bit set to 1 is kept. This may occur in case of multiple TEI assignment of non-automatic terminals.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.7.2 Procedures	10.8.1	4 (f)	In the first bullet, the issue of a MDL-ERROR-INDICATION primitive leads to an implementation dependent action at the user side. This is not an essential requirement and has not been included.
5.8 Exception condition reporting and recovery.		X	The two first paragraphs are not included. They contain no requirements. Alternatively they may be kept as notes. The last paragraph referring to appendix II defining action to be taken on receipt of MDL-ERROR-INDICATION primitives is not included. All the actions referred to are covered elsewhere in this TBR.
5.8.1 N(S) sequence error	10.9.1	4 (f)	Inherent part of the layer 2 protocol. An N(S) sequence error may occur when a bit error occurs in a previous transmitted I-frame. The bit error causes an FCS error resulting in an invalid frame being received and discarded. The next I-frame transmitted will then contain a N(S) sequence error. The N(S) error will only occur in case of a window size larger than 1. The requirement concerning establishment of only one exception condition is not included. It is adequately addressed by the definitions of the REJ frame. It is not possible by definition for layer 2 to signal to its peer, acknowledgement of two different numbers of I-frames at the same time. The requirement concerning action upon receipt of a REJ frame is not included. It is covered by subclause 5.6.4. The requirements concerning action upon receipt of a SABME or DISC when in reject recovery state is not included. They are covered by subclauses 5.5.1.2 and 5.5.3.2, respectively. The last paragraph with a reference to appendix I is not included. Appendix I is not applicable to European networks.
5.8.2 N(R) sequence error		X	Addressed by 5.8.5.
5.8.3 Timer recovery condition		X	Contains no requirements not already in 5.6.7.
5.8.4 Invalid frame condition	10.9.2	4 (f)	Layer 2 recovery procedures depend on invalid frames being discarded. Also, the layer 3 procedures depend on layer 2 not providing frames to layer 3 with errors in the contents.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.8.5 Frame rejection condition	10.9.3	4 (f)	The receipt of an undefined frame is not possible in an error free network. Requirement not included. The receipt of a supervisory or unnumbered frame with incorrect length is not possible in an error free network. Requirement not included. The receipt of an invalid N(R) may occur due to transmission error. Essential requirement. The receipt of a frame with an I field exceeding N201 is possible as a result of a transmission error in a flag. However, such an error would result in an invalid FCS in the "frame" that would result. Requirement not included. The requirement concerning the issue of a MDL-ERROR-INDICATION is not included. The ETS includes no requirement for consequent action as a result of the primitive being issued. The note is not included. It contains no requirements.
5.8.6 Receipt of an FRMR response frame		X	The note to clause 5 indicates that a FRMR response shall never be generated by a data link layer entity. Also there is no provision within Appendix II for the network side data link layer management entity to send FRMR. Therefore it would require a network misoperation for a FRMR to be received by the user side (see F.1.1 above).
5.8.7 Unsolicited response frames		X	It contains either requirements defined elsewhere in the standard (subclause 5.8.8) or implementation dependent requirements.
5.8.8 Multiple-assignment of TEI value	10.9.4	4 (f)	There are a number of circumstances in which duplicate TEI assignment can occur, e.g. when a TE without a connection detector (and therefore possibly in the TEI assigned state) is connected to a multipoint configuration. Recovery procedures are essential to permit continued support of layer 3.
5.9 List of system parameters	10.10	I	Procedures for automatic negotiation of data link layer parameters are not supported in European networks. Therefore the two paragraphs concerning this are not included. In European networks there are no alternatives to the default values defined. Therefore "The default value of " is replaced by "The value of" in the subclauses of subclause 5.9. table 10 "System parameters" is not included. All relevant parameters are covered in the text.

Table F.2 (continued): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
5.9.1 Timer T200	10.10.1	D	Note 1 and note 2 do not include any requirements and are therefore not included. A range of acceptable values of the timer (0,95 s to 3 s) has been defined for the following reasons. 1. A single value of the timer without tolerances is not appropriate to a standard. 2. The minimum value of 0,95 s was chosen to ensure that no TE which passed ETS 300 153 requirements (1 s ± 5 %) would fail the TBR. 3. The maximum value of 3 s was selected on the basis that longer values than 1 s should be permitted, since they do no harm to the network and may be necessary in order to support TE where the local loop includes a satellite connection (as described in ETS 300 125).
5.9.2 Maximum number of retransmissions (N200)	10.10.2	D	
5.9.3 Maximum number of octets in an information field (N201)	10.10.3	D	The bullet concerning packet information is not included. It is outside the scope of the TBR.
5.9.4 Maximum number of transmission of the TEI identity request message (N202)	10.10.4	D	
5.9.5 Maximum number of outstanding I-frames (k)	10.10.5	D	The bullets concerning packet information are not included. They are outside the scope of the TBR.
5.9.6 Timer T201		X	Not a user side timer.
5.9.7 Timer T202	10.10.6	D	A range of acceptable values of the timer (1.9s to 5s) has been defined for the following reasons: 1) a single value of the timer without tolerances is not appropriate to a standard; 2) the minimum value of 1,9 s was chosen to ensure that no TE which passed ETS 300 153 requirements (2 s ± 5 %) would fail the TBR; 3) the maximum value of 5 s was selected on the basis that longer values than 2 s should be permitted, since they do no harm to the network and may be necessary in order to support TE where the local loop includes a satellite connection.
5.9.8 Timer T203		X	Only used for the data link layer monitor function, which is considered not essential (see 5.10 below).
5.10 Data link layer monitor function		X	Not essential to call processing.

Table F.2 (concluded): Changes with respect to ETS 300 125

Clause of ETS 300 125	Clause in this TBR	Status	Justification
Annex A (to Recommendation Q.921): Provision of point-to-point signalling connections	10.3	4 (f)	The TBR-RT includes a question on the point-to-point data link configuration, which affects requirement and test case selection. The text is taken from the draft second edition, as this is more clearly stated.
Annex B (to Recommendation Q.921): SDL for point-to-point procedures		X	The SDLs include no additional requirements, but are complementary to the text.
Annex C (to Recommendation Q.921): An SDL representation of the broadcast procedures of the data link layer		X	The SDLs include no additional requirements, but are complementary to the text.
Annex D (to Recommendation Q.921): State transition table of the point-to-point procedures of the data link layer		X	The state transition tables include no additional requirements, but are complementary to the text.
Appendix I (to Recommendation Q.921): Retransmission of REJ response frames		X	The Appendix is not applicable to European networks.
Appendix II (to Recommendation Q.921): Occurrence of MDL-ERROR-INDICATION within the basic states and actions to be taken by the management entity		X	For error codes C,D, G and H, the requirements are already stated in the text. The other error codes specify no specific action on the user side. Informative only in ETS 300 125.
Appendix III (to Recommendation Q.921): Optional basic access deactivation procedures		X	Applicable only to the network side.
Appendix IV (to Recommendation Q.921): Automatic negotiation of data link layer parameters		X	Not applicable to European networks.
Abbreviations and acronyms used in Recommendation Q.921 (I.441)		D	Those which are referred to in the text of this TBR are included.
References (used in Q.921)		X	This TBR has its own list of normative references.

