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Part 1: Basic telephony services**

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## Foreword

This draft European Telecommunication Standard (ETS) has been produced by the Radio Equipment and Systems (RES) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

Every ETS prepared by ETSI is a voluntary standard. This ETS may contain text concerning conformance testing of the equipment to which it relates. This text should be considered as guidance only and does not make this ETS mandatory.

This ETS is based on ETS 300 175, parts 1 to 8 [1] - [8] and ETS 300 444 [14]. This ETS has been developed in accordance to the rules of documenting a profile specification as described in ISO/IEC 9646-6 [11].

<b>Proposed transposition dates</b>	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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## 1 Scope

This European Telecommunication Standard (ETS) specifies that set of technical requirements for Digital Enhanced Cordless Telecommunications (DECT) Fixed Part (FP) and DECT Cordless Terminal Adapter (CTA) necessary for the support of the Radio in the Local Loop (RLL) Access Profile (RAP).

The objective of the ETS is to ensure the air interface interoperability of DECT RAP CTAs and DECT RAP FPs and Wireless Relay Stations (WRS) if applied.

In addition, this ETS defines the features, services, procedures etc. for the CTA and the FT, which are provision mandatory either in the CTA or in the FT, as well as some elements that are provision optional but still process mandatory.

Another objective is to use as much as possible from the existing GAP profile, but to exclude the not applicable GAP-features. Therefore most of the RAP features refer to GAP features and the necessary additional features (for example Operation, Administration, and Maintenance (OA&M)) are listed and explained in this document.

This ETS (i.e. part 1), contains the so called "Plain Old Telephone Service (POTS)" services including leased lines and 64 kbit/s bearer service.

## 2 Normative references

This ETS 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 ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 175-1: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 1: Overview".
- [2] ETS 300 175-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 2: Physical layer".
- [3] ETS 300 175-3: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 3: Medium access control layer".
- [4] ETS 300 175-4: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 4: Data link control layer".
- [5] ETS 300 175-5: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 5: Network layer".
- [6] ETS 300 175-6: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 6: Identities and addressing".
- [7] ETS 300 175-7: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 7: Security features".
- [8] ETS 300 175-8: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Common Interface; Part 8: Speech coding and transmission".
- [9] I-ETS 300 176: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Approval Test Specification".

- [10] TBR 6: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); General terminal attachment requirements".
- [11] ISO/IEC 9646-6: "Information Technology - Open system Interconnection - Conformance testing methodology and framework: Protocol profile test specification".
- [12] ISO/IEC 9646-7: "Information Technology - Open system Interconnection - Conformance testing methodology and framework: Implementation Conformance Statements".
- [13] TBR 10: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); General terminal attachment requirements; Telephony applications".
- [14] ETS 300 444 (December 1995): "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Generic Access Profile (GAP)".
- [15] prETS 300 700: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".
- [16] DTR/RES-03074: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Services, facilities and configurations for the DECT Radio in the Local Loop (RLL) Access Profile (RAP)" .
- [17] ETS 300 765-2: "Radio Equipment and Systems (RES); Digital Enhanced Cordless Telecommunications (DECT); Radio in the Local Loop (RLL) Access Profile (RAP); Part 2: Advanced telephony services".
- [18] ETR 246: "Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Application of DECT Wireless Relay Stations (WRS)".

### 3 Definitions, abbreviations and symbols

#### 3.1 DECT definitions

For the purposes of this ETS the following definitions apply.

**attach:** The process whereby a PP within the coverage area of a FP to which it has access rights, notifies this FP that it is operative. The reverse process is detach, which reports the PP as inoperative.

NOTE 1: An operative PP is assumed to be ready to receive calls.

**authentication:** The process whereby a DECT subscriber is positively verified to be a legitimate user of a particular FP.

NOTE 2: Authentication is generally performed at call set-up, but may also be done at any other time (e.g. during a call).

**bearer service:** A type of telecommunication service that provides a defined capability for the transmission of signals between user-network interfaces.

NOTE 3: The DECT user-network interface corresponds to the top of the network layer (layer 3).

**C-plane:** The control plane of the DECT protocol stacks, which contains all of the internal DECT protocol control, but may also include some external user information.

NOTE 4: The C-plane stack always contains protocol entities up to and including the network layer.

**call:** All of the NWK layer processes involved in one network layer peer-to-peer association.

**Cordless Terminal Adapter (CTA):** Physical grouping that contains a DECT portable part and a line interface.

**Fixed Part (DECT Fixed Part) (FP):** A physical grouping that contains all of the elements in the DECT network between the local network and the DECT air interface.

NOTE 5: Call may sometimes be used to refer to processes of all layers, since lower layer processes are implicitly required.

**DECT network:** A network that uses the DECT air interface to interconnect a local network to one or more portable applications. The logical boundaries of the DECT network are defined to be at the top of the DECT network layer.

NOTE 6: A DECT network is a logical grouping that contains one or more fixed radio terminations plus their associated portable radio termination. The boundaries of the DECT network are not physical boundaries.

NOTE 7: A DECT FP contains the logical elements of at least one FT, plus additional implementation specific elements.

**Fixed Radio Termination (FT):** A logical group of functions that contains all of the DECT processes and procedures on the fixed side of the DECT air interface.

NOTE 8: A FT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements together with a selection of layer 2 and layer 3 elements.

**geographically unique identity:** This term relates to FP identities, PARIs and RFPIs. It indicates that two systems with the same PARI, or respectively two RFPs with the same RFPI, can not be reached or listened to at the same geographical position.

NOTE 9: for PARI and RFPI see abbreviations.

**global network:** A telecommunication network capable of offering a long distance telecommunication service.

NOTE 10: The term does not include legal or regulatory aspects, nor does it indicate if the network is a public or a private network.

**globally unique identity:** The identity is unique within DECT (without geographical or other restrictions).

**handover:** The process of switching a call in progress from one physical channel to another physical channel.

NOTE 11: There are two physical forms of handover, intra-cell handover and inter-cell handover.

**incoming call:** A call received at a PP.

**inter-cell handover:** The switching of a call in progress from one cell to another cell.

**internal handover:** Handover processes that are completely internal to one FT. Internal handover reconnects the call at the lower layers, while maintaining the call at the NWK layer.

NOTE 12: The lower layer reconnection can either be at the DLC layer (connection handover) or at the MAC layer (bearer handover).

**interoperability:** The capability of FPs and PPs, that enable a PP to obtain access to teleservices in more than one location area and/or from more than one operator (more than one service provider).

**interoperator roaming:** Roaming between FP coverage areas of different operators (different service providers).

**Interworking Unit (IWU):** A unit that is used to interconnect subnetworks.

NOTE 13: The IWU will contain the interworking functions necessary to support the required subnetwork interworking.

**intra-cell handover:** The switching of a call in progress from one physical channel of one cell to another physical channel of the same cell.

**intraoperator roaming:** Roaming between different FP coverage areas of the same operator (same service provider).

**Local Network (LNW):** A telecommunication network capable of offering local telecommunication services.

NOTE 14: The term does not include legal or regulatory aspects, nor does it indicate if the network is a public network or a private network.

**locally unique identity:** A unique identity within one FP or location area, depending on application.

**location area:** The domain in which a PP may receive (and/or make) calls as a result of a single location registration.

**location registration:** The process whereby the position of a DECT PT is determined to the level of one location area, and this position is updated in one or more databases.

NOTE 15: These databases are not included within a DECT FT.

**MAC Connection (CONNECTION):** An association between one source MAC Multi-Bearer Control (MBC) entity and one destination MAC MBC entity. This provides a set of related MAC services (a set of logical channels), and it can involve one or more underlying MAC bearers.

