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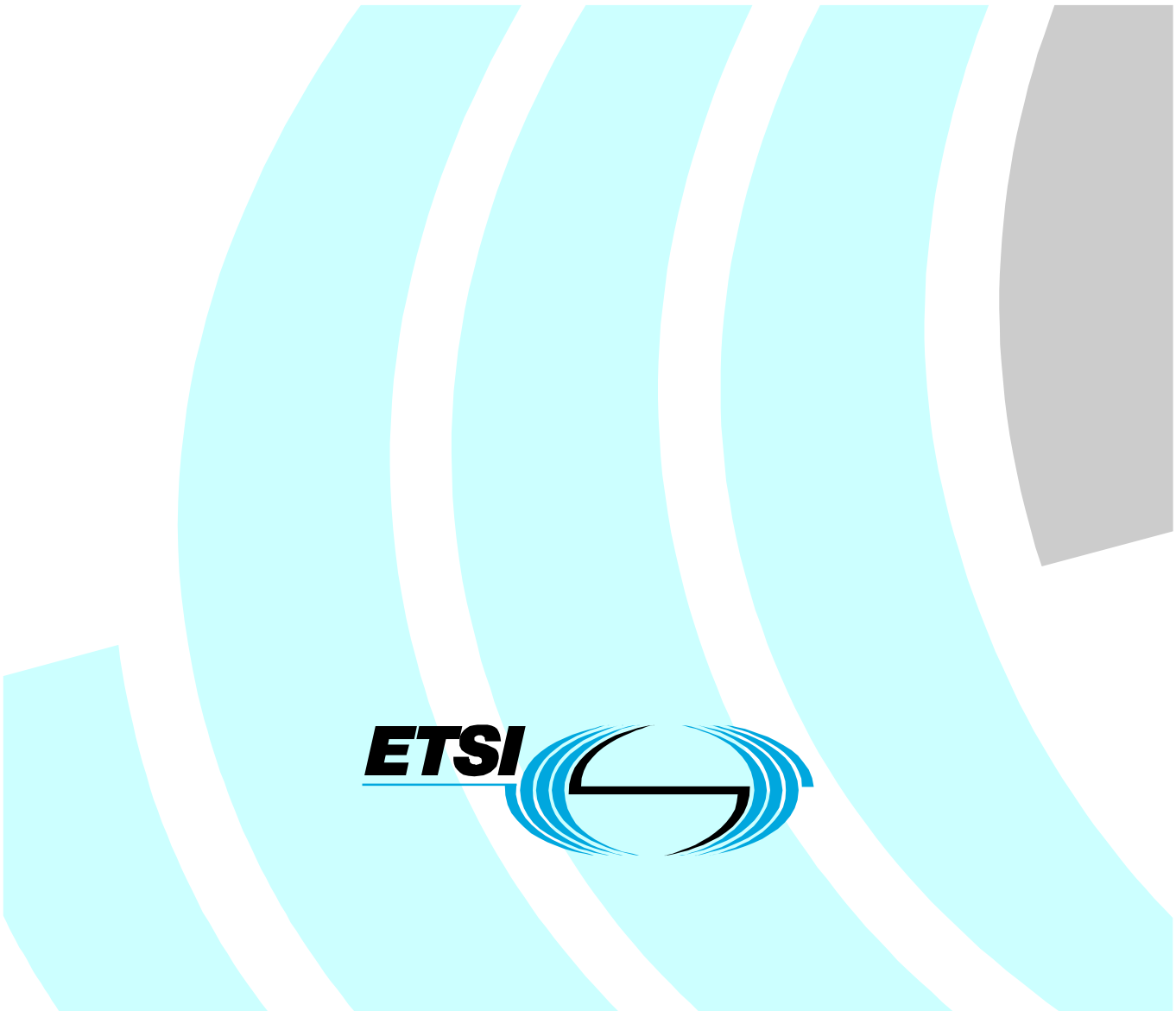
Technical Specification

Broadband Radio Access Networks (BRAN); HIPERACCESS; Conformance Testing for the Data Link Control (DLC) Layer; Part 1: Protocol Implementation Conformance Statement (PICS) proforma



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Foreword

This Technical Specification (TS) has been produced by ETSI Project Broadband Radio Access Networks (BRAN).

The present document is part 1 of multi-part deliverable covering Broadband Radio Access Networks (BRAN); HIPERACCESS; Conformance Testing for the Data Link Control (DLC) Layer, as identified below:

Part 1: "Protocol Implementation Conformance Statement (PICS) proforma";

Part 2: "Test Suite Structure and Test Purposes (TSS&TP) specification";

Part 3: "Abstract Test Suite (ATS)".

Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. When such a statement is based on a protocol, it is called PICS.

1 Scope

The present document provides the PICS proforma for BRAN HIPERACCESS DLC layer, as defined in TS 102 000 [1] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4] and ETS 300 406 [2].

It details in tabular form the implementation options, i.e. the optional functions additional to those, which are mandatory to implement.

2 References

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

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI TS 102 000 (V1.1.1): "Broadband Radio Access Networks (BRAN); HIPERACCESS; Data Link Control (DLC) protocol specification".

[2] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[3] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[4] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 102 000 [1], ISO/IEC 9646-1 [3], ISO/IEC 9646-7 [4] and the following apply:

Implementation Conformance Statement (ICS): statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

NOTE: The ICS can take several forms: protocol ICS, profile ICS, profile specific ICS, information object ICS, etc.