F.4 Changes with respect to ETS 300 102-1

F.4.1 General

The December 1990 version of ETS 300 102-1 (including Amendments 1 and 2) was used as the basis for this TBR. The changes made in the draft revision were taken into account wherever appropriate. It is intended that apparatus conforming to either version of ETS 300 102-1 will conform to this TBR.

F.4.2 Messages and information elements

Only those messages which are referred to in the requirements are included within this TBR.

The only information elements which are included within this TBR are those which are either:

- mandatory within one or more messages included within this TBR; or

- optional, and referred to directly by the requirements in this TBR.

Those information elements which do not come within either category are not included in the list of information elements, and their optional presence is not mentioned within the descriptions of the messages in this TBR.

A statement permitting the TE to implement in layer 3 messages any optional information element not mentioned in this TBR is included in subclauses 11.2 and 11.3.1. The layer 3 test suite does not give a FAIL verdict if a message is received by the tester which includes an optional information element not mentioned in this TBR.

F.4.3 Layer 3 response time

The time period within which layer 3 responds to an incoming message is not specified in ETS 300 102-1. However, if the TE takes an unreasonably long time to respond to a message, the network, on expiry of various network side timers, may believe that a fault has occurred, and take the affected B-channel out of service (possibly after attempting the Restart procedure, see below).

Also, if no limit to the maximum response time is specified, there is fundamentally no means of testing the requirements, because no final conclusion can be reached to a test case in the absence of a response from the TE.

No requirement has been included within ETS 300 104 (NET 3, part 2). However, the CTS 2 test suite includes a maximum layer 3 response time of 30 s. This has been adopted in this TBR. It is most unlikely that, under test conditions, this value would be exceeded by any TE.

F.4.4 B-channels

Requirements to connect and disconnect the B-channel have not been included from this TBR. This is because the TE does not interwork with the network in the B-channel for the purpose of processing calls (see clause F.1).

Assignment and release of B-channels remains a requirement, since it is essential under Article 4 (f) for the TE to keep an accurate record of which B-channels are in use. If this is not done, then the TE may cease to be capable of interworking with the network, for example because it incorrectly believes that no B-channels are available.

F.4.5 Cause values

In some cases in ETS 300 102-1, the cause value does not determine the subsequent action of the network. The requirements (scattered over many clauses) for the TE to generate correct cause values in a DISCONNECT, RELEASE or RELEASE COMPLETE message are therefore not included in the TBR as being not essential. Requirements to generate the correct cause value in a STATUS message are retained, as network actions affecting call processing depend on the cause value in a STATUS message sent by the TE.

F.4.6 Receipt of RESTART

No consensus was reached on this subject.

The minority opinion was that the ability to respond to receipt of a RESTART message is not essential because:

1) the circumstances under which the network sends RESTART are not defined, but the informative text in ETS 300 102-1 indicates that it is usually a last resort procedure prior to taking a channel or interface out of service when all other means of clearing a call have failed to obtain a response from the TE. Therefore, failure to respond to a RESTART results in the network taking the same action that it would have taken if the RESTART not been sent at all;

2) there are requirements for the TE to respond to call control messages at layer 3 within a certain time (see subclause F.4.3);

3) it is permitted for a network to send RESTART even in a multipoint configuration, where the procedure is optional in ETS 300 102-1. Because it is optional on both sides of the interface, there is no guarantee that the TE(s) conforming to ETS 300 102-1 are also implementing the procedure. Under these circumstances the network shall have some sort of recovery procedures;

4) the requirement to return B-channels to the idle condition in response to the RESTART message is not essential because of the conclusions of subclause F.4.4.

The majority opinion expressed the view that the requirement is essential in some circumstances because:

1) some networks implement the sending of RESTART in a primary rate or point-to-point configuration, expecting the TE to be capable of responding, because support of the procedure is mandatory in ETS 300 102-1 under these circumstances;

2) if the TE does not respond, then the affected B-channels are taken out of service, with the result that there is a reduction in the ability of the interface to process calls. The requirement is therefore applicable to those cases where a point-to-point configuration is known to exist, i.e. Primary rate, and Basic Rate with a point-to-point data link operating according to ETS 300 125, Part 2, annex A;

3) some networks send a RESTART message on occasions, such as on recovery following a data link layer failure, which are sufficiently frequent to be regarded as normal operating conditions.

The requirements have been included in the TBR for point-to-point and primary rate configurations.

F.4.7 Layer 3 timers

All the layer 3 user side timers are considered not to be essential. The reasons in each case are included in the table below.

Table F.3: Considerations of layer 3 timers

Timer	Justification
T301	It is optional on the user side in ETS 300 102-1.
T302	This timer is used in the Overlap Receiving state, as a maximum time between INFORMATION messages containing the called number. If T302 is not implemented, then, expiry of the network side T304 will cause the network to initiate clearing.
T303	This timer is optional on the user side in ETS 300 102-1.
T304	This timer is used in the Overlap Sending state, as a maximum time between INFORMATION messages containing the called number. If T304 is not implemented, then expiry of the network side T302 will cause the network to initiate clearing if the address information is incomplete.
T305	ETS 300 102-1 has the timer set to 30 s. The network side timer T305 or T306 will also expire after 30 s and cause a RELEASE to be sent, achieving the same effect.
T308	ETS 300 102-1 first edition has the timer set to 4 s. The second edition sets the timer to (N200 + 1) × T200. An error-free network will never permit the timer to expire, because the network will respond to a RELEASE with a RELEASE COMPLETE.
T309	The timer is optional on the user side in ETS 300 102-1.
T310	The timer is optional on the user side in ETS 300 102-1.
T313	An error-free network will never permit T313 to expire, because the network will respond to a CONNECT with a CONNECT ACKNOWLEDGE.
T314	T314 is a timer concerned with the possible loss of segments of messages segmented according to in ETS 300 102-1, annex K. Message segmentation has not been included within this TBR.
T316	This timer is used in the procedures for sending RESTART. These have not been included in this TBR.
T317	This timer is used in the procedures for receiving RESTART. The maximum value of the timer is included within subclause 11.4.8.