**outgoing call:** A call originating from a PP.

**Portable Application (PA):** A logical grouping that contains all the elements that lie beyond the DECT network boundary on the portable side.

NOTE 16: The functions contained in the PA may be physically distributed, but any such distribution is invisible to the DECT network.

**Portable Part (DECT Portable Part) (PP):** A physical grouping that contains all elements between the user and the DECT air interface. PP is a generic term that may describe one or several physical pieces.

NOTE 17: A DECT PP is logically divided into one PT plus one or more PAs.

**Portable Radio Termination (PT):** A logical group of functions that contains all of the DECT processes and procedures on the portable side of the DECT air interface.

NOTE 18: A PT only includes elements that are defined in the DECT CI standard. This includes radio transmission elements (layer 1) together with a selection of layer 2 and layer 3 elements.

**Radio Fixed Part (RFP):** One physical sub-group of a FP that contains all the radio end points (one or more) that are connected to a single system of antennas.

**registration:** An ambiguous term, that should always be qualified. See either location registration or subscription registration.

**roaming:** The movement of a PP from one FP coverage area to another FP coverage area, where the capabilities of the FPs enable the PP to make or receive calls in both areas.

NOTE 19: Roaming requires the relevant FPs and PP to be interoperable.

**subscription registration:** The infrequent process whereby a subscriber obtains access rights to one or more FPs.

NOTE 20: Subscription registration is usually required before a user can make or receive calls.

**Wireless Relay Station (WRS):** A physical grouping that combines elements of both PTs and FTs to relay information on a physical channel from one DECT termination to a physical channel to another DECT termination.

NOTE 21: The DECT termination can be a PT or an FT or another WRS.

### 3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply.

AC	Authentication Code
ARC	Access Rights Class
ARD	Access Rights Details
ARI	Access Rights Identity
BCD	Binary Coded Decimal
CC	Call Control
CEC	Commission of the European Communities
CI	Common Interface
CK	Cipher Key
CRSS	Call Related Supplementary Services
CTA	Cordless Terminal Adapter
C/O	Connection Oriented mode
D	DECT reference point
DCK	Derived Cipher Key
DECT	Digital Enhanced Cordless Telecommunications
DLC	Data Link Control, Layer 2b of the DECT protocol stack
DSAA	DECT Standard Authentication Algorithm
DSCA	DECT Standard Cipher Algorithm
DTMF	Dual Tone Multi-Frequency
FLEN	Frame Length
FP	Fixed Part, (see definitions)
FT	Fixed radio Termination
IE	Information Element
IPEI	International Portable Equipment Identity
IPUI	International Portable User Identity
ISDN	Integrated Services Digital Network
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardization
IWU	Interworking Unit
KS	PP authentication Session Key
KS'	FP authentication Session Key
LA	Location Area
LAL	Local Area Level
LCE	Link Control Entity
LSIG	Link Signature
LLN	Logical Link Number
LNW	Local Network
LLME	Lower Layer Management Entity
MAC	Medium Access Control, Layer 2a of the DECT protocol stack
ME	Management entity
MM	Mobility Management, a NWK layer functional grouping
NLF	New Link Flag
NTP	Normal Transmit Power

NWK	Network, Layer 3 of the DECT protocol stack
OA&M	Operation, Administration, and Maintenance
P	Public (environment)
PAP	Public Access Profile
PARI	Primary Access Rights Identity
PARK	Portable Access Rights Key
PHL	PHysical Layer
PLI	Park Length Indicator
PMID	Portable part MAC IDentity (MAC layer)
POTS	Plain Old Telephone Service
POT	Plain Old Telephone
PP	Portable Part
PSTN	Public Switched Telephone Network
PT	Portable radio Termination. See definition
PUN	Portable User Number
PUT	Portable User Type
R/B	Residential/Business (environment)
RAND	A RANDdom challenge issued by a FP
RES	A RESponse calculated by a PP
RFP	Radio Fixed Part, (see definitions)
RFPI	Radio Fixed Part Identity
RS	A value used to establish authentication session keys
SAP	Service Access Point
SAPI	Service Access Point Identifier
SARI	Secondary Access Rights Identity
SS	Supplementary Services
TE	Terminal Equipment
TI	Transaction Identifier
TPUI	Temporary Portable User Identity
UAK	User Authentication Key
UPI	User Personal Identification
WRS	Wireless Relay Station

### 3.3 Symbols

The symbols defined in this subclause are applied for procedures, features, services in this ETS if not explicitly otherwise stated. The interpretation of status columns in all tables is as follows:

- M for mandatory to support (provision mandatory, process mandatory);
- O for optional to support (provision optional, process mandatory);
- I for out-of-scope (provision optional, process optional) not subject for testing;
- C for conditional to support (process mandatory);
- N/A for not-applicable (in the given context the specification makes it impossible to use this capability).

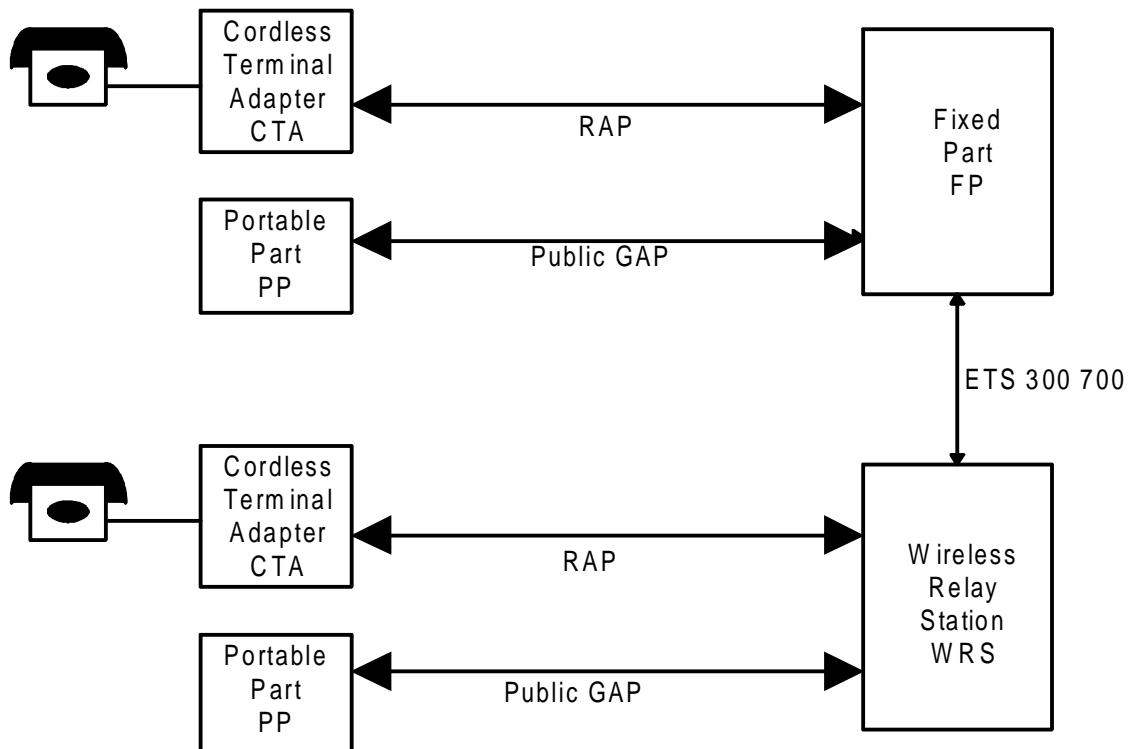
Provision mandatory, process mandatory means that the indicated feature, service or procedure shall be implemented as described in this ETS, and may be subject to testing.