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

Profile ICS: ICS for an implementation or system claimed to conform to a given profile specification

Protocol ICS (PICS): ICS for an implementation or system claimed to conform to a given protocol specification

Profile Requirement List (PRL): requirement list for an implementation or system claimed to conform to a given profile specification

3.2 Abbreviations

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

AP	Access Point (= base station)
ARQ	Automatic Repeat Request
AT	Access Termination (= terminal = subscriber station)
BRAN	Broadband Radio Access Network
DL	DownLink
DLC	Data Link Control (layer)
FDD	Frequency Division Duplex
ICS	Implementation Conformance Statement
IP	Internet Protocol
IUT	Implementation Under Test
MAC	Medium Access Control, Message Authentication Code
PDU	Protocol Data Unit
PICS	Protocol ICS
PRL	Profile Requirement List
RLC	Radio Link Control
SAR	Segmentation And Re-assembly
SUT	System Under Test
TEK	Traffic Encryption Key
UL	UpLink

4 Conformance to this PICS proforma specification

If it claims to conform to the present document, the actual PICS proforma to be filled in by a supplier shall be technically equivalent to the text of the PICS proforma given in annex A, and shall preserve the numbering/naming and ordering of the proforma items.

An PICS which conforms to the present document shall be a conforming PICS proforma completed in accordance with the guidance for completion given in clause A.1.

Annex A (normative): Protocol ICS proforma for TS 102 000

A.1 Guidance for completing the proforma

A.1.1 Purposes and structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in TS 102 000 may provide information about the implementation in a standardized manner.

The PICS proforma is subdivided into clauses for the following categories of information:

- guidance for completing the PICS proforma;
- identification of the implementation;
- identification of the TS 102 000;
- global statement of conformance;
- roles;
- major capabilities;
- PDUs;
- PDU parameters.

A.1.2 Abbreviations and conventions

The PICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7.

Item column

The item column contains a number, which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Status column

The following notations, defined in ISO/IEC 9646-7, are used for the status column:

m	mandatory - the capability is required to be supported.
o	optional - the capability may be supported or not.
n/a	not applicable - in the given context, it is impossible to use the capability.
x	prohibited (excluded) - there is a requirement not to use this capability in the given context.

o.i qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.

ci conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.

i irrelevant (out-of-scope) - capability outside the scope of the reference specification. No answer is requested from the supplier.

NOTE 1: This use of "i" status is not to be confused with the suffix "i" to the "o" and "c" statuses above.

Reference column

The reference column makes reference to TS 102 000, except where explicitly stated otherwise.

Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7, are used for the support column:

Y or y supported by the implementation.

N or n not supported by the implementation.

N/A, n/a or - no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

If this PICS proforma is completed in order to describe a multiple-profile support in a system, it is necessary to be able to answer that a capability is supported for one profile and not supported for another. In that case, the supplier shall enter the unique reference to a conditional expression, preceded by "?" (e.g. ?3). This expression shall be given in the space for comments provided at the bottom of the table. It uses predicates defined in the SCS, each of which refers to a single profile and which takes the value TRUE if and only if that profile is to be used.

EXAMPLE 1: ?3: IF prof1 THEN Y ELSE N.

NOTE 2: As stated in ISO/IEC 9646-7, support for a received PDU requires the ability to parse all valid parameters of that PDU. Supporting a PDU while having no ability to parse a valid parameter is non-conformant. Support for a parameter on a PDU means that the semantics of that parameter are supported.

Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values: <min value> .. <max value>
  example: 5 .. 20

- list of values: <value1>, <value2>, ..., <valueN>
  example: 2 ,4 ,6 ,8, 9
  example: '1101'B, '1011'B, '1111'B
  example: '0A'H, '34'H, '2F'H

- list of named values: <name1>(<val1>), <name2>(<val2>), ..., <nameN>(<valN>)
  example: reject(1), accept(2)

- length: size (<min size> .. <max size>)
  example: size (1 .. 8)

Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

References to items

For each possible item answer (answer in the support column) within the PICS proforma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE 2: A.5/4 is the reference to the answer of item 4 in table 5 of annex A.

EXAMPLE 3: A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table 6 of annex A.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.1.3 Instructions for completing the PICS proforma

The supplier of the implementation shall complete the PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided, using the notation described in clause A.1.2.

However, the tables containing in "Access Termination AT" clause shall only be completed for AT implementations, and the tables containing in "Access Point AP" clause shall only be completed for AP implementations.

If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately.

More detailed instructions are given at the beginning of the different clauses of the PICS proforma.

A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the PICS should be named as the contact person.

A.2.1 Date of the statement

.....

A.2.2 Implementation Under Test (IUT) identification

IUT name:

.....

.....

IUT version:

.....

A.2.3 System Under Test (SUT) identification

SUT name:

.....

.....

Hardware configuration:

.....

.....

.....

Operating system:

.....

A.2.4 Product supplier

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.2.5 Client (if different from product supplier)

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

A.2.6 PICS contact person

(A person to contact if there are any queries concerning the content of the PICS)

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.3 Identification of the TS 102 000

This proforma applies to the protocols described in the following standard:

TS 102 000: "Broadband Radio Access Networks (BRAN) HIPERACCESS Functional Specification, DLC layer".

A.4 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No) .....