F.4.8 Detailed list of changes with respect to ETS 300 102-1

Table F.4: Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
Foreword		X	This TBR has its own foreword.
1 General		X	This TBR has its own scope.
1.1 Scope		X	This TBR has its own scope.
1.2 Application to interface structures		X	This TBR has its own scope.
2 Overview of call control		X	Introductory only.
2.1 Circuit switched calls		X	Introductory only.
2.1.1 Call states at the user side of the interface		X	Introductory only.
2.1.1.1 Null state (U0)	11.1.1.1	D	
2.1.1.2 Call initiated (U1)	11.1.1.2	D	
2.1.1.3 Overlap sending (U2)	11.1.1.3	D	

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
2.1.1.4 Outgoing call proceeding (U3)	11.1.1.4	D	
2.1.1.5 Call delivered (U4)	11.1.1.5	D	
2.1.1.6 Call present (U6)	11.1.1.6	D	
2.1.1.7 Call received (U7)	11.1.1.7	D	
2.1.1.8 Connect request (U8)	11.1.1.8	D	
2.1.1.9 Incoming call proceeding (U9)	11.1.1.9	D	
2.1.1.10 Active (U10)	11.1.1.10	D	
2.1.1.11 Disconnect request (U11)	11.1.1.11	D	
2.1.1.12 Disconnect indication (U12)	11.1.1.12	D	
2.1.1.13 Suspend request (U15)	11.1.1.13	D	
2.1.1.14 Resume request (U17)	11.1.1.14	D	
2.1.1.15 Release request (U19)	11.1.1.15	D	
2.1.1.16 Overlap receiving (U25)	11.1.1.16	D	
2.1.2 Network call states		H	Although the network call states are applicable to the network, not to the user side, there are occasions when they are relevant to the user side, e.g. on receipt by the user side of a STATUS message. They have therefore been included within this TBR.
2.1.2.1 Null state (N0)	11.1.2.1	D	
2.1.2.2 Call initiated (N1)	11.1.2.2	D	
2.1.2.3 Overlap sending (N2)	11.1.2.3	D	
2.1.2.4 Outgoing call proceeding (N3)	11.1.2.4	D	
2.1.2.5 Call delivered (N4)	11.1.2.5	D	
2.1.2.6 Call present (N6)	11.1.2.6	D	
2.1.2.7 Call received (N7)	11.1.2.7	D	
2.1.2.8 Connect request (N8)	11.1.2.8	D	
2.1.2.9 Incoming call proceeding (N9)	11.1.2.9	D	
2.1.2.10 Active (N10)	11.1.2.10	D	
2.1.2.11 Disconnect request (N11)	11.1.2.11	D	
2.1.2.12 Disconnect indication (N12)	11.1.2.12	D	

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
2.1.2.13 Suspend request (N15)	11.1.2.13	D	
2.1.2.14 Resume request (N17)	11.1.2.14	D	
2.1.2.15 Release request (N19)	11.1.2.15	D	
2.1.2.16 Call abort (N22)	11.1.2.16	D	
2.1.2.17 Overlap receiving (N25)	11.1.2.17	D	
2.2 Packet mode access connections			Text not included. Outside the scope of this TBR.
2.3 Temporary signalling connections			Text not included. Outside the scope of this TBR.
2.4 States associated with the global call reference	11.1.3	H	
2.4.1 Call states at the user side of the interface	11.1.3.1	H	.
2.4.1.1 Null (Rest 0)	11.1.3.1.1	D	
2.4.1.2 Restart request (Rest 1)		X	Not included. The ability to send a RESTART message is not essential (see 5.5).
2.4.1.3 Restart (Rest 2)	11.1.3.1.2	D	
2.4.2 Call states at the network side of the interface	11.1.3.2	H	
2.4.2.1 Null (Rest 0)	11.1.3.2.1	D	
2.4.2.2 Restart request (Rest 1)	11.1.3.2.2	D	
2.4.2.3 Restart (Rest 2)		X	
3 Message functional definitions and content	11.2	D	Relevant text included as a general introductory text to the definitions following.
3.1 Messages for circuit mode connection control		I	Included as a note.
3.1.1 Alerting	11.2.1	D	
3.1.2 Call proceeding	11.2.2	D	
3.1.3 Congestion control		X	Not included. Applicable only to the USER INFORMATION message.
3.1.4 Connect	11.2.3	D	
3.1.5 Connect acknowledge	11.2.4	D	
3.1.6 Disconnect	11.2.5	D	
3.1.7 Facility		X	Not included. Not applicable to Basic Call.
3.1.8 Information	11.2.6	D	
3.1.9 Notify	11.2.7	D	
3.1.10 Progress	11.2.8	D	
3.1.11 Release	11.2.9	D	
3.1.12 Release complete	11.2.10	D	The mandatory requirement to respond to a Release complete message with a release of the call reference is not included. It is stated as a requirement in subclause 5.3.4.3.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
3.1.13 Resume	11.2.11	D	
3.1.14 Resume acknowledge	11.2.12	D	
3.1.15 Resume reject	11.2.13	D	
3.1.16 Setup	11.2.14	D	
3.1.17 Setup acknowledge	11.2.15	D	
3.1.18 Status	11.2.16	D	
3.1.19 Status enquiry	11.2.17	D	The mandatory requirement to respond to a STATUS ENQUIRY with a STATUS message is not included. It is stated as a requirement in subclause 5.8.10.
3.1.20 Suspend	11.2.18	D	
3.1.21 Suspend acknowledge	11.2.19	D	
3.1.22 Suspend reject	11.2.20	D	
3.1.23 User information		X	Not included. Outside the scope of this TBR, (User-user signalling)
3.2 Messages for packet mode connection control		X	Not included. Outside the scope of this TBR.
3.3 Messages for user to user signalling not associated with circuit switched calls		X	Not included. Outside the scope of this TBR.
3.4 Messages used with the global call reference		X	Included as a note.
3.4.1 Restart		X	
3.4.2 Restart acknowledge		X	
3.4.3 Status		X	
4 General message format and information elements coding	11.3	I	Included as introductory text to the definitions following.
4.1 Overview	11.3.1	D	Included as introductory text to the definitions following.
4.2 Protocol discriminator	11.3.2	D	
4.3 Call reference	11.3.3	D	References to call references with other length than 1 and 2 octets are not included. The requirement concerning the dummy call reference is not included. It is stated in 5.1.1.
4.4 Message type	11.3.4	D	
4.5 Other information elements	11.3.5	H	
4.5.1 Coding Rules	11.3.5.1	D	The mandatory requirement about receiving additional octets is not included. Last sentence not included.
4.5.1.1 Codeset 0	11.3.5.1.1	D	
4.5.1.2 Codeset 5	11.3.5.1.2	D	