Provision optional, process mandatory means that the indicated feature, service or procedure may be implemented, and if implemented, the feature, service or procedure shall be implemented as described in this ETS, and may be subject to testing.

NOTE: The used notation is based on the notation proposed in ISO/IEC 9646-7 [12].

## 4 Introduction

### 4.1 Reference model



### 4.2 Services & facilities

This ETS provides a minimum service level, i.e. the so-called "POTS" services, and optional extensions including 64 kbit/s bearer service and leased lines. The RAP shall also provide for optional mobility features by supporting GAP PP subscriber terminals and CTAs with WRS GAP functionality (see ETS 300 700 [15]).

Other standards of the RAP are expected to describe ISDN services, broadband packet services and digital leased lines (see annex F).

## 5 Feature definitions

For the purposes of this ETS the feature definitions in the following subclauses apply.

The number given in square brackets after the name of a feature is the item number used in the tables of this ETS.

### 5.1 Network (NWK) features (only differences to GAP)

**On-Hook (CONDITIONAL Release) [N.100]:** The ability of the CTA to indicate the action of going on-hook (e.g. to terminate a call) to the DECT FP. On reception of the "on hook" indication, the DECT FP may terminate the call, and release the radio resource.

**Calling Line Identification Presentation (CLIP) [N.101]:** The ability to provide the calling party number to the CTA by transmitting DTMF modem tones to the POTS before off hook during incoming call.

**incoming maintenance transaction [N.102]:** The ability of the CTA to receive OA&M messages from the FP.

**outgoing maintenance transaction [N.103]:** The ability of the CTA to send OA&M messages to the FP.

**maintenance during subscriber call [N.104]:** The ability of the CTA to send/receive OA&M messages to/from the FP during an active subscriber call.

**metering pulses [N.105]:** The ability of the CTA to generate metering pulses on reception of a corresponding RAP-CC message.

**leased lines [N.106]:** The ability to establish and release leased lines.

**physical resources fault [N.107]:** The ability of the CTA to corresponding OA&M messages to indicate the location of faults in the Physical resources to the network management

**remote test [N.108]:** The ability of the network management to request OA&M information from the CTA.

**alarms [N.109]:** The ability of the CTA to indicate to the network management that a significant system event occurs or is about to occur which may seriously affect the systems ability to function.

**start remote over the air subscription [N.110]:** The ability to start the over the air subscription procedure of a CTA.

**start quality measurement [N.111]:** The ability to start a Link Quality Measurement.

**stop quality measurement [N.112]:** The ability to stop a Link Quality Measurement and to read the result.

**switch from voice to data service [N.113]:** The ability to set-up a connection for data service by reception of an RAP-CC message or by detection of a 2.1 kHz tone in the Audio-Channel.

**coin collection [N.114]:** The ability to transmit the result of coin collection via RAP-CC message.

**ground start [N.115]:** The ability to transmit the ground start signal via a RAP-CC message.

**remote configuration [N.116]:** The ability to configure the parameters of the CTA via OA&M messages.

**64 kbit/s bearer service using DLC LU7 service [N.117]:** The ability to offer the DLC LU7 service suitable for a 64 kbit/s bearer service and transparent ISDN services using double slots at the physical layer.

**emergency calls [N.118]:** For further study.

**line parking [N.119]:** Line parking is a reduction of the loop current provided by the Local Exchange to the off-hook Terminal Equipment after a specified period without an end-to-end connection.

**line polarity reversal [N.120]:** The ability to transmit the line polarity reversal signal via a RAP-CC message.

**incoming WRS maintenance transaction [N.121]:** The ability of the WRS to receive OA&M messages from the FP.

**outgoing WRS maintenance transaction [N.122]:** The ability of the WRS to send OA&M messages to the FP.

## 5.2 Application features (only differences to GAP)

**manual entry of the PARK and AC to a CTA [A.100]:** The ability of the PP to accept a manual entry of the PARK for ensuring attachment to the right FP in a physical area covered by many providers and a manual entry of the AC via the keypad of a connected telephone-set.



## **6 Service definitions**

For the purposes of this ETS the following service definitions apply.

### **6.1 Data Link Control (DLC) service definitions**

#### **6.1.1 Reference to GAP**

See ETS 300 444 [14] Generic Access Profile, subclause 5.1.

#### **6.1.2 LU 7 service**

See ETS 300 175-4 [4], annex E, subclause E.4, DLC Layer Service.

### **6.2 Medium Access Control (MAC) service definitions**

#### **6.2.1 Reference to GAP**

See ETS 300 444 [14] Generic Access Profile, subclause 5.2.

#### **6.2.2 LU 7 service**

See ETS 300 175-4 [4], annex E; subclause E.3, MAC Layer Service.

## **7 Interoperability requirements**

### **7.1 General**

The tables listed in this subclause define all the protocol elements i.e. features, services, and procedures which are mandatory, optional, and conditional under the provision of another protocol element, or out of the scope of this ETS, or in some context not-applicable according to the definition of the status column as defined in subclause 3.3 for the RAP FP and PP. All optional elements shall be process mandatory according to the procedures described in this ETS.

Protocol elements defined as mandatory, optional or conditional in this subclause shall further be defined in clauses 8, 9, 10, 11, 12, 13 and 14, and annex D in detail either explicitly and/or as references to the DECT base standard ETS 300 175, parts 2 to 8 [2] to [8], ETS 300 444 [14] and I-ETS 300 176 [9].

NOTE: Annexes A, B and C are informative and may be used as additional information, but do not mandate requirements.

The requirements of TBR 6 [10] shall be met by all equipment conforming to this ETS.

## 7.2 NWK features

Table 1: NWK features status

Feature supported					
Item no.	Name of feature	GAP Ref.	RAP Ref.	Status	
				CTA	FT
N.1	Outgoing call	4.1		M	M
N.2	Off Hook	4.1		M	M
N.3	On Hook (full release)	4.1		M	M
N.4	Dialled digits (basic)	4.1		M	M
N.5	Register recall (Hook flash) (note 1)	4.1		M	M
N.8	Incoming call	4.1		M	M
N.9	Authentication of the PP	4.1		M	M
N.11	Location registration	4.1		M	M
N.12	On air key allocation	4.1		M	O
N.13	Identification of PP	4.1		M	O
N.14	Service class indication/assignment	4.1		M	M
N.15	Alerting	4.1		M	M
N.16	ZAP	4.1		O	O
N.17	Encryption activation FT initiated	4.1		M	M
N.18	Subscription registration user procedure on-air	4.1		M	M
N.19	Link control	4.1		M	M
N.20	Terminate access rights FT initiated	4.1		M	O
N.21	Partial release	4.1		M	M
N.26	Authentication of FT	4.1		O	O
N.27	Encryption activation PT initiated	4.1		O	O
N.28	Encryption deactivation FT initiated	4.1		O	O
N.29	Encryption deactivation PT initiated	4.1		O	O
N.100	On Hook (conditional release)		6.1	M	M
N.101	Calling Line Identification Presentation (CLIP) analogue		6.1	O	O
N.102	Incoming maintenance transaction		6.1	M	M
N.103	Outgoing maintenance transaction		6.1	M	M
N.104	Maintenance during normal call		6.1	M	M
N.105	Metering Pulses		6.1	M	M
N.106	Leased Lines		6.1	O	O
N.107	Physical resources fault		6.1	M	M
N.108	Remote test		6.1	M	M
N.109	Alarms		6.1	M	M
N.110	Start remote over the air subscription		6.1	O	O
N.111	Start Quality measurement		6.1	O	O
N.112	Stop Quality measurement		6.1	O	O
N.113	Switch from voice to data service		6.1	O	O
N.114	Coin collection		6.1	O	O
N.115	Ground start		6.1	O	O
N.116	Remote configuration		6.1	O	O
N.117	64 kbit/s bearer service using DLC LU7 service for ISDN		6.1	O	O
N.118	Emergency call		6.1	O	O
N.119	Line parking		6.1	O	O
N.120	Line polarity reversal		6.1	O	O
N.121	Incomming WRS maintenance transaction		6.1	N/A	O
N.122	Outgoing WRS maintenance transaction		6.1	N/A	O

NOTE 1: This feature uses keypad code 15 hex.