NOTE: Answering "No" to this question indicates non-conformance to the TS 102 000 specification. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming, on pages attached to the PICS proforma.

A.5 Roles

Table A.1: Roles

Item	Role	Reference	Status	Support
1	Access Termination AT	4	o.1	
2	Access Point AP	4	o.1	
o.1:	It is mandatory to support at least one of these items.			

A.6 Access Termination (AT)

This clause contains the PICS proforma tables related to the Access Termination (AT). They need to be completed for description of AT implementations only.

Prerequisite: A.1/1 -- Access Termination (AT)

A.6.1 Major MAC capabilities and functionalities for AT

Table A.2: Major MAC functionalities for AT

Item	Name	Reference	Status	Support
1	Range of multiplexing schemes	4.2.3	m	
2	Range of connection types	7.1	m	
3	Dynamic multicast group allocation	4.5.6	m	
4	Error control using ARQ protocol (retransmission of erroneous UL data)	4.3.3, 8.5	m	
5	Procedure for power control in UL	4.6.2	m	
6	Encryption of MAC PDU payload (unicast connection)	8.1	m	
7	SAR Segmentation And Reassembly of messages	7.3.1	m	
8	AT issues Request for resource allocation	9.3	m	
9	AT sends MAC PDUs upon reception of GRANTs	9.2	m	
10	AT supports bandwidth request contention procedure	9.5	o	

Table A.3: Additional specifications for ARQ

Item	Name	Reference	Specified	Supported
1	Number of retransmissions possibly imposed by the AP	8.5.1	up to 2	

Table A.4: Types of grants

Item	Name	Reference	Status	Supported
1	Grant for Initialization and ranging	8.7.4	m	
2	Grant for bandwidth request	9.1, 9.4	m	
3	Grant for Contention resolution	9.5	c0401	
c0401: IF A.2/10 - if AT supports contention bandwidth request procedure THEN m - then mandatory ELSE n/a				

Table A.5: Additional specifications for resource allocation grants

Item	Name	Reference	Status	Supported
1	Continuous grant	9.4	m	
2	Polling	9.4	m	
3	Piggyback	9.4	m	
4	Poll-me bit	9.4	m	

Table A.6: AT multiplexing schemes

Item	Name	Reference	Status	Support
1	FDD Frequency Division Duplex	4.2.3, 8.3	o.2	
2	TDD Time Division Duplex	4.2.3, 8.3	o.2	
3	H-FDD Frequency Division Half Duplex	4.2.3, 8.3	o.2	
o.2: It is mandatory to support at least one of these items.				

Table A.7: Connection types

Item	Name	Reference	Status	Support
1	Basic management connection	7.1	m	
2	Primary management connection	7.1	m	
3	Secondary management connection	7.1	m	
4	Broadcast connection (DL only)	7.1	m	
5	Multicast connections (DL only)	4.5.6, 7.1	m	

Table A.8: MAC PDUs

Item	Name	Reference	Status	Support
1	Segmented long MAC signalling PDU	7.2, 8.1	m	
2	Non-Segmented long MAC signalling PDU	7.2, 8.1	m	
3	Short MAC signalling PDU (UL only)	7.2, 8.1	m	
4	MAC data PDU	7.2, 8.1	m	
5	long MAC dummy PDU	7.2, 8.1	m	
6	Short MAC dummy PDU (UL only)	7.2, 8.1	m	

A.6.2 Major DLC capabilities and functionalities for AT

Table A.9: Major AT DLC functionalities

Item	Name	Reference	Status	Support
1	Initialization Control	10	m	
2	Radio Resource Control RRC	11	m	
3	Security Control	12	m	
4	Connection Control	13	m	

A.6.2.1 Services supporting Initialization Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.10: Initialization Control procedures

Item	Services supporting:	Reference	Status	Support
1	Synchronization and parameters acquisition	10.3	m	
2	Ranging	10.4	m	
3	Physical capabilities negotiation	10.5.1	m	
4	AT Authentication	10.5.2	m	
5	Other capabilities negotiation	10.5.3	m	

A.6.2.2 Services supporting Radio Resource Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.11: Radio Resource Control procedures

Item	Services supporting:	Reference	Status	Support
1	Link supervision	11.2	m	
2	UL radio channel measurement	11.3.2	m	
3	DL radio channel measurement, initiated by AT	11.3.3	m	
4	Adaptive change of physical modes	11.3.4	m	
5	Automatic transmit power control for UL	11.3.5	m	
6	Automatic UL transmit time control	11.3.5	m	
7	Change of PHY mode set	11.4	m	
8	Change of UL structure	11.5, 5.2.6	m	
9	Load levelling (inter-carrier handover)	11.6	m	

Table A.12: Set of physical modes

Item	Name	Reference	Status	Support
1	Initial set of Physical modes	4.6.1	m	
2	Alternate set of Physical modes	4.6.1	m	

A.6.2.3 Services supporting Security Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.13: Security Control procedures

Item	Services supporting:	Reference	Status	Support
1	Authentication	12	m	
2	Privacy initialization	12.1	m	
3	Key management - AT Authorization	12.2	m	
4	Traffic Encryption Key (TEK) management	12.2.3	m	
5	TEK usage	12.3	m	
6	Data encryption for unicast connection	12.3.3	m	

A.6.2.4 Services supporting Connection Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.14: Connection Control procedures

Item	Services supporting:	Reference	Status	Support
1	UL and DL Connection establishment initiated by AP or AT	13.4.2	m	
2	UL and DL Connection change initiated by AP or AT	13.4.3	m	
3	UL and DL Connection deletion initiated by AP or AT	13.4.4	m	
4	DL multicast connection established by AP	13.5	m	

A.6.3 DLC PDU descriptions, seen from AT

In the following PDU tables, status with m or o is the only valid case, due to the direction of the PDU. When not applicable to a given direction, status not applicable (n/a) is defined.