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
4.5.2 Extensions of codesets	11.3.5.2	D	The mandatory requirement about recognizing the shift information and handling of the codesets are not included and moved to 11.4.6.
4.5.3 Locking shift procedure	11.3.5.3	D	
4.5.4 Non-locking shift procedure	11.3.5.4	D	
4.5.5 Bearer capability	11.3.5.5	D	Note with reference to future extension not included. References to non ETSI coding of the information element are not included.
4.5.6 Call Identity	11.3.5.6	D	
4.5.7 Call State	11.3.5.7	D	
4.5.8 Called party number	11.3.5.8	D	
4.5.9 Called party subaddress	11.3.5.9	D	
4.5.10 Calling Party Number		X	
4.5.11 Calling party subaddress		X	
4.5.12 Cause	11.3.5.10	D	ETSI cause values needs clarification.
4.5.13 Channel identification	11.3.5.11	D	Changes made according to ETSI requirements.
4.5.14 Congestion level		X	
4.5.15 Display		X	2nd and 3rd sentences of 3rd paragraph included as a note.
4.5.16 High layer compatibility	11.3.5.12	D	
4.5.17 Keypad facility		X	
4.5.18 Low layer compatibility	11.3.5.13	D	
4.5.19 More data		X	Not included. Applicable only to the USER INFORMATION message.
4.5.20 Network-specific facilities		X	
4.5.21 Notification indicator	11.3.5.14	D	Reference to non ETSI coding of the information element is not included.
4.5.22 Progress indicator	11.3.5.15	D	
4.5.23 Repeat indicator		X	Not included. Outside the scope of the TBR.
4.5.24 Restart indicator	11.3.5.16	D	
4.5.25 Segmented message		X	
4.5.26 Sending complete	11.3.5.17	D	
4.5.27 Signal		X	
4.5.28 Transit network selection		X	
4.5.29 User-user		X	2nd sentence of 3rd paragraph included as a note.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
4.6 Supplementary services information elements		X	
4.6.1 Date/time		X	
4.6.2 Facility		X	
4.6.2.1 Invoke component		X	
4.6.2.1.1 Operation-specific field for user-user information supplementary service		X	
4.6.2.2 Return result component		X	
4.6.2.3 Return error component		X	
4.6.3 Feature activation		X	Not included. Outside the scope off this TBR.
4.6.4 Feature indication		X	Not included. Outside the scope off this TBR.
4.6.5 Switchhook		X	Not included. Outside the scope off this TBR.
4.7 Information elements for packet communications		X	Not included. Outside the scope off this TBR.
5 Circuit switched call control procedures	11.4	X	Text is not included because the subject is addressed in more detail in the subsequent subclauses.
5.1 Call establishment at the originating interface	11.4.1	4 (f)	It is inherently necessary for layer 2 to be established in order for layer 3 call control messages to be exchanged across the interface.
5.1.1 Call request	11.4.1.1	4 (f)	Fundamental part of the signalling system for setting up an outgoing call.
5.1.2 B-channel selection - originating	11.4.1.2, 11.4.1.3.1, 11.4.1.3.2, 11.4.1.4, 11.4.1.5	4f	Requirements included to attach the B-channel on entering the Active state and permission to attech earlier during call setup if progress indicator #8 received.
5.1.3 Overlap sending	11.4.1.2	4 (f)	Optional Essential. Perfectly acceptable for a TE not to support Overlap sending. Needs to be correct if implemented so that outgoing calls can be set up.
5.1.4 Invalid call information		X	Applicable to the network.
5.1.5 Call proceeding		H	
5.1.5.1 Call proceeding, en-bloc sending	11.4.1.3.1	4 (f)	Fundamental part of the signalling system for setting up an outgoing call.
5.1.5.2 Call proceeding, overlap sending	11.4.1.3.2	4 (f)	Optional Essential. Perfectly acceptable for a TE not to support Overlap sending. Needs to be correct if implemented so that calls can be set up.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.1.6 Notification of interworking at the originating interface		X	The progress indicator is already defined as an optional field in various call control messages. There is therefore no need for a special requirement to address the use of Progress in messages sent by the TE. In messages received by the TE, the second edition of ETS 300 102-1 provides helpful clarification to the effect that only network side timers are stopped when Progress is issued. The only change too user side requirements concerns attachment of the B-channel, which is outside the scope of this TBR (see subclause F.4.4 above).
5.1.7 Call confirmation indication	11.4.1.4	4 (f)	Fundamental part of the signalling system for setting up an outgoing call.
5.1.8 Call connected	11.4.1.5	4 (f)	Fundamental part of the signalling system for setting up an outgoing call.
5.1.9 Call rejection		X	Applicable to the network side.
5.1.10 Transit network selection		X	The requirement in the ETS on the TE is to use the transit network selection information element in the relevant call control messages. This is already permitted by subclause 11.3.1. There is no additional requirement.
5.2 Call establishment at the destination interface	11.4.2	4 (f)	It is inherently necessary for layer 2 to be established in order for layer 3 call control messages to be exchanged across the interface.
5.2.1 Incoming call	11.4.2.1	4 (f)	Fundamental part of the signalling system for setting up an incoming call.
5.2.2 Compatibility checking	11.4.2.2	4 (f)	Included as a requirement in modified form. It is essential that the TE responds correctly with call acceptance or rejection depending upon whether it considers itself to be compatible with the call. What is not tested (because the operation of the B-channels is outside the scope of this TBR, see clause F.1 above) is whether the TE sends information in the B-channels compatible with the coding of bearer capability, high layer compatibility and low layer compatibility information elements in the call control messages.
5.2.3 B-channel selection-destination		H	
5.2.3.1 SETUP message delivered by point-to-point data link	11.4.2.3.1	4 (f)	Fundamental part of the signalling system for setting up an incoming call.
5.2.3.2 SETUP message delivered by broadcast data link	11.4.2.3.2	4 (f)	Fundamental part of the signalling system for setting up an incoming call.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.2.4 Overlap receiving	11.4.2.4	4 (f)	Optional Essential. Perfectly acceptable for a TE not to support Overlap receiving. Needs to be correct if implemented so that incoming calls using Overlap receiving can be set up (necessary in some countries for compatibility with the DDI supplementary service, which may be implemented using overlap receiving). A note has been added indicating the circumstances under which overlap receiving might be implemented in the network.
5.2.5 Call confirmation		H	
5.2.5.1 Response to en-bloc SETUP or completion of overlap receiving	11.4.2.5.1	4 (f)	Fundamental part of the signalling system for setting up an incoming call.
5.2.5.2 Receipt of CALL PROCEEDING and ALERTING		X	Applicable to the network.
5.2.5.3 Called user clearing during incoming call establishment		X	Applicable to the network.
5.2.5.4 Call failure		X	Applicable to the network.
5.2.6 Notification of interworking at the terminating interface		X	The progress indicator is already defined as an optional field in various call control messages. There is therefore no need for a special requirement to address the use of Progress in messages sent by the TE. In messages received by the TE, the second edition of ETS 300 102-1 provides helpful clarification to the effect that only network side timers are stopped when Progress is issued. The only change to user side requirements concerns attachment of the B-channel, which is outside the scope of the TBR (see clause F.1 above).
5.2.7 Call accept	11.4.2.6	4 (f)	Fundamental part of the signalling system for setting up an incoming call.
5.2.8 Active indication	11.4.2.7	4 (f)	Fundamental part of the signalling system for setting up an incoming call.
5.2.9 Non-selected user clearing	11.4.2.8	4 (f)	Applicable only to multipoint configurations at Basic Rate. Essential to permit the undisturbed operation of the network with the selected terminal.
5.3 Call clearing		H	
5.3.1 Terminology	11.4.3.1	D	B-channel connection and disconnection not included. (see clause F.1 above)