**7.3 DLC services (Reference to GAP)**

See subclause 6.3 of ETS 300 444 [14] GAP.

**7.4 MAC services**

See subclause 6.4 of ETS 300 444 [14] GAP.

**7.5 Physical Layer (PHL) services**

See subclause 6.5 of ETS 300 444 [14] GAP.

**7.6 Application features**

**Table 2: Application features status**

Feature supported					
Item no.	Name of feature	GAP-Ref.	RAP-Ref	Status	
				RAP	
				CTA	FP
A.1	AC_bitstring_mapping	4.2		M	M
A.2	Multiple subscription registration	4.2		O	N/A
A.100	Manual entry of the PARK and AC to CTA's		6.2	O	N/A

**7.7 NWK feature to procedure mapping**

**Table 3: NWK feature to procedure mapping**

Feature/Procedure mapping					
Feature	Procedure	GAP-Ref.	RAP-Ref	Status	
				RAP	
				CTA	FP
N.1 Outgoing call		4.1		M	M
	Outgoing call request	8.2		M	M
	Overlap sending	8.3		M	O
	Outgoing call proceeding	8.4		M	O
	Outgoing call confirmation	8.5		M	O
	Outgoing call connection	8.6		M	M
	Sending keypad information	8.10		M	M
N.2 Off Hook		4.1		M	M
	Outgoing call request	8.2		M	M
	Incoming call connection	8.15		M	M
N.3 On Hook (full release)		4.1		M	M
	Normal call release	8.7		M	M
	Abnormal call release	8.8		M	M
N.100 On Hook (conditional release)			6.1	M	M
	Sending on hook information		10.1.1	M	M
N.4 Dialed digits (basic)		4.1		M	M
	Sending keypad information	8.10		M	M
N.5 Register recall (Hook flash)		4.1		M	M
	Sending keypad information	8.10		M	M
N.8 Incoming call		4.1		M	M

(continued)

Table 3 (continued): NWK feature to procedure mapping

Feature/Procedure mapping					
Feature	Procedure	GAP-Ref.	RAP-Ref	Status	
				CTA	FP
	Incoming call request	8.12		M	M
	Incoming call confirmation	8.13		M	M
	PT alerting	8.14		M	M
	Incoming call connection	8.15		M	M
N.9 Authentication of the PP		4.1		M	M
	Authentication of PT	8.24		M	M
N.11 Location registration		4.1		M	M
	Location registration	8.28		M	M
	Location update	8.29		M	O
N.12 On air key allocation		4.1		M	O
	Key allocation	8.32		M	M
N.13 Identification of PP		4.1		M	O
	Identification of PT	8.22		M	M
N.14 Service class indication/assignment		4.1		M	M
	Obtaining access rights	8.30		M	M
	Authentication of PT	8.24		M	M
N.15 Alerting		4.1		M	M
	PT alerting	8.14		M	M
N.16 ZAP		4.1		O	O
	Obtaining access rights	8.30		M	M
	Incrementing the ZAP value	8.26		M	M
	Authentication of FT	8.23		O	M
N.17 Encryption activation FT initiated		4.1		M	M
	Cipher-switching initiated by FT	8.33		M	M
	Storing the DCK	8.27		M	M
N.18 Subscription registration user procedure on-air		4.1		M	M
	Obtaining access rights	8.30		M	M
N.19, Link control		4.1		M	M
	Indirect FT initiated link establishment	8.35		M	M
	Direct PT initiated link establishment	8.36		M	M
	Link release "normal"	8.37		M	M
	Link release "abnormal"	8.38		M	M
	Link release "maintain"	8.39		M	M
N.20 Terminate access rights FT initiated		4.1		M	O
	FT terminating access rights	8.31		M	M
	Authentication of FT	8.23		O	M
N.21, Partial release		4.1		M	M
	Partial release	8.9		M	M
N.26, Authentication of FT		4.1		O	O
	Authentication of FT	8.23		M	M
N.27, Encryption activation PT initiated		4.1		O	O
	Cipher-switching initiated by PT	8.34		M	M
	Storing the DCK	8.27		M	M

(continued)

Table 3 (continued): NWK feature to procedure mapping

Feature/Procedure mapping					
Feature	Procedure	GAP-Ref.	Status		
			RAP-Ref	RAP	
				CTA	FP
N.28, Encryption deactivation FT initiated		4.1		O	O
	Cipher-switching initiated by FT	8.33		M	M
N.29, Encryption deactivation PT initiated		4.1		O	O
	Cipher-switching initiated by PT	8.34		M	M
N.101, Calling Line Identification Presentation (CLIP) analogue			6.1	O	O
	Incoming call request	8.12		M	M
N.102, Incoming maintenance transaction			6.1	M	M
	Incoming maintenance call		10.2.1	M	M
	Sending OA&M information		10.3	M	M
	Outgoing call during maintenance call		10.2.3	M	M
	Incoming call during maintenance call		10.2.4	M	M
	Off-Hook allowed at CTA		10.3.8	M	O
N.103, Outgoing maintenance transaction			6.1	M	M
	Outgoing maintenance call		10.2.2	M	M
	Sending OA&M information		10.3	M	M
	Outgoing call during maintenance call		10.2.3	M	M
	Incoming call during maintenance call		10.2.4	M	M
	Off-Hook allowed at CTA		10.3.8	M	O
N.104, Maintenance during normal call			6.1	M	M
	Sending OA&M information		10.3	M	M
N.105, Metering Pulses			6.1	M	M
	Metering pulses		10.4.1	M	M
				<b>CTA</b>	<b>FP</b>
N.106, Leased Lines			6.1	O	O
	Establish leased line		10.5	M	M
	Release leased line		10.6	M	M
N.107, Physical resources fault			6.1	M	M
	Physical resources fault		10.3.1	M	M
N.108, Remote test			6.1	M	M
	Remote test		10.3.2	M	M
N.109, Alarms			6.1	M	M
	Alarms		10.3.3	M	M
N.110, Start remote over the air subscription			6.1	O	O
	Subscription to a new Fixed Part		10.3.4.1	M	M
	Resubscription to the same Fixed Part		10.3.4.2	M	M

(continued)

Table 3 (concluded): NWK feature to procedure mapping

Feature/Procedure mapping					
Feature	Procedure	GAP-Ref.	RAP-Ref	Status	
				CTA	FP
	Additional subscriptions to the same Fixed Part		10.3.4.3	M	M
	Remote resynchronization		10.3.9	M	M
N.111, Start Quality measurement			6.1	O	O
	Start Quality measurement		10.3.5	M	M
N.112, Stop Quality measurement			6.1	O	O
	Stop Quality measurement		10.3.6	M	M
N.113, Switch from voice to data service			6.1	O	O
	Switch from voice to data service		10.4.2	M	M
N.114, Coin collection			6.1	O	O
	Coin collection		10.4.3	M	M
N.115, Ground start			6.1	O	O
	Ground start		10.4.4	M	M
	Sending keypad information	8.10		M	M
N.116, Remote configuration			6.1	O	O
	Remote configuration		10.3.7	M	M
N.117, 64 kbit/s bearer service using DLC LU7 service for ISDN			6.1	O	O
	Switch between 32 kbit/s and 64 kbit/s bearer service		10.4.6	M	M
N.118, Emergency call			6.1	O	O
	Emergency call setup		ffs	M	M
N.119, Line parking			6.1	O	O
	Line parking		10.4.7	M	M
N.120, Line polarity reversal			6.1	O	O
	Line polarity reversal		10.4.5	M	M
N.121, Incoming WRS maintenance transaction			6.1	N/A	O
	Incoming WRS maintenance call		17.3.1	N/A	M
	Sending OA&M information		10.3	N/A	M
N.122, Outgoing WRS maintenance transaction			6.1	N/A	O
	Outgoing WRS maintenance call		17.3.2	N/A	M
	Sending OA&M information		10.3	N/A	M