A.6.3.1 PDU descriptions for MAC and Broadcast support

Table A.15: Broadcast Control and MAC PDUs

Item	PDU	AT receiving			AT sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcGeneralBroadcastInformation	8.8	m			n/a	
2	RlcBandwidthReq		n/a		9.3.3	m	
3	RlcQueueStatusReq	9.3.4	m			n/a	
4	RlcQueueStatusRsp		n/a		9.3.4	m	

A.6.3.2 PDU descriptions for Initialization Control support

Table A.16: Initialization Control PDUs

Item	PDU	AT receiving			AT sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcRangingInvitation	10.4	m			n/a	
2	RlcRangingReq		n/a		10.4	m	
3	RlcRangingContinue	10.4	m			n/a	
4	RlcRangingSuccess	10.4	m			n/a	
5	RlcRangingAck		n/a		10.4	m	
6	RlcPhyCapabilitiesReq	10.5	m			n/a	
7	RlcPhyCapabilitiesInfo		n/a		10.5	m	
8	RlcPhyCapabilitiesCnf	10.5	m			n/a	
9	RlcOtherCapabilitiesReq	10.5	m			n/a	
10	RlcOtherCapabilitiesInfo		n/a		10.5	m	
11	RlcOtherCapabilitiesCnf	10.5	m			n/a	

A.6.3.3 PDU descriptions for Radio Resource Control support

Table A.17: Radio Resource Control PDUs

Item	PDU	AT receiving			AT sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcInitializationCmd	11.2.3	m			n/a	
2	RlcDownlinkPhyModeChange		n/a		11.3.4	m	
3	RlcDownlinkPhyModeChangeAck	11.3.4	m			n/a	
4	RlcMeasurementReportData		n/a		11.3.3	m	
5	RlcMeasurementReportCriterium	11.3.3	m			n/a	
6	RlcUplinkCorrection	11.3.5	m			n/a	
7	RlcHandoverCmd	11.6	m			n/a	
8	RlcHandoverAck		n/a		11.6	m	

A.6.3.4 PDU descriptions for Security Control support

Table A.18: Security Control PDUs

Item	PDU	AT receiving			AT sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcAuthenticationCommand	12.2	m			n/a	
2	RlcAuthenticationManufacturerInformation		n/a		12.2	m	
3	RlcAuthorizationRequest		n/a		12.2	m	
4	RlcAuthorizationReply	12.2	m			n/a	
5	RlcAuthorizationReject	12.2	m			n/a	
6	RlcAuthorizationInvalid	12.2	m			n/a	
7	RlcTekRequest		n/a		12.2	m	
8	RlcTekAllocation	12.2	m			n/a	
9	RlcTekReject	12.2	m			n/a	
10	RlcTekInvalid	12.2	m			n/a	

A.6.3.5 PDU descriptions for Connection Control support

Table A.19: Connection Control PDUs

Item	PDU	AT receiving			AT sending		
		Reference	Status	Support	Reference	Status	Support
1	RLCConnectionAdditionInit				13.2	m	
2	RLCConnectionAdditionSetup	13.2	m				
3	RLCConnectionAdditionAck				13.2	m	
4	RLCConnectionChangeInit				13.2	m	
5	RLCConnectionChangeSetup	13.2	m				
6	RLCConnectionChangeAck				13.2	m	
7	RLCConnectionDeletionInit	13.2	m		13.2	m	
8	RLCConnectionDeletionAck	13.2	m		13.2	m	

A.6.4 PDU parameters, PDU values, Timers

See clauses A.8 to A.10, common to AT and AP.

A.7 Access Point (AP)

This clause contains the PICS proforma tables related to the Access Point (AP). They need to be completed for description of AP implementations only.

Prerequisite: A.1/2 -- Access Point (AP)

A.7.1 Major MAC capabilities and functionalities for AP

Table A.20: Major MAC functionalities for AP

Item	Name	Reference	Status	Support
1	Range of multiplexing schemes	4.2.3	m	
2	Range of connection types	4.5.6, 7.1	m	
3	Dynamic multicast group allocation	4.5.6	m	
4	Error control using ARQ protocol (retransmission of erroneous UL data)	4.3.3, 8.5	o	
5	Procedure for power control in UL	4.6.2	m	
6	Procedure for power control in DL	4.6.2	o	
7	Encryption of MAC PDU payload (unicast connection)	5.1	m	
8	SAR Segmentation and Reassembly of messages	7.3.1	m	
9	AP receives Request for resource and solves the allocation	9.3	m	
10	AP sends GRANTs as answers to REQUESTs for resource allocation	9.2	m	
11	AP supports bandwidth request contention procedure	9.5	o	
12	AP provides fixed bandwidth capacity by assigning a continuous grant	9.4.1	m	

Table A.21: Additional specifications for ARQ

Item	Name	Reference	Specified	Supported
1	Number of retransmissions possibly imposed by the AP to the AT	8.5.1	0,1,or 2	