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.3.2 Exception conditions	11.4.3.2	4 (f)	Fundamental part of the signalling system for clearing a call. Subparagraphs b and c not included as they are addressed in more detail in subclauses 5.2.9 and 5.3.3. Subparagraphs e1 & e2 not included as being applicable only to the network.
5.3.3 Clearing initiated by the user	11.4.3.3	4 (f)	Fundamental part of the signalling system for clearing a call.
5.3.4 Clearing initiated by the network		X	Applicable to the network.
5.3.4.1 Clearing when tones/announcements provided	11.4.3.4	4 (f)	The Option of entering the Disconnect Indication state is retained for when the DISCONNECT message includes progress indicator #8. Normal clearing according to subclause 5.3.4.2 is also permitted.
5.3.4.2 Clearing when tones/announcements not provided	11.4.3.4.2	4 (f)	Fundamental part of the signalling system for clearing a call.
5.3.4.3 Completion of clearing	11.4.3.4.3	4 (f)	Fundamental part of the signalling system for clearing a call.
5.3.5 Clear collision	11.4.3.5	4 (f)	Clear collision occurs when both the TE and the network simultaneously transfer DISCONNECT messages specifying the same call. Clear collision can also occur when both sides simultaneously transfer RELEASE messages related to the same call. Fundamental part of the signalling system for clearing a call. Clear collisions are regarded as a normal occurrence in ISDN.
5.4 In-band tones and announcements		X	Applicable to the network.
5.5 Restart procedure		X	See F.4.6 above.
5.5.1 Sending RESTART		X	There are no defined circumstances under which the TE is required to send RESTART to the network. The subclause is therefore not essential.
5.5.2 Receipt of RESTART		4 (f)	See subclause F.4.6 above.
5.6 Call rearrangements	11.4.4	X	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.
5.6.1 Call suspension	11.4.4.1	X	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.
5.6.2 Call suspended	11.4.4.2	X	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.
5.6.3 Call suspend error	11.4.4.3	4 (f)	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.6.4 Call re-establishment	11.4.4.4	X	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.
5.6.5 Call resume errors	11.4.4.5	X	Not included for Primary Rate, since the Terminal Portability Supplementary Service is only applicable to Basic Rate.
5.7 Call collisions	11.4.5	I	Included for information. No requirement exists.
5.8 Handling of error conditions	11.4.6	I	Text not included, except for an introductory sentence, as subsequent subclauses address the matter in more detail.
5.8.1 Protocol discrimination error	11.4.6.1	4 (f)	It was intended that the requirement should be modified (and a TBR-RT question added) to address the possibility that a TE may be simultaneously capable of supporting Euro-ISDN and a national ISDN protocol with a different protocol discriminator. Time has not permitted the inclusion of suitable text.
5.8.2 Message too short		X	Would require network misoperation in order to occur.
5.8.3 Call reference error	11.4.6.2	H	
5.8.3.1 Invalid call reference format		X	First two paragraphs are not included because they would require a network misoperation to occur. The third paragraph is not included because the dummy call reference is not used in association with the basic call.
5.8.3.2 Call reference procedural errors	11.4.6.2.1	4 (f)	Item a) could result from the implementation of Supplementary Services on the network side. Item b) could result from the implementation of Supplementary Services on the network side. Item c) could result from the implementation of Supplementary Services on the network side. Item d) is not included, as a network error would be necessary for this to occur. Item e) could result from the collision of a SETUP ACKNOWLEDGE with the resending of a SETUP. Item f) is not included, as a network error would be necessary for this to occur. Item g) is not included, as the case is dealt with in more detail in subclause 5.8.11. Item h) (from the second edition) is not included as a network error would be necessary for this to occur

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.8.4 Message type or message sequence errors	11.4.6.3	4 (f)	Could result from the implementation of Supplementary Services on the network side. Third exception from the second edition is included for the same reason.
5.8.5 General information element errors	11.4.6.4	I	Included as introductory text to the subsequent paragraphs.
5.8.5.1 Information element out of sequence		X	Would require network misoperation in order to occur.
5.8.5.2 Duplicated information elements	11.4.6.4.1		Could result from the implementation of Supplementary Services on the network side.
5.8.6 Mandatory information element errors	11.4.6.5	H	
5.8.6.1 Mandatory information element missing	11.4.6.5.1	4 (f)	Necessary to future proof the TE against additional features on the network.
5.8.6.2 Mandatory information element content error	11.4.6.5.2	4 (f)	Necessary to future proof the TE against additional features on the network.
5.8.7 Non-mandatory information element errors	11.4.6.6	H	
5.8.7.1 Unrecognized information element	11.4.6.6.1	4 (f)	Necessary to future proof the TE against additional features on the network. Text takes into account the second edition.
5.8.7.2 Non-mandatory information element content error	11.4.6.6.2	4 (f)	Necessary to future proof the TE against additional features on the network. Text takes into account the second edition.
5.8.7.3 Unexpected recognized information element (draft 2nd edition)	11.4.6.6.3	4 (f)	Necessary to future proof the TE against additional features on the network.
5.8.8 Data link reset	11.4.6.7	X	Even the actions specified are not taken, the network will perform the necessary action under ETS 300 102-1, including the clearance of calls in those states which require it, and the invocation of the Status or Status Enquiry procedures. The correct response to this is included within this TBR, and therefore an incompatible call state cannot persist.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
5.8.9 Data link failure	11.4.6.8	4 (f)	Even the actions specified are not taken, the network will perform the necessary action under ETS 300 102-1, including the clearance of calls in those states which require it, and the invocation of the Status or Status Enquiry procedures. The correct response to this is included within this TBR, and therefore an incompatible call state cannot persist. In State U10, when timer T309 is not implemented, a liaison to SPS5 requesting clarification of whether, in ETS 300 102-1 the requirement is to clear immediately or never to clear, met with differences of opinion as to the meaning of the ETS. It was therefore agreed that, for the purposes of the TBR, given the optional nature of T309, the TE may clear immediately, clear never, or clear after a delay. In effect there is no requirement.
5.8.10 Status enquiry procedure	11.4.6.9	4 (f)	Text modified to not include dependence on timers. STATUS enquiry is one of the permitted responses to such events as data link reset. Call processing does not depend on the precise timing of the procedure.
5.8.11 Receiving a STATUS message	11.4.6.10	4 (f)	Included as a requirement. Optional Essential for receiving a STATUS (i.e. applicable only if sending STATUS ENQUIRY is implemented. Essential for sending STATUS in response to receiving STATUS ENQUIRY, otherwise the network may place the B-channel in a maintenance condition.
5.9 User notification procedure	11.4.7	4 (f)	Generation of NOTIFY is a normal operating condition of the network. There is no requirement for the TE to generate NOTIFY (see 5.6.7).
6 Packet communication procedures		X	Outside the scope of this TBR.
7 User-to user signalling procedures		X	Outside the scope of this TBR.
8 Application of circuit-switched supplementary services to terminals using stimulus procedures		X	Not an essential requirement.
9 List of system parameters		H	
9.1 Timers in the Network Side		X	Applicable to the network side.
9.2 Timers in the User side		X	All layer 3 timers except T317 relating to requirements included in this TBR would require a network misoperation in order to occur. See F.4.7 for more detail.