## 7.8 Application feature to procedure mapping

Table 4: Application feature to procedure mapping

Feature / Procedure mapping					
Feature	Procedure	GAP-Ref.	RAP-Ref	Status	
				CTA	FP
A.1 AC to bitstring mapping		4.2		M	M
	AC to bitstring mapping	14.2		M	M
A.2 Multiple subscription registration		4.2		O	N/A
	Subscription control	14.1		M	N/A
A.100 Manual entry of the PARK and AC for CTA			4.2	O	N/A
	Manual entry of the PARK and AC for CTA		18.3	M	N/A

## 7.9 General requirements

See subclauses 6.9.1 - 6.9.7 of ETS 300 444 [14] GAP.

## 8 Procedure description

See clause 7 of ETS 300 444 [14] GAP.

## 9 NWK layer procedures

This clause specifies the NWK layer procedures, messages and information elements required in the RAP.

This profile does not prevent any CTA, PT or FT transmitting or receiving and processing any other NWK layer message or information element not specified in the profile. A PT or FT receiving an unsupported NWK layer message or information element which it does not recognise shall ignore it, as specified in clause 17 of ETS 300 175-5 [5].

### 9.1 Reference to GAP

The following subclauses of ETS 300 444 [14] GAP are part of the description of the NWK-Layer Procedures for the RAP Profile (see also subclause 0 table 3: "NWK feature to procedure mapping" of this ETS): subclauses 8.1 - 8.6, and 8.7 (only Normal call release, FT initiated), subclauses 8.8 - 8.15, 8.17, 8.22 - 8.24, 8.27 - 8.39.

#### 9.1.1 Release procedure for "On-hook (conditional release)"

The procedure shall be performed as defined in subclause 9.5.1 of ETS 300 175-5 [5]. The following text together with the associated subclauses define the mandatory requirements with regard to this ETS.

The CTA shall be capable of sending "on hook" information which shall be included in the <<IWU-TO-IWU>> information element (using Protocol Discriminator "RAP") in one {CC-INFO} message. The CTA and the FT are mandated to be able to perform this procedure in states T-02 and T-10. In all other states the CTA uses the release procedures as defined in GAP.

The normal reaction of the FT will be to initiate the normal call release procedures. The FT can also decide not to release the call directly for example in case of emergency calls.

If the TE at the CTA goes on-hook while a call is not established (after line parking etc.), the CTA shall establish a maintenance call and send "on hook".

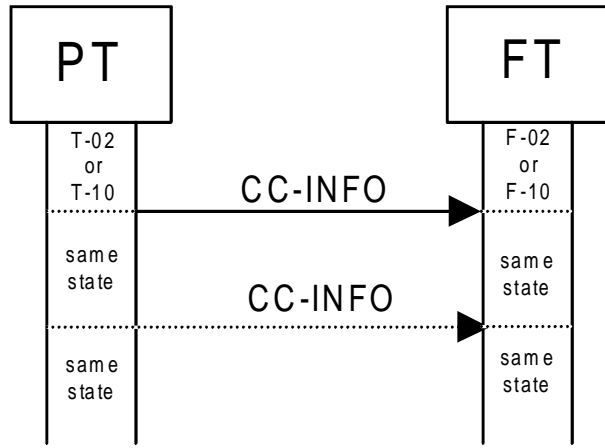


Figure 1: Sending on-hook information

Table 5: Values used within the {CC-INFO} message

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	On hook

9.2 Maintenance calls

For the following maintenance calls the special call class "OA&M call" is required in the IE <<Basic service>> of the {CC\_SETUP} message.

9.2.1 Incoming maintenance call

The incoming call procedures as defined in GAP shall be used. The FT is not required to send the <<SIGNAL>> info element during the incoming maintenance call procedure.

9.2.2 Outgoing maintenance call

The outgoing call procedures as defined in GAP shall be used. The CTA is not required to send the <<KEYPAD>> info element during the outgoing maintenance call procedure.

9.2.3 Outgoing call during maintenance call

The CTA releases the maintenance call with partial release and initiates afterwards the outgoing call.

Option: with OA&M message "off hook not allowed" it is possible to disable outgoing calls from the CTA to be sure that important OA&M procedures are not interrupted.

9.2.4 Incoming call during maintenance call

The FT should release the maintenance call with partial release and initiate afterwards the incoming call.

9.3 Sending OA&M information

The FT and the CTA shall be capable of sending and receiving "OA&M" information which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" which can be send with every CC-message which is allowed to carry the <<IWU-TO-IWU>> information element.



**Table 6: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Codings for OA&M information

If the CTA wants to inform the FT about a physical resources fault it shall send "physical resources fault" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established when the fault is detected, the CTA can setup an outgoing maintenance call to transmit this OA&M message.

**Table 7: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Physical resources fault

### 9.3.2 Remote test

If the FT wants the CTA to perform remote controlled tests it shall send "remote test (request)" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message.

**Table 8: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Remote test (request)

Depending on the test to be performed the CTA may answer to the remote CTA test (request) with a remote test (confirm) which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established when the test is finished the CTA can setup an outgoing maintenance call to transmit this OA&M message.

**Table 9: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Remote test (confirm)

**9.3.3 Alarms**

If the CTA wants to inform the FT about alarms it shall send "alarms" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established when the alarm is generated, the CTA can setup an outgoing maintenance call to transmit this OA&M message.

**Table 10: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Alarms

**9.3.4 Start remote over the air subscription**

**9.3.4.1 Subscription to a new fixed part**

NOTE: The procedures for subscription of a CTA to a new fixed part are for further study.

**9.3.4.2 Resubscription to the same fixed part**

NOTE: The procedures for resubscription of a CTA to the same fixed part are for further study.

**9.3.4.3 Additional subscriptions to the same fixed part**

If the FT wants a new port of a multiport CTA to be subscribed to itself it can send "subscription suggest" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message.

**Table 11: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Subscription suggest (port nr)

On reception of this message at the CTA the CTA shall release every call at the requested port with partial release. The CTA shall then perform the obtain access rights procedure at the requested port. This obtain access rights procedure shall be carried out only to the system that invoked the subscription suggest message. The FT shall set bit a44 of the higher layer capabilities-bits to "access\_rights\_supported" when sending the subscription suggest message. The CTA will assume this bit to be set when starting the obtain access rights procedure and will not check if it is set.

### 9.3.5 Start quality measurement

If the FT wants the CTA to perform quality measurements it shall send "start quality measurement" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message and receive the wanted measurement values from the CTA.

**Table 12: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Start quality measurement (parameters)

Depending on the parameters given with the start quality measurement message the CTA may start sending "quality measurement value" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall only be send during an established (perhaps maintenance) call.

**Table 13: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Quality measurement value

### 9.3.6 Stop quality measurement

If the FT wants the CTA to stop quality measurements it shall send "stop quality measurement" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message.

**Table 14: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Stop quality measurement

### 9.3.7 Remote configuration

Remote configuration can be done in a manufacturers proprietary way using <<Escape to Proprietary>> Information Elements.