Table A.22: Types of grants

Item	Name	Reference	Status	Supported
1	grant for Initialization and ranging	8.7.4	m	
2	grant for bandwidth request	9.1, 9.4	m	
3	grant for Contention resolution	9.5	c2201	
c2201: IF A20/11 - if AP supports contention bandwidth request procedure THEN m - then mandatory ELSE n/a				

Table A.23: Additional specifications for resource allocation

Item	Name	Reference	Status	Supported
1	Continuous grant	13.2	m	
2	Polling	13.2	m	
3	Piggyback	13.2	m	
4	Poll-me bit	13.2	m	

Table A.24: AP Multiplexing schemes

Item	Name	Reference	Status	Support
1	FDD Frequency Division Duplex	4.2.3	o.3	
2	TDD Time Division Duplex	4.2.3	o.3	
3	H-FDD Frequency Division Half Duplex	4.2.3	c2401	
o.3: It is mandatory to support at least one of these items. c2401: IF A.24/1 - AP supports FDD THEN m - then mandatory ELSE n/a				

Table A.25: Connection types

Item	Name	Reference	Status	Support
1	Basic management connection	7.1	m	
2	Primary management connection	7.1	m	
3	Secondary management connection	7.1	m	
4	Broadcast connection (DL only)	7.1	m	
5	Multicast connections (DL only)	4.5.6, 7.1	m	

Table A.26: MAC PDUs types

Item	Name	Reference	Status	Support
1	Segmented long MAC signalling PDU	7.2, 8.1	m	
2	Non-Segmented long MAC signalling PDU	7.2, 8.1	m	
3	Short MAC signalling PDU (UL only)	7.2, 8.1	m	
4	MAC data PDU	7.2, 8.1	m	
5	long MAC dummy PDU	7.2, 8.1	m	
6	Short MAC dummy PDU (UL only)	7.2, 8.1	m	

Table A.27: Set of Physical modes

Item	Name	Reference	Status	Support
1	Initial set of Physical modes	4.6.1	m	
2	Alternate set of Physical modes	4.6.1	o	

A.7.2 Major DLC capabilities and functionalities for AP

Table A.28: Major AP DLC functionalities

Item	Name	Reference	Status	Support
1	Initialization Control	10	m	
2	Radio Resource Control RRC	11	m	
3	Security Control	12	m	
4	Connection Control	13	m	

A.7.2.1 Services supporting Initialization Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.29: Initialization Control procedures

Item	Services supporting	Reference	Status	Support
1	Synchronization and parameters acquisition	10.3	m	
2	Ranging	10.4	m	
3	Physical capabilities negotiation	10.5.1	m	
4	AT Authentication	10.5.2	m	
5	Other capabilities negotiation	10.5.3	m	

A.7.2.2 Services supporting Radio Resource Control function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.30: Radio Resource Control procedures

Item	Services supporting	Reference	Status	Support
1	Link supervision	11.2	m	
2	UL radio channel measurement	11.3.2	m	
3	DL radio channel measurement report procedure	11.3.3	m	
4	Adaptive change of DL physical modes	11.3.4	m	
5	Adaptive change of UL physical modes	11.3.1	m	
6	Automatic transmit power control for UL	11.3.5	m	
7	Automatic UL transmit time control	11.3.5	m	
8	Automatic transmit power control for DL	11.3.6	o	
9	Change of PHY mode set	11.4	m	
10	Change of UL structure	11.5, 5.2.6	o	
11	Load levelling (inter-carrier handover)	11.6	o	

Table A.31: Set of Physical modes

Item	Name	Reference	Status	Support
1	Initial set of Physical modes	4.6.1	m	
2	Alternate set of Physical modes	4.6.1	o	

A.7.2.3 Services supporting Security Control Function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.32: Security Control procedures

Item	Services supporting	Reference	Status	Support
1	Authentication	12	m	
2	Privacy initialization	12.1	m	
3	Key management - AT Authorization	12.2	m	
4	Traffic Encryption Key (TEK) management	12.2.3	m	
5	TEK usage	12.3	m	
6	Data encryption for unicast connection	12.3.3	m	

A.7.2.4 Services supporting Connection Control Function

The supplier of the implementation shall state the support of the implementation for the services required by each of the following procedures and associated capabilities.

Table A.33: Connection Control procedures

Item	Services supporting:	Reference	Status	Support
1	UL and DL Connection establishment initiated by AP or AT	13.4.2	m	
2	UL and DL Connection change initiated by AP or AT	13.4.3	m	
3	UL and DL Connection deletion initiated by AP or AT	13.4.4	m	
4	DL multicast connection established by AP	13.5	m	

A.7.3 DLC PDU descriptions, seen from AP

In the following PDU tables, status with m or o is the only valid case, due to the direction of the PDU. When not applicable to a given direction, status not applicable (n/a) is defined.