Table F.4 (continued): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
Annex A (informative): User side and network side SDL diagrams		X	Informative only in ETS 300 102-1.
Annex B (normative): Compatibility checking		X	See that subclause 5.2.2 for more detail on the justification.
B.1 Introduction		X	
B.2 Calling side compatibility checking		X	
B.3 Called side compatibility checking		X	
B.3.1 Compatibility checking with addressing information		X	
B.3.2 Network-to user compatibility checking		X	
B.3.3 User-to-user compatibility checking		X	
B.3.4 User action tables		X	
B.4 Interworking with existing networks		X	
Annex C (normative): Transit network selection		X	See 5.1.10 for information concerning transit network selection.
C.1 Selection not supported		X	
C.2 Selection supported		X	
Annex D (informative): Extension for symmetric call operation		X	Not applicable to the user-network interface.
Annex E (normative): Network specific facility selection		X	Applicable to the network.
Annex F (informative): D-channel backup procedures		X	Not applicable to Euro-ISDN.
Annex G (informative): Cause definitions		X	The annex is informative, and mainly repeats in extended form the information in subclause 4.5.12.
Annex H (informative): Examples of information elements coding		X	Contains no requirements. Informative only.
Annex I (normative): Use of progress indicators		X	No new requirements added to the user side.
Annex J (normative): Examples of cause value and location for busy condition		X	Informative examples only.
Annex K (normative): Message segmentation procedures		X	For Basic call there are no messages that are long enough to require segmentation. Not all networks actually implement message segmentation.

Table F.4 (concluded): Changes with respect to ETS 300 102-1

Clause of ETS 300 102-1	Clause in this TBR	Status	Justification
Annex L (normative): Low layer information coding principles		X	Addresses interworking via the network.
Annex M (normative): Low layer compatibility negotiation		X	Addresses interworking via the network.
Annex N (normative): Procedures for establishment of bearer connection prior to call acceptance		X	Applicable to network only.
Annex O (informative): Optional procedures for bearer service change		X	Informative only.
Annex P (informative): Formal Definitions for the Facility information element		X	Informative only.
Appendix I (informative) (to ETS 300 102-1): Usage of cause values		X	Informative only.
Appendix II (informative): (to ETS 300 102-1): Example message flow diagrams and example conditions for cause mapping		X	Informative only.
Appendix III (informative) (to ETS 300 102-1): Summary of assigned information element identifier and message type code points for the T/S 46-XX series of ETSs		X	Informative only.

F.5 Changes with respect to I-ETS 300 313

This annex sumarizes the changes of the layer 2 ATS with respect to I-ETS 300 313.

F.5.1 Change of use of timer TAC (layer 2 response time)

The layer 2 response time value, which is tested by timer TAC, to be tested depends on the configuration (point-to-point or point-to-multipoint). The original test suite used a constant value (200 ms) and is therefore not able to test different values as necessary. To solve the problem a variable (TAC_VAL) is used to pass the value of timer TAC to the test cases. This value is initialized at the start of PR31401 for BA and PR34001 for PA, as these two preambles are used by all test cases.

In the constants declaration two new constants are declared (TAC_PTP and TAC_PTMP). In the test suite variables declaration a new variable is declared (TAC_VAL).

F.5.2 Change of timer tolerances

The declaration of the constants T200MAX and T202MAX are changed to 5 000 (5 s) in order to reflect the changes of tolerances used in this TBR.

F.5.3 Change of timer TWL3 (layer 3 response time)

The value TWL3 is changed from a PIXIT value to the layer 3 response time defined in this TBR for layer 3.

F.5.4 Detailed list of changes with respect to I-ETS 300 313

Table F.5: Changes with respect to ETS 300 313

Test case identifier	Problem in I-ETS 300 313	Changes with respect to I-ETS 300 313
TC13010	The purpose of the test case is to test that the IUT transmits an ID-request frame only N202 (3) times. However, an IUT may initiate TEI assignment procedure for its own reasons (subclause 5.3.1 of ETS 300 125) and therefore an IUT may retransmit ID-request endlessly and still be implemented according to the standard. Therefore it can only be tested that the IUT transmits ID-request **at least** N202 times.	It is tested that the IUT transmits ID-request at least N202 times. The test case is not awaiting a timeout of a test timer in order to pass. After retransmission of (N202-1) ID-requests the test case proceeds to PO44004 with verdict pass.
TC14019	The test case is using the non-essential requirement, that an IUT shall initiate TEI assignment procedure after TEI removal.	The modified version of CS51001 does take into account not using non-essential requirements when checking state 1. Therefore the expected receipt of an ID request can be replaced by the modified version of CS51001.
TC14022	Same as for TC14019	Same as for TC14019
TC24004	**Problem 1** The Basic Access part of the test case is not able to test a point-to-point configured IUT, as the Basic Access part provides that the IUT is able to receive layer 3 messages in UI-frames. **Problem 2** For point-to-multipoint a UI-frame containing a compatible SETUP (UI1) with the mandatory information element Channel Identification missing is sent to the IUT. This causes the IUT to respond with a RELEASE COMPLETE. In order to code UI1 it necessary to provide information giving the coding of a compatible SETUP with the mandatory information element Channel Identification missing. This information is provided from the PIXIT filled by the test apparatus supplier.	**Problem 1** The problem can be solved by using the Primary Rate Access part for Basic Access IUTs configured for point-to-point. The I-frame used (IN5) in the PA part is an I-frame which is declared for BA as well. Therefore when using the test case for BA the declarations will be correct. A new selection mechanism is introduced using a new PICS parameter PC_PTMP **Problem 2** Instead of using a compatible SETUP with no Channel ID, a SETUP (UI3) with no information elements is used. The response from the IUT is the same in both cases, and using UI3 does not require information from the PIXIT.
TC24007	Same as for TC14019	Same as for TC14019