### 9.3.8 Off-hook allowed at CTA

If the FT wants to enable or to disable the CTA to initiate outgoing calls it shall send "off-hook allowed"/"off-hook not allowed" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message.

**Table 15: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Off-hook allowed/Off-hook not allowed

### 9.3.9 Remote resynchronization

If the FT wants the CTA to perform resynchronization it shall send "resynchronization request" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message. This {CC-INFO} message shall be send during an established call. If no call is established the FT can setup an incoming maintenance call to transmit this OA&M message.

**Table 16: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Resynchronization request

Remote resynchronization is necessary to be able to inform a locked CTA about new static system information or new arrangements of carriers etc.

## 9.4 RLL-CC

### 9.4.1 Metering pulses

The procedure shall be performed as defined in ETS 300 175-5 [5], subclause 10.6.2.4. If the CTA wants the FT to generate a meter pulse it shall send the IE <<Feature-Activate>> in the {CC-SETUP} during the normal call setup.

**Table 17: Values used within the {CC-SETUP} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Portable identity>>			
	<Type>	0	IPUI
	<PUT>	All	Area dependent
<<Fixed Identity>>	<PUN>	All	Area dependent
			Shall always include the whole PARK including the non significant bits.
	<Type>	32	PARK
	<Length of identity value>	All	PLI+1
<<Basic service>>	<ARC+ARD>	All	Area dependent
<<Feature activate>>	<Call class>	8	Normal call setup
	<Basic service>	0	
<<Feature activate>>			
	<Length of Contents>	4	
	<Feature>	60H	Cost information
	<Parameter>	b1H	Cost information for the complete connection and charging pulses during the call

The FT shall respond with a <<Feature-Indicate>> IE in a {CC-INFO} message.

**Table 181: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<Feature indicate>>			
	<Length of Contents>	?	
	<Feature>	60H	Cost information
	<Parameter>	b1H	Cost information for the complete connection and charging pulses during the call
	<Status Indicator>	81H	Service request accepted, feature is activated
	<Charging Component> <Length>	7?H	Pulse (c14) Length ??
	<Value>	?	??

NOTE: The reaction of the application on the reception of a <<Feature-indicate>> is for further study, as well as the need for a confirmation of a pulse.

**9.4.2 Switch from voice to data service**

If the FT or CTA wants to switch from voice to data service because of detection of a 2.1kHz modem tone during an established call it shall send "modem tone detection" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message.

**Table 192: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Modem tone detection

NOTE: The reaction of the receiving part is for further study.

**9.4.3 Coin collection**

If the CTA wants to notify the result of coin collection to the FT during an established call it shall send "coin collection" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message.

**Table 20: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Coin collection

**9.4.4 Ground start**

If the CTA wants to indicate ground start to the FT it shall send keypad information following the procedure defined in subclause 8.10 of the GAP using the keypad information for register recall (15H).

**9.4.5 Line polarity reversal**

If the FT wants the CTA to generate a line polarity reversal during an established call it shall send "line polarity reversal" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message.

**Table 21: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Line polarity reversal

#### 9.4.6 Switch between 32 kbit/s and 64 kbit/s bearer service

If the FT or CTA wants to switch to 64 kbit/s bearer service (using DLC LU7 service for ISDN) during an established call it shall send "switch to 64 kbit/s bearer service" command.

If the CTA wants to switch from a 64Kbit/s to a 32Kbit/s bearer service during an established call it shall send "switch to 32Kbit/s bearer service" command.

Procedures and messages are for further study.

#### 9.4.7 Line parking

If the Local Exchange wants to park a line because there is no end to end connection from a Terminal Equipment on the CTA to another subscriber, the FT shall send "line parking" which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" in a {CC-INFO}-message and release the call to the CTA using the normal link release procedures.

**Table 22: Values used within the {CC-INFO} message**

Information element	Field within the information element	Standard values within the field/IE	Normative action/comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>	See annex D	Line parking

#### 9.5 Establish leased line

For further study.

#### 9.6 Release leased line

For further study.

### 10 DLC layer procedures

#### 10.1 General

#### 10.2 Reference to GAP

The complete clause 9 of ETS 300 444 [14] GAP is part of the description of the DLC-Layer Procedures for the RAP Profile.

### 11 MAC layer procedures

#### 11.1 General

#### 11.2 Reference to GAP

The complete clause 10 of ETS 300 444 [14] GAP is part of the description of the MAC-Layer Procedures for the RAP Profile.

#### 11.3 Advance timing

NOTE: The application of this MAC service, as defined in clause 7.3.5.2 of ETS 300 175-3 [3], is for further study.

## 12 Physical layer requirements

### 12.1 General

### 12.2 Reference to GAP

The complete clause 11 of ETS 300 444 [14] GAP is part of the description of the PHL-Layer Procedures for the RAP Profile.

## 13 Requirements regarding the speech transmission

### 13.1 General

The applicable requirements specified in ETS 300 175-8 [8] second edition and TBR 10 [13] second edition shall be applied for the FP. The encoding requirements of ETS 300 175-8 [8] subclause 5.1 shall apply for the CTA. Furthermore, the CTA shall conform to applicable requirements of national regulations. If a national requirement conflicts with the requirements of this ETS, the requirements of this ETS shall have precedence.

### 13.2 Echo control requirements for CTAs intended for 2-wire connections

The echo from the 4- to 2-wire hybrid of the CTA towards the network shall be controlled by inserting an echo loss into the sending path of the CTA. The weighted echo loss, LE, shall be >34 dB referred to the uniform PCM reference point of the CTA. This requirement shall be met for the whole range of 2-wire cable equivalents and termination impedances Z (see TBR10 [13] second edition subclause 7.30.2.2.1, (see note) specified by the national authority. The echo control device shall have a control range of at least 0 - 4 ms.

A 2-wire connection to a CTA may be direct and/or indirect, for example via a PABX. Echoes from indirect 2-wire connections shall also meet the 34 dB LE requirement. This may require a control range beyond 4 ms. The manufacturer shall declare the control range of the echo control device.

NOTE 1: General information on requirements for local loop applications are found in annex B of ETS 300 175-8 [8].

NOTE 2: It is recommended to use a simple echo canceller (see ETS 300 175-8 [8] annex A, subclause A.2.2) in the implementation of the echo control function of the CTA.

### 13.3 Disabling the echo control functions

#### 13.3.1 General

A CTA may be tested for LE >46 dB. Compare with the two options on terminal coupling loss for PPs (ETS 300 175-8 [8] subclause 7.4.1). If the >46 dB requirement is met, it is allowed to disable the artificial echo loss or echo control device (ETS 300 175-8 [8] subclause 7.4.1.2) in the FP. This information can be included in the subscription procedure.

#### 13.3.2 Modem services

The echo control functions shall be disabled at both the CTA and the FP upon detection of a 2.1 kHz modem answering tone. ITU-T Recommendations V.25, G.164 and G.165 defines the requirements for modem answering tone including timing requirements. The tone can be without or with phase reversals, indicating if only echo suppressors or also echo cancellers shall be disabled. In this application all echo control functions shall be disabled no matter if the tone contains phase reversals or not. This tone shall at least be detected at the FP, whereby the FP shall disable the FP the echo control functions and shall transmit to the CTA the modem tone detection message defined in annex D. The CTA shall be able to detect this message, and shall upon receipt disconnect the echo control functions of the CTA.



## 14 Requirements regarding fax and data transmission

### 14.1 General

Generally the RLL transport will be transparent to modem and fax services up to a certain rate. The maximum rate is limited to 9.6 kbit/s for the standard 32 kbit/s ADPCM full slot duplex channel. The optional feature N.117, 64 kbit/s PCM bearer service using the double slot LU7 service, supports rates up to 28.8 kbit/s.