A.7.3.1 PDU descriptions for MAC and Broadcast support

Table A.34: Broadcast Control and MAC PDUs

Item	PDU	AP receiving			AP sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcGeneralBroadcastInformation	8.8	n/a			m	
2	RlcBandwidthReq	9.3	m			n/a	
3	RlcQueueStatusReq		n/a		9.3.4	m	
4	RlcQueueStatusRsp	9.3.4	m			n/a	

A.7.3.2 PDU descriptions for Initialization Control support

Table A.35: Initialization Control PDUs

Item	PDU	AP receiving			AP sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcRangingInvitation		n/a		10.4	m	
2	RlcRangingReq	10.4	m			n/a	
3	RlcRangingContinue		n/a		10.4	m	
4	RlcRangingSuccess		n/a		10.4	m	
5	RlcRangingAck	10.4	m			n/a	
6	RlcPhyCapabilitiesReq		n/a		10.5	m	
7	RlcPhyCapabilitiesInfo	10.5	m			n/a	
8	RlcPhyCapabilitiesCnf		n/a		10.5	m	
9	RlcOtherCapabilitiesReq		n/a		10.5	m	
10	RlcOtherCapabilitiesInfo	10.5	m			n/a	
11	RlcOtherCapabilitiesCnf		n/a		10.5	m	

A.7.3.3 PDU descriptions for Radio Resource Control support

Table A.36: Radio Resource Control PDUs

Item	PDU	AP receiving			AP sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcInitializationCmd		n/a		11.2.3	m	
2	RlcDownlinkPhyModeChange	11.3.4	m			n/a	
3	RlcDownlinkPhyModeChangeAck		n/a		11.3.4	m	
4	RlcMeasurementReportData	11.3.3	m			n/a	
5	RlcMeasurementReportCriterium		n/a		11.3.3	m	
6	RlcUplinkCorrection		n/a		11.3.5	m	
7	RlcHandoverCmd		n/a		11.6	m	
8	RlcHandoverAck	11.6	m			n/a	

A.7.3.4 PDU descriptions for Security Control support

Table A.37: Security Control PDUs

Item	PDU	AP receiving			AP sending		
		Reference	Status	Support	Reference	Status	Support
1	RlcAuthenticationCommand		n/a		12.2	m	
2	RlcAuthenticationManufacturerInformation	12.2	m			n/a	
3	RlcAuthorizationRequest	12.2	m			n/a	
4	RlcAuthorizationReply		n/a		12.2	m	
5	RlcAuthorizationReject		n/a		12.2	m	
6	RlcAuthorizationInvalid		n/a		12.2	m	
7	RlcTekRequest	12.2	m			n/a	
8	RlcTekAllocation		n/a		12.2	m	
9	RlcTekReject		n/a		12.2	m	
10	RlcTekInvalid		n/a		12.2	m	

A.7.3.5 PDU descriptions for Connection Control support

Table A.38: Connection Control PDUs

Item	PDU	AP receiving			AP sending		
		Reference	Status	Support	Reference	Status	Support
1	RLCConnectionAdditionInit	13.2	m				
2	RLCConnectionAdditionSetup				13.2	m	
3	RLCConnectionAdditionAck	13.2	m				
4	RLCConnectionChangeInit	13.2	m				
5	RLCConnectionChangeSetup				13.2	m	
6	RLCConnectionChangeAck	13.2	m				
7	RLCConnectionDeletionInit	13.2	m		13.2	m	
8	RLCConnectionDeletionAck	13.2	m		13.2	m	

A.7.4 PDU parameters, PDU values, Timers

See clauses A.8 to A.10, common to AT and AP.

A.8 PDU parameters

A.8.1 Parameters of PDUs for MAC and bandwidth support

Table A.39: RLC general broadcast information

Item	Parameter	Reference	Status	Support
1	duplexMode	8.8	m	
2	frameOffset	8.8	m	
3	tdmaZoneDownlink	8.8	m	
4	encryptionMode	8.8	m	
5	uplinkPowerIncRangingStart	8.8	m	
6	uplinkPowerMaxRangingStart	8.8	m	
7	downlinkPowerControl	8.8	m	
8	periodMeasurementReportGBI	8.8	m	
9	periodRangingInvitation	8.8	m	
10	timerGranuConnection	8.8	m	
11	timerGranuSecurity	8.8	m	
12	uplinkNumberPduPerFecBlock	8.8	m	
13	uplinkNumberMidamblePerBurst	8.8	m	
14	crMaxNumberRetries	8.8	m	
15	crStartingWindowSize	8.8	m	
16	crMaxBackoffWindow	8.8	m	
17	fixedVariableChannelInd	8.8	m	
18	phyModeSetDescriptorCurrent	8.8	m	
19	phyModeSetDescriptorFuture	8.8	o	

Table A.40: RLC bandwidth request

Item	Parameter	Reference	Status	Support
1	caid2	9.3.3	m	
2	piggyback2	9.3.3	m	
3	caid3	9.3.3	m	
4	piggyback3	9.3.3	m	

Table A.41: RLC queue status request

Item	Parameter	Reference	Status	Support
1	caid	9.3.4	m	

Table A.42: RLC queue status response

Item	Parameter	Reference	Status	Support
1	piggyback	9.3.4	m	

A.8.2 Parameters of PDUs for Initialization Control support

Table A.43: RLC ranging invitation

Item	Parameter	Reference	Status	Support
1	atMacAddress	10.4	m	
2	tid	10.4	m	
3	basicCid	10.4	m	
4	primaryCid	10.4	m	
5	secondaryCid	10.4	m	
6	basicCaid	10.4	m	
7	primaryCaid	10.4	m	
8	secondaryCaid	10.4	m	
9	apTxPowerIndication	10.4	m	

Table A.44: RLC ranging request

Item	Parameter	Reference	Status	Support
1	rangingStatus	10.4	m	

Table A.45: RLC ranging continue

Item	Parameter	Reference	Status	Support
1	timingAdjustRanging	10.4	m	
2	uplinkPowerInc	10.4	m	