Table F.5 (continued): Changes with respect to ETS 300 313

Test case identifier	Problem in I-ETS 300 313	Changes with respect to I-ETS 300 313
TC25005	In case of retransmitting SABME N200 times, the behaviour of the IUT is not clear. Therefore it only possible to test whether an IUT retransmits SABME *at least* N200 times	Test is changed in order to test that the IUT retransmits SABME at least N200 times
TC27027	The postamble PO44001 is used. It leaves the IUT into state 4, in which may not be stable.	"+PO44001" is replaced by "+PO44004". PO44004 will leave the IUT in state 1, 4 or 7, depending on which state is stable for the IUT.
TC27031	Same as for TC14019	Same as for TC14019
TC27040	The IUT is left in state 4 which often is unstable state	The IUT is left in state 7
TC27058	The purpose of the test case is to test whether the IUT ignores a frame containing an FCS error. The IUT is brought to state 7.0 and an I-frame (Release) with a FCS error is sent to the IUT and no frames are expected from the IUT for TNOAC (3 s). However, the IUT may not be stable in state 7.0 and therefore it may send a DISC, which will cause the verdict fail.	A DISC from the IUT is accepted. In case a DISC is received verdict inconclusive is assigned. It is not possible to determine whether the IUT is not be stable in state 7.0, and initiates disconnection of the datalink or whether the DISC is sent as a result of the I-frame with a FCS error.
TC27074	The IUT may be left in an unstable state at the end of the test.	PO44001 is replaced by PO44004.
TC27075	The IUT may be left in an unstable state at the end of the test.	PO44001 is replaced by PO44004.
TC27417	The IUT may be left in an unstable state at the end of the test.	PO44001 is replaced by PO44004.
TC28019	Same as for TC14019	Same as for TC14019
PR31001	The basic access ATS is not able to test point-to-point configured IUTs	A selection mechanism selecting the primary rate access preambles for basic access point-to-point IUTs is introduced.
PR31401	The ATS uses a fixed value for the layer 2 response time. The TBRs requires two different values depending on the configuration.	A selection mechanism of the appropriate value of layer 2 response time is added.
PR33001	Same as for PR31001	Same as for PR31001
PR34001	Same as for PR31001 and PR31401	Same as for PR31001 and PR31401
PR34003	For an IUT unstable in state 4 the IUT may end in a infinite loop.	If the IUT sends a SABME a DM is sent to it, which leaves it in state 4.
PR35001	The preamble is using a non-essential requirement. It expects that the IUT when in state 4 and receiving a DM F=0 initiates establishment of the data link.	It is an essential requirement that the IUT initiates re-establishment in case of N(R) sequence error (ETS 300 125, subclause 5.8.5, Frame rejection condition). Therefore sending a RR command frame with a N(R) sequence error when the IUT is in state 7.0 will force the IUT to transmit a SABME and enter state 5.1.There is no difference for the purpose of the test entering state 5.0 or 5.1.

Table F.5 (concluded): Changes with respect to ETS 300 313

Test case identifier	Problem in I-ETS 300 313	Changes with respect to I-ETS 300 313
PR37002	Same as for PR31001	Same as for PR31001
PR37004	A empty SETUP is sent to the IUT in state 1 or state 4. The empty SETUP will initiate that the IUT will respond with a RELEASE COMPLETE, but before that it shall establish a datalink. It is expected to receive a ID-request or SABME within TWAIT (30 s) which is assumed to be initiated because layer 2 has an I-frame to send. After receiving the first frame the following frames are expected to be received within timer TAC (layer 2 response time). However, the assumption is not necessarily correct. Therefore it cannot be required that the IUT sends most of the frames within expiry of timer TAC.	When sending the empty SETUP to the IUT TWL3 (layer 3 response time) is started, and it is not cancelled before the response in an I-frame is received. All use of timer TAC is deleted.
PO44004		The postamble has been modified.
CS51001	The purpose of the check state is to test whether the IUT is in state 1. It is expected that the IUT does not initiate TEI assignment procedure. However, an IUT may initiate TEI assignment procedure of its own reasons (subclause 5.3.1 of ETS 300 125) and therefore it cannot be assumed that the terminal is stable in state 1.	The new Check state allows that the IUT sends a ID-request. In that case it is proven that the IUT just left state 1 and therefore the verdict pass is assigned. In case no frames are received within TNOAC (3 sec.) an ID-check request is sent to the IUT and no response is expected.
CS53001	When calling CS53001 there may be an I-frame in the I queue of the IUT as a result of the preambles and test cases performed prior to the call of the postamble. This is not taken into account in the old version.	CS53001 has been modified so that the only requirement is that the IUT transmits an ID-request within expiry of TW202. CS will accept an establishment of the data link and a possible transmission of any I-frame from the IUT.
CS54001	The postamble is using the non essential requirement to respond to a DISC with DM when in state 4.	There are no means to check whether the IUT is in state 4 without using non-essential requirements. Therefore the non-essential requirement is used. However, if the IUT does nor respond to a DISC when in state 4 (non-essential) the verdict inconclusive is assigned.
CS57001	An IUT in state 7.0, may send a DISC for its own reasons. This gives the verdict fail in the ATS.	In case the IUT sends a DISC, the verdict inconclusive is assigned, as it is not possible to determine whether the IUT was in state 7 or 6.
CS57101	The IUT is left in a unstable state at the end of the test.	PO44001 is replaced by PO44004
CS57401	The IUT is left in a unstable state at the end of the test.	PO44001 is replaced by PO44004

F.6 Changes with respect to I-ETS 300 322

F.6.1 Change of test case identifiers

In I-ETS 300 322 TC10008 and TC10009 existed in two different versions. One version for testing basic access and one version for testing primary rate access. The versions for testing primary rate access are assigned new identifiers:

- TC10008 for BA is assigned the identifier TC10008;

- TC10008 for PA is assigned the identifier TC10037;

- TC10009 for BA is assigned the identifier TC10009;

- TC10009 for PA is assigned the identifier TC10038.

F.6.2 Changes of constraints

In I-ETS 300 322 the constraints does not allow for the inclusion of all supplementary service elements and tests could fail if such elements were included in messages sent from the IUT.

The ATS has been modified such that these elements are no longer constrained and are therefore ignored when present.

F.6.3 Changes to required Cause values

The cause values of DISCONNECT, RELEASE and RELEASE COMPLETE messages are constrained in I-ETS 300 322.

This is not an essential requirement and the test cases no longer require specific cause values in these messages.

Annex G (normative): List of supported telecommunication services

G.1 Basic telecommunication services

This TBR is applicable to TE supporting basic telecommunication services based on the following bearer capabilities:

- circuit-mode 3,1 kHz audio (ETS 300 084);

- circuit-mode 64 kbit/s unrestricted (ETS 300 108);

  NOTE: This also includes circuit-mode access to a PSPDN (X.31 case A).