NOTE: It has been experienced that some equipment using the 32 kbit/s ADPCM channel, agree during the negotiation phase on a transfer rate, that is higher than the rate that gives the highest throughput. A manual setting of a limit for the maximum rate would help. This is for further study.

### 14.2 Requirements

#### 14.2.1 Disabling the echo control functions

The FP and CTA shall disable the echo control functions upon detection of a 2.1 kHz answering modem tone as described in subclause 14.3.2.

NOTE. There may be a need for an optional (manual) command to disable the echo control function. This is for further study.

#### 14.2.2 Implementation of the LU7 PCM services.

If feature N.117, table 1, is supported, the LU7 service shall be implemented in the CTA, FP and WRS, as defined in ETS 300 175-4 [4], annex E.

NOTE 1: For the WRS, only Physical and MAC layer requirements as defined in ETS 300 175-4 [4], annex E are applicable.

The following procedure shall be followed, at least when no a priori information is available whether the call is a speech call or a fax/modem call:

The CTA shall set up calls using B-field set up and the LU7 PCM service. If no modem 2.1 kHz answering tone is detected within 5 seconds after off-hook at the called party, the double slot bearer shall be converted into a full slot and the ADPCM service shall be provided for the rest of the call. If no duplex double slot bearer is available at call set up, but a duplex full bearer is, the ADPCM service shall be provided for the entire call. The definition of the message to switch from PCM to ADPCM is indicated in subclause 10.4.6.

NOTE 2: Detailed procedures are for further study.

NOTE 3: Alternative procedures to the above procedures are for further study.

## 15 Management procedures

The complete clause 13 of ETS 300 444 [14] GAP is part of the description of the management procedures for the RAP Profile.

## **16 Interworking with WRS applications**

### **16.1 General**

FP support of Wireless Relay Stations is optional. DTR/RES-03074 [16] describes different applications of WRS. The WRS is an important component to provide cost effective infra structures and GAP mobility options including combined CTA and GAP residential service with intercom functions. WRS applications and features are also described in ETR 246 [18].

### **16.2 Requirements**

WRS shall support RAP and GAP. This implies that the WRS shall conform to applicable GAP requirements. In addition WRSs shall support the implementation of the RAP features N.102 - N.103, N.107 - N.113 and N.116 - N.117 with given status indication. The relevant codings are indicated in annex D. For the related procedures, see subclause 17.3 below.

NOTE: The procedures differ from those for the CTA in order not to mandate a NWK CC and DLC inside the WRS.

### **16.3 WRS maintenance calls**

#### **16.3.1 Incoming WRS maintenance call**

For incoming maintenance calls the FT shall use <<IWU-TO-IWU>> as defined in annex D, included in the {MM-INFO-SUGGEST} message, using the procedures as defined in ETS 300 175-5 [5], subclause 13.7.

NOTE: A special value for the <<INFO-TYPE>> shall be used, indicating "OA&M call".

#### **16.3.2 Outgoing WRS maintenance call**

For outgoing maintenance calls the WRS shall use <<IWU-TO-IWU>> as defined in annex D, included in the {MM-INFO-REQUEST} message, using the procedures as defined in ETS 300 175-5 [5], subclause 13.7. The FT shall respond according to these procedures with a {MM-INFO-ACCEPT}, which may include a <<IWU-TO-IWU>> as defined in annex D.

NOTE: A special value for the <<INFO-TYPE>> shall be used, indicating "OA&M call".

#### **16.3.3 Maintenance during WRS MM operation**

NOTE: Maintenance during WRS MM operation is for further study.

## **17 Application procedures**

### **17.1 General**

### **17.2 Reference to GAP**

The following subclauses of ETS 300 444 [14] GAP is part of the description of the Application Procedures for the RAP Profile: 14.1 and 14.2.

### **17.3 Manual entry of the PARK and AC to CTA's**

For further study.

**Annex A (informative): PP locking procedure for on air subscription**

See annex A of ETS 300 444 [14] GAP.

**Annex B (informative): Tones, progress indicator and U-plane connection**

See annex B of ETS 300 444 [14] GAP.

## **Annex C (informative): ETS 300 175 changes**

For the purposes of this ETS, the following changes are required to ETS 300 175.

### **To ETS 300 175-5 [5]:**

For the <<IWU-TO-IWU>> IE (subclause 7.7.23), a protocol discriminator (pd) value shall be allocated, indicating "RLL Access Profile". Detailed coding for this protocol discriminator is given in annex D of this ETS.

For the <<BASIC-SERVICE>> IE (subclause 7.6.4), a call class shall be allocated, indicating "OA&M call set-up".

"For the <<INFO-TYPE>> IE (subclause 7.7.20), a value shall be allocated, indicating "OA&M call".

### Annex D (normative): Codings for "OA&M" and "RAP-CC" messages

The FT and the CTA shall be capable of sending and receiving OA&M and RAP-CC information which shall be included in the <<IWU-TO-IWU>> information element using Protocol Discriminator "RAP" which can be send with every CC-message which is allowed to carry the <<IWU-TO-IWU>> information element.

Information element	Field within the information element	Standard values within the field/IE	Normative action / comment
<<IWU-to-IWU>>			
	<Length of Contents>	04H	
	<Protocol Discriminator>	?	RAP indication
	<IWU-to-IWU information>		Codings for OA&M and RAP-CC

#### General structure for RAP <<IWU-to-IWU>>

Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | Octet

0	<<IWU-TO-IWU>>							1
Length of Contents (L)								2
1	S/R	RAP						3
SC		Service Type						4

#### Service Category (SC)

Bits	8	7	Meaning
	0	0	RAP-CC
	0	0	RAP-OA&M
	0	0	Reserved
	0	0	Reserved

#### Service type:

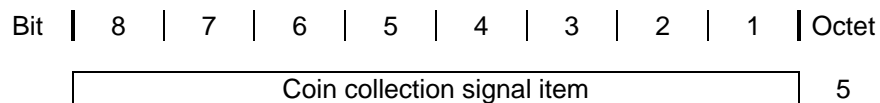
If SC indicates RAP-CC

Bits	6	5	4	3	2	1	Meaning
	0	0	0	0	0	0	Reserved
	0	0	0	0	0	1	On hook
	0	0	0	0	1	0	Modem tone detection
	0	0	0	0	1	1	Coin collection
	0	0	0	1	0	0	Line polarity reversal
	0	0	0	1	0	1	Switch to 64 kbit/s bearer service
	0	0	0	1	1	0	Switch to 32 kbit/s bearer service
	0	0	0	1	1	1	Line parked
	All other values						Reserved

if SC indicates RAP/OA&M

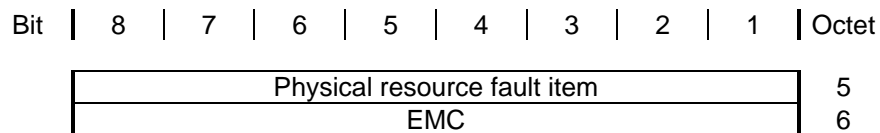
Bits	6	5	4	3	2	1	Meaning
	0	0	0	0	0	0	Off hook not allowed
	0	0	0	0	0	1	Off hook allowed
	0	0	0	0	1	0	Physical resource fault
	0	0	0	0	1	1	Remote test activation
	0	0	0	1	0	0	Alarm
	0	0	0	1	0	1	Subscription suggest
	0	0	0	1	1	0	Start quality measurement
	0	0	0	1	1	1	Quality measurement value
	0	0	1	0	0	0	Stop quality measurement
	0	0	1	0	0	1	Resynchronization request
	0	0	1	0	1	0	Remote test information
	All other values						Reserved