Table A.46: RLC ranging success

Item	Parameter	Reference	Status	Support
1	timingAdjustRanging	10.4	m	
2	uplinkPowerInc	10.4	m	
3	initializationStatus	10.4	m	

Table A.47: RLC ranging ack

Item	Parameter	Reference	Status	Support
1	rangingStatus	10.4	m	

Table A.48: RLC physical capabilities request

No parameter

Table A.49: RLC physical capabilities info

Item	Parameter	Reference	Status	Support
1	downlink64QamSupport	10.5	m	
2	uplink16QamSupport	10.5	m	
3	uplinkTurboEncSupport	10.5	m	
4	uplinkPowerMaxQpsk	10.5	m	
5	uplinkPowerMax16Qam	10.5	m	
6	numberSaidSupport	10.5	m	
7	terminalType	10.5	m	
8	pairOfCarrierFrequenciesLow	10.5	m	
9	pairOfCarrierFrequenciesHigh	10.5	m	

Table A.50: RLC physical capabilities confirm

Item	Parameter	Reference	Status	Support
1	downlink64QamUse	10.5	m	
2	uplink16QamUse	10.5	m	
3	uplinkTurboEncUse	10.5	m	
4	uplinkPreambleLength	10.5	m	
5	uplinkPowerMaxQpsk	10.5	m	
6	uplinkPowerMax16Qam	10.5	m	
7	initializationStatus	10.5	m	

Table A.51: RLC other capabilities request

No parameter

Table A.52: RLC other capabilities info

Item	Parameter	Reference	Status	Support
1	numberUplinkConnsSupport	10.5	m	
2	numberDownlinkConnsSupport	10.5	m	
3	numberConnAggsSupport	10.5	m	
4	numberConnsPerConnAggSupport	10.5	m	
5	crSupport	10.5	m	
6	tripleDesSupport	10.5	m	
7	terminalClCapabilities	10.5	m	

Table A.53: RLC other capabilities confirm

Item	Parameter	Reference	Status	Support
1	numberUplinkConnsUse	10.5	m	
2	numberDownlinkConnsUse	10.5	m	
3	numberConnAggsUse	10.5	m	
4	numberConnsPerConnAggUse	10.5	m	
5	tripleDesUse	10.5	m	

A.8.3 Parameters of PDUs for Radio Resource Control support

Table A.54: RLC initialization command

Item	Parameter	Reference	Status	Support
1	initializationCmd	11.2.3	m	

Table A.55: RLC measurement report data

Item	Parameter	Reference	Status	Support
1	downlinkPhyModeWanted	11.3.3	m	
2	cnrMeasured	11.3.3	m	
3	rxPowerMeasured	11.3.3	m	
4	txPowerMeasured	11.3.3	m	
5	txPowerMargin	11.3.3	m	
6	maxUplinkPhyMode	11.3.3	m	

Table A.56: RLC downlink physical mode change

Item	Parameter	Reference	Status	Support
1	downlinkPhyModeGranted	11.3.3	m	

Table A.57: RLC downlink physical mode change ack

Item	Parameter	Reference	Status	Support
1	downlinkPhyModeGrantedAck	11.3.3	m	

Table A.58: RLC uplink correction

Item	Parameter	Reference	Status	Support
1	uplinkPowerInc	11.3.3	m	
2	timingAdjustFine	11.3.3	m	
3	measurementReportReq	11.3.3	m	

Table A.59: RLC measurement report criterium

Item	Parameter	Reference	Status	Support
1	periodMeasurementReportAtSpecific	11.3.3	m	

Table A.60: RLC handover command

Item	Parameter	Reference	Status	Support
1	atMacAddress	11.6	m	
2	newPairOfCarrierFrequencies	11.6	m	
3	apcId	11.6	m	

Table A.61: RLC handover acknowledge

Item	Parameter	Reference	Status	Support
1	atMacAddress	11.6	m	

A.8.4 Parameters of PDUs for Security Control support

Table A.62: RLC Authentication Command

No parameter

Table A.63: RLC Authentication Manufacturer information

Item	Parameter	Reference	Status	Support
1	manufacturerX509certificate	12.2	m	

Table A.64: RLC Authorization Request

Item	Parameter	Reference	Status	Support
1	manufacturerID	12.2	m	
2	atPublicKey	12.2	m	
3	atX509certificate	12.2	m	

Table A.65: RLC Authorization Reply

Item	Parameter	Reference	Status	Support
1	authorizationKey	12.2	m	
2	akSequenceNumber	12.2	m	
3	akLifeTime	12.2	m	
4	said	12.2	m	

Table A.66: RLC Authorization Reject

Item	Parameter	Reference	Status	Support
1	authRejectErrorCode	12.2	m	
2	errorInfoText	12.2	m	

Table A.67: RLC Authorization Invalid

Item	Parameter	Reference	Status	Support
1	authInvalidErrorCode	12.2	m	
2	errorInfoText	12.2	m	

Table A.68: RLC TEK request

Item	Parameter	Reference	Status	Support
1	said	12.2	m	
2	hmacDigest	12.2	m	

Table A.69: RLC TEK allocation

Item	Parameter	Reference	Status	Support
1	said	12.2	m	
2	tek1	12.2	m	
3	tek1Lifetime	12.2	m	
4	tek1SequenceNumber	12.2	m	
5	ivParameter	12.2	m	
6	hmac	12.2	m	
7	initializationStatus	12.2	m	