- circuit-mode 64 kbit/s unrestricted with tones/announcements (ETS 300 267-1);

- circuit-mode speech (ETS 300 083);

- circuit-mode multirate (ETS 300 389).

G.2 Supplementary services

This TBR is applicable to TE that supports:

a) any supplementary service invoked by stimulus signalling (ETS 300 122-1); or

b) any supplementary service invoked by functional signalling where the call state is not altered other than by the procedure defined for basic call. This includes the following:

   - Multiple Subscriber Number (MSN) supplementary service (ETS 300 052-1);
   - Direct Dialling In (DDI) supplementary service (ETS 300 064-1);
   - Subaddressing (SUB) supplementary service (ETS 300 061-1);
   - Calling Line Identification Presentation (CLIP) supplementary service (ETS 300 092-1);
   - Calling Line Identification Restriction supplementary (CLIR) service (ETS 300 093-1);
   - Connected Line Identification Presentation (COLP) supplementary service (ETS 300 097-1);
   - Connected Line Identification Restriction (COLR) supplementary service (ETS 300 098-1);
   - Call Waiting (CW) supplementary service (ETS 300 058-1);
   - Advice Of Charge (AOC) supplementary service (ETS 300 182-1);
   - Malicious Call Identification (MCID) supplementary service (ETS 300 130-1);
   - Call Hold (HOLD) supplementary service (ETS 300 141-1);
   - Three-Party (3PTY) supplementary service (ETS 300 188-1);
   - Conference call add-on (CONF) supplementary service (ETS 300 185-1);
   - Closed User Group (CUG) supplementary service (ETS 300 138-1);
   - Freephone (FPH) supplementary service (ETS 300 210-1);
   - User-to-User Signalling (UUS) supplementary service (ETS 300 286-1);
   - Diversion supplementary services (CFU, CFB, CFNR and CD) (ETS 300 207-1)
   - Explicit Call Transfer (ECT) supplementary service (ETS 300 369-1);
   - Completion of Calls to Busy Subscriber (CCBS) supplementary service (ETS 300 359-1).

   Other supplementary services that may be defined in the future may be included in this category.

Annex H (informative): Bibliography

1) 73/23/EEC: "Council Directive of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits".

2) 89/336/EEC: "Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility".

3) 91/263/EEC: "Council Directive of 29 April 1991 on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity".

4) ENV 55102-1 (1993): "Electromagnetic Compatibility requirements for ISDN Terminal Equipment - Part 1: Emission requirements".

5) ENV 55102-2 (1992): "Electromagnetic Compatibility requirements for ISDN Terminal Equipment - Part 2: Immunity requirements".

6) EN 60950 (1991): "Safety of information technology equipment, including electrical business equipment (IEC 950:1991 modified)".

7) EN 60950/A1 (1993): "IEC 950:1991/A1:1992".

8) EN 60950/A2 (1993): "IEC 950:1991/A2:1993 modified".

9) ETS 300 011 (1992): "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles".

10) ETS 300 012 (1992): "Integrated Services Digital Network (ISDN); Primary rate user-network interface; Layer 1 specification and test principles".

11) ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".

12) ETS 300 052-1 (1991): "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

13) ETS 300 058-1 (1991): "Integrated Services Digital Network (ISDN); Call Waiting (CW) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

14) ETS 300 061-1 (1991): "Integrated Services Digital Network (ISDN); Subaddressing (SUB) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

15) ETS 300 064-1 (1991): "Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

16) ETS 300 092-1 (1992): "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

17) ETS 300 092-1 (1992): "Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

18) ETS 300 083 (1993): "Integrated Services Digital Network (ISDN); Circuit mode structured bearer service category usable for speech information transfer Terminal requirements for end-to-end compatibility"

19) ETS 300 084 (1993): "Integrated Services Digital Network (ISDN); Circuit mode structured bearer service category usable for 3,1 kHz audio information transfer Terminal requirements necessary for end-to-end compatibility"

20) ETS 300 097-1 (1992): "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

21) ETS 300 098-1 (1992): "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLR) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

22) ETS 300 102-1/A1 (1992).

23) ETS 300 102-1/A2 (1993).

24) ETS 300 102-2 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".

25) ETS 300 104 (1991): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access; Layer 3 aspects (Candidate NET 3, Part 2)".

26) ETS 300 108 (1992): "Integrated Services Digital Network (ISDN); Circuit mode 64 kbit/s 8 kHz unrestricted structured bearer service category Service description"

27) ETS 300 125 (1991): "Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".

28) ETS 300 153 (1992): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access (Candidate NET 3, Part 1)".

29) ETS 300 130-1 (1992): "Integrated Services Digital Network (ISDN); Malicious Call Identification Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

30) ETS 300 138-1 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

31) ETS 300 141-1 (1992): "Integrated Services Digital Network (ISDN); Call Hold (HOLD) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

32) ETS 300 153 (1992): "Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access (Candidate NET 3, Part 1)".

33) ETS 300 182-1 (1993): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

34) ETS 300 185-1 (1993): "Integrated Services Digital Network (ISDN); Conference call, add on (CONF) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

35) ETS 300 188-1 (1993): "Integrated Services Digital Network (ISDN); Three-Party (3PTY) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

36) ETS 300 196 (1993): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol".

37) Final Draft prETS 300 207-1 (1994): "Integrated Services Digital Network (ISDN); Diversion Supplementary services Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

38) ETS 300 210-1 (1992): "Integrated Services Digital Network (ISDN); Freephone (FPH) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

39) ETS 300 267-1 (1994): "Integrated Services Digital Network (ISDN); Telephony 7 kHz and videotelephony teleservices Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

40) ETS 300 286-1 (1993): "Integrated Services Digital Network (ISDN); User-to-User Signalling (UUS) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

41) Draft prI-ETS 300 313 (1993): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Abstract Test Suite (ATS) for user of data-link-layer protocol for general application".

42) Draft prI-ETS 300 322 (1993): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Abstract Test Suite (ATS) for user of signalling-network-layer protocol for circuit-mode basic call control".

43) Draft prETS 300 359-1 (1993): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

44) Draft prETS 300 369-1 (1994): "Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) Supplementary service Digital Subscriber Signalling System No. one (DSS1) protocol. Part 1: Protocol specification"

45) prTBR 3: "Integrated services digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access".

46) TBR 8 (1993): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals".

47) CCITT Recommendation E.163 (1988): "Numbering plan for the international telephone service".

48) CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".

49) ITU-T Recommendation F.69 (1993): "Plan for telex destination codes".

50) ITU-T Recommendation F.182 (1993): "Operational provisions for the international public facsimile service between subscribers' stations with group 3 facsimile machines (telefax 3)".

51) ITU-T Recommendation F.184 (1993): "Operational provisions for the international public facsimile service between subscriber stations with group 4 facsimile machine (telefax 4)".

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