### Coin collection



Bits	8	7	6	5	4	3	2	1	Meaning
	X	X	X	X	X	X	X	1/0	Coin absent/present
	X	X	X	X	X	X	1/0	X	High denomination coin / Low denomination coin
	All other values								Reserved
									X: dont care

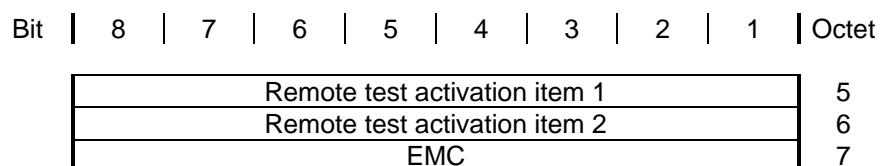
### Physical resource fault



Bits	8	7	6	5	4	3	2	1	Meaning
	X	X	X	X	X	X	X	1/0	Antenna fault present/absent
	X	X	X	X	X	X	1/0	X	RF unit plus logic fault present/absent
	X	X	X	X	X	1/0	X	X	Line interface unit fault present/absent
	X	X	X	X	1/0	X	X	X	Power supply unit fault present/absent
	X	X	X	1/0	X	X	X	X	Backup battery fault present/absent
	X	X	1/0	X	X	X	X	X	Network terminating unit fault present/absent
	X	1/0	X	X	X	X	X	X	General unit fault present/absent
	1/0	X	X	X	X	X	X	X	Escape
									X: dont care

If bit 8 is set, the EMC shall be present.

### Remote test activation



Remote test activation item 1:

Bits	8	7	6	5	4	3	2	1	Meaning
X	X	X	X	X	X	X	X	1/0	Detect network terminating unit test activated/deactivated
X	X	X	X	X	X	X	1/0	X	Detect presence of telephone test activated/deactivated
X	X	X	X	X	1/0	X	X	X	Check for leakage to earth test activated/deactivated
X	X	X	X	1/0	X	X	X	X	Detect hazardous voltage test activated/deactivated
X	X	X	1/0	X	X	X	X	X	Detect mains power at CTA test activated/deactivated
X	X	1/0	X	X	X	X	X	X	Check for dial tone from exchange at CTA test activated/deactivated
X	1/0	X	X	X	X	X	X	X	Link Quality test activated/deactivated
1/0	X	X	X	X	X	X	X	X	RSSI test activated/deactivated

X: dont care

Remote test activation item 2:

Bits	8	7	6	5	4	3	2	1	Meaning
X	X	X	X	X	X	X	X	1/0	Ring / Ring trip test activated/deactivated
X	X	X	X	X	X	X	1/0	X	Dialled digit test activated/deactivated
X	X	X	X	X	1/0	X	X	X	Deliver number of failed remote call attempts made by CTA
X	X	X	X	1/0	X	X	X	X	Reserved
X	X	X	1/0	X	X	X	X	X	Reserved
X	X	1/0	X	X	X	X	X	X	Reserved
X	1/0	X	X	X	X	X	X	X	Reserved
1/0	X	X	X	X	X	X	X	X	Escape

X: dont care

If bit 8 is set, the EMC shall be present.

**Remote test information**

Bit	8	7	6	5	4	3	2	1	Octet
Remote test information item 1									5
Remote test information item 2									6
Result fields / EMC									7
									L+?

Remote test information item 1:

Bits	8	7	6	5	4	3	2	1	Meaning
0	0	0	0	0	0	0	0	1	Results on test Detect network terminating unit
0	0	0	0	0	0	0	1	0	Results on test Detect presence of telephone
0	0	0	0	0	0	1	0	0	Results on test Check for leakage to earth
0	0	0	0	1	0	0	0	0	Results on test Detect hazardous voltage
0	0	0	1	0	0	0	0	0	Results on test Detect mains power at CTA
0	0	1	0	0	0	0	0	0	Results on test Check for dial tone from exchange at CTA
0	1	0	0	0	0	0	0	0	Results on test Link Quality
1	0	0	0	0	0	0	0	0	Results on test RSSI test



Remote test information item 2:

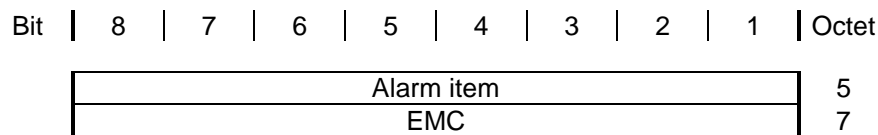
Bits	8	7	6	5	4	3	2	1	Meaning
	0	0	0	0	0	0	0	1	Results on test Ring / Ring trip test activated/deactivated
	0	0	0	0	0	0	1	0	Results on test Dialed digit test activated/deactivated
	0	0	0	0	0	1	0	0	Delivery of number of failed remote call attempts made by CTA
	0	0	0	0	1	0	0	0	Reserved
	0	0	0	1	0	0	0	0	Reserved
	0	0	1	0	0	0	0	0	Reserved
	0	1	0	0	0	0	0	0	Reserved
	1	0	0	0	0	0	0	0	Escape

If bit 8 is set, the EMC shall be present, as first octet in the result field

Result field(s):

The content of the result fields has to be defined after definition of the tests (annex E).

### Alarm

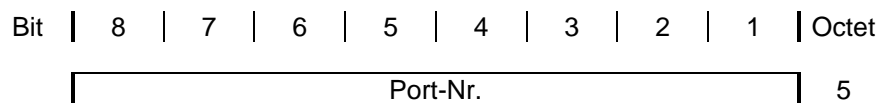


Bits	8	7	6	5	4	3	2	1	Meaning
	X	X	X	X	X	X	X	1/0	Mains failure alarm present/absent
	X	X	X	X	X	X	1/0	X	Power supply failure alarm present/absent
	X	X	X	X	X	1/0	X	X	Low battery voltage alarm present/absent
	X	X	X	X	1/0	X	X	X	Opening of CTA enclosure alarm present/absent
	X	X	X	1/0	X	X	X	X	Reserved
	X	X	1/0	X	X	X	X	X	Reserved
	X	1/0	X	X	X	X	X	X	Reserved
	1/0	X	X	X	X	X	X	X	Escape

X: dont care

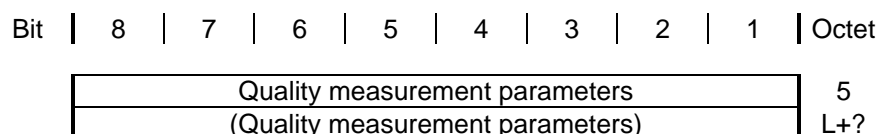
If bit 8 is set, the EMC shall be present.

### Subscription suggest



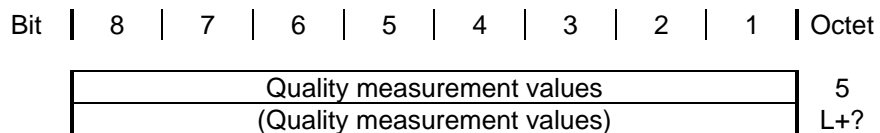
Bits	8	7	6	5	4	3	2	1	Meaning
	X	X	X	X	X	X	X	X	Desired Port-Nr. (0-FFH)

### Start quality measurement



The content of the fields for quality measurement parameters have to be defined after the definition of the quality measurement procedure (annex E).

Quality measurement value



The contents of the fields for quality measurement value have to be defined after the definition of the quality measurement procedure (annex E).

**Annex E (normative): Description of remote tests and quality measurement**

NOTE: A detailed description of procedures and results of the remote tests and quality measurement are for further study.

## History

Document history	
July 1996	Public Enquiry PE 109: 1996-07-08 to 1996-11-01