Table A.70: RLC TEK reject

Item	Parameter	Reference	Status	Support
1	tekSequenceNumber	12.2	m	
2	said	12.2	m	
3	tekErrorCode	12.2	m	
4	errorInfoText	12.2	m	

Table A.71: RLC TEK invalid

Item	Parameter	Reference	Status	Support
1	tekSequenceNumber	12.2	m	
2	said	12.2	m	
3	tekErrorCode	12.2	m	
4	errorInfoText	12.2	m	

A.8.5 Parameters of PDUs for Connection Control support

Table A.72: RLC Connection Addition Initialization

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	clid	13.2	m	
3	connectionClParameters	13.2	m	
4	scid	13.2	m	
5	directionChoice	13.2	m	
6	arqUsage	13.2	m	

Table A.73: RLC Connection Addition Setup

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	assignedCid	13.2	m	
3	clid	13.2	m	
4	connectionClParameters	13.2	m	
5	scid	13.2	m	
6	directionChoice	13.2	m	
7	arqUsage	13.2	m	
8	said	13.2	m	
9	contentionFlag	13.2	o	
10	confirmationCode	13.2	o	

Table A.74: RLC Connection Addition Acknowledge

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	assignedCid	13.2	m	
3	confirmationCode	13.2	m	

Table A.75: RLC Connection Change Initialization

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	cid	13.2	m	
3	scid	13.2	m	
4	directionChoice	13.2	m	
5	arqUsage	13.2	m	

Table A.76: RLC Connection Change Setup

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	assignedCid	13.2	m	
3	assignedCaid	13.2	m	
4	pmAssociated	13.2	m	
5	scid	13.2	m	
6	directionChoice	13.2	m	
7	arqUsage	13.2	m	
8	contentionFlag	13.2	o	
9	confirmationCode	13.2	o	

Table A.77: RLC Connection Change Acknowledge

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	assignedCid	13.2	m	
3	confirmationCode	13.2	o	

Table A.78: RLC Connection Deletion Initialization

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	requestedCid	13.2	m	

Table A.79: RLC Connection Deletion Acknowledge

Item	Parameter	Reference	Status	Support
1	transactionId	13.2	m	
2	requestedCid	13.2	m	

A.9 Values of PDUs Parameters

As there are no options in the definition of the parameter values, refer to the Technical specifications in TS 102 000 and to the ASN.1 description for a complete definition of the parameter values, which are all mandatory.

A.10 Timers

Table A.80: AT Timers

Item	<Item description>	Reference	Status	Support	Value	
					Allowed range	Supported
1	T_BandwidthReq	MSC	m		Not yet specified	
2	T_RSB	MSC	m		Not yet specified	
3	T_RangingAck	A.4	m		Not yet specified	
4	T_PhyCapabilitiesInfo	A.4	m		Not yet specified	
5	T_PhyCapabilitiesCnf	A.4	m		Not yet specified	
6	T_OtherCapabilitiesInfo	A.4	m		Not yet specified	
7	T_OtherCapabilitiesCnf	A.4	m		Not yet specified	
8	T_ConnectionAdditionInit	A.4	m		Not yet specified	
9	T_ConnectionAdditionAck	A.4	m		Not yet specified	
10	T_ConnectionChangeInit	A.4	m		Not yet specified	
11	T_ConnectionChangeAck	A.4	m		Not yet specified	
12	T_ConnectionDeletionInit	A.4	m		Not yet specified	
13	T_ConnectionDeletionAck	A.4	m		Not yet specified	
14	T_MeasurementReportData	A.4	m		Not yet specified	
15	T_Synchronization	10.3.2	m		Not yet specified	
16	T_AuthReq	12.2	m		Not yet specified	
17	T_AuthRequestRetry	12.2	m		Not yet specified	
18	T_TEKRefresh	12.2.3	m		Not yet specified	
19	T_TekReq	MSC	m		Not yet specified	
20	T_Tek2Req	MSC	m		Not yet specified	
21	T_HandoverAck	MSC	m		Not yet specified	

Table A.81: AP Timers

Item	<Item description>	Reference	Status	Support	Value	
					Allowed range	Supported
1	T_RangingAck	A.4	m		Not yet specified	
2	T_PhyCapabilitiesReq	A.4	m		Not yet specified	
3	T_PhyCapabilitiesCnf	A.4	m		Not yet specified	
4	T_OtherCapabilitiesReq	A.4	m		Not yet specified	
5	T_OtherCapabilitiesCnf	A.4	m		Not yet specified	
6	T_InitializationCmd	MSC	m		Not yet specified	
7	T_ConnectionAdditionSetup	A.4	m		Not yet specified	
8	T_ConnectionAdditionAck	A.4	m		Not yet specified	
9	T_ConnectionChangeSetup	A.4	m		Not yet specified	
10	T_ConnectionChangeAck	A.4	m		Not yet specified	
11	T_ConnectionDeletionInit	A.4	m		Not yet specified	
12	T_ConnectionDeletionAck	A.4	m		Not yet specified	
13	T_DownlinkPhyModeChange	A.4, 11.3.4	m		Not yet specified	
14	T_UplinkCorrection	A.4	m		Not yet specified	
15	T_HandoverCmd	MSC	m		Not yet specified	
16	T_AuthCmd	12.2, MSC	m		Not yet specified	

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