



ETSI
TECHNICAL
REPORT

ETR 043

July 1992

Source: ETSI TC-RES

Reference: DTR/RES-3004

ICS: 33.060

Key words: DECT

**Radio Equipment and Systems (RES);
Digital European Cordless Telecommunications (DECT)
Common interface
Services and facilities requirements specification**

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Copyright Notification: No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1992. All rights reserved.

5.1.26	Silent polling.....	25
5.1.27	Status indication signalling.....	25
5.1.28	Class of service field.....	26
5.1.29	Class of service field indication.....	26
5.1.30	Inter-operator roaming registration.....	27
5.1.31	Control of supervisory tones.....	27
5.1.32	Regular security handshake.....	27
5.1.33	Signalling of display characters.....	28
5.1.34	Display control characters.....	28
5.1.35	ZAP suspend.....	28
5.1.36	ZAP terminate.....	28
5.1.37	Alphanumeric text messaging and radiopaging service.....	29
5.1.38	Voice and user data traffic encryption activation/de-activation.....	29
5.1.39	Signalling traffic encryption activation/de-activation.....	29
5.1.40	Debit public access (telepoint).....	29
5.1.41	Credit public access (telepoint).....	30
5.1.42	Credit agency public access (telepoint).....	30
5.1.43	On-demand (hot-bill) public access (telepoint).....	30
5.1.44	Advice of tariff request.....	30
5.1.45	Advice of charge request.....	31
5.1.46	Location registration for incoming calls, paging or messages.....	31
5.1.47	Location de-registration for incoming calls, paging or messages.....	31
5.1.48	Queue management.....	31
5.1.49	Queue entry request.....	32
5.1.50	Queue exit request.....	32
5.1.51	"Portable part inaccessible" indication.....	32
5.1.52	"In-range" indication.....	32
5.1.53	Emergency service access request.....	32
5.1.54	Indication of teleservices available request.....	33
5.1.55	Indication of teleservices available.....	33
5.1.56	Selection of service provider/network operator.....	33
5.1.57	Selection of required teleservice (not selection of service provider).....	33
5.1.58	Selection of bearer service.....	34
5.1.59	Validation of portable part user.....	34
5.1.60	Validation of portable part.....	34
5.1.61	Validation of identity module.....	35
5.1.62	User identification (UPI).....	35
5.1.63	Group address.....	35
5.1.64	Selection of additional character sets.....	35
5.1.65	Data capability.....	35
5.1.66	Support for supplementary services.....	36
5.1.67	Dial tone detection indication.....	36
5.1.68	Request for indication of (temporary) subscriber number.....	36
5.1.69	Portable part capability/fixed part capability data exchange.....	37
5.1.70	Subscription registration user procedure (on-air).....	37
5.1.71	Subscription registration user procedure (keypad).....	37
5.1.72	Subscription registration user procedure (DECT authentication module).....	38
5.1.73	Subscription data exchange (on-air).....	38
5.1.74	Subscription registration message format for public access (telepoint).....	38
5.1.75	Multicell fixed part coverage.....	39
5.1.76	Handover.....	39
5.1.77	Intra-cell handover.....	39
5.1.78	Inter-cell handover.....	39
5.1.79	Tandem use with other mobile systems.....	40
5.1.80	Multiple subscription registration.....	40
5.1.81	All-physical-channel capability.....	40
5.2	DECT Packet switched facilities.....	40
5.2.1	Point to point packet services.....	40
5.2.2	Data services.....	41
5.2.3	Broadcast packet services.....	41

6	PSTN applications	42
6.1	PSTN basic service access.....	42
6.1.1	PSTN voice service	42
6.1.1.1	DECT bearer service requirement.....	42
6.1.2	PSTN data service	42
6.1.2.1	DECT bearer service requirement.....	42
6.2	PSTN supplementary service access	42
6.2.1	DECT bearer service requirement.....	42
6.3	PSTN public access (telepoint) service	42
6.3.1	DECT bearer service requirement.....	43
6.4	PSTN residential, PBX and key system applications.....	43
6.4.1	Residential.....	43
6.4.2	Analogue/digital PBX and key systems.....	43
6.5	PSTN local loop applications	43
7	Wireless PBX applications	44
8	Public access (telepoint) applications	44
8.1	Minimum public access (telepoint) service requirements	44
8.2	Summary of DECT public access (telepoint) voice service facilities which are process mandatory	44
8.3	Facilities required to support a public access (telepoint) service.....	48
8.3.1	Authentication (of portable part, user or detachable module).....	48
8.3.2	DECT security profile for public access (telepoint).....	48
8.3.3	Authentication constraints.....	50
8.3.4	Authentication of fixed part.....	50
8.3.5	Portable station identity number.....	50
8.3.6	Public access (telepoint) portable part identity.....	50
8.3.7	Portable part/fixed part exchange of service provision data capability.....	50
8.3.8	Emergency service access request.....	50
8.3.9	Selection of required teleservice request.....	51
8.3.10	Selection of service provider/network operator request	51
8.3.11	Multiple subscription registration.....	51
8.3.12	Class-of-service field indication.....	51
8.3.13	Supervisory tones.....	51
8.3.14	On/off hook.....	52
8.3.15	Go to DTMF	52
8.3.16	Dialled digits (basic)	52
8.3.17	Public access service provider identity	52
8.3.18	Public access (telepoint) service request code.....	52
8.3.19	Public access (telepoint) account identities.....	52
8.3.20	Authentication of user to portable part (portable part lock).....	52
8.3.21	Standard subscription registration procedure for public access (telepoint) compatible equipment.....	52
8.3.22	Subscription data registration (on-air)	52
8.3.23	Subscription registration message format for public access (telepoint)	53
8.3.24	Standard formats and procedures for subscription authentication	53
8.3.25	Inter-operator roaming.....	53
8.3.26	Ability to target a specific service provider.....	53
8.3.27	ZAP per subscription	53
8.3.28	On-air ability to suspend access rights (ZAP-suspend).....	54
8.3.29	On-air ability to terminate access rights (ZAP-terminate).....	54
8.3.30	In-range indication	54
8.3.31	Ability to provide inter-cell handover.....	54
8.3.32	Debit public access (telepoint).....	54
8.3.33	Credit public access (telepoint).....	54
8.3.34	Credit agency public access (telepoint)	54
8.3.35	On-demand (hot-bill) public access (telepoint)	54
8.3.36	Incoming call facility.....	54
8.3.37	Location registration for incoming calls, paging or messages	55

8.3.38	Location de-registration for incoming calls, paging or messages.....	55
8.3.39	Location registration for radio paging through public access (telepoint) fixed part	55
8.3.40	Location de-registration for radio paging through public access (telepoint) fixed part	55
8.3.41	Radio page acknowledge in a public access (telepoint) fixed part.....	55
8.3.42	Indication of teleservices available	55
8.3.43	Queue management	55
9	Local loop applications.....	56
10	ISDN applications	56
10.1	ISDN supported teleservices	56
10.2	ISDN supplementary services.....	56
10.3	Residential applications.....	56
10.4	ISPBX/key systems applications.....	56
10.5	Local loop applications.....	56
10.6	ISDN public access (telepoint) applications.....	56
11	X.25 applications	57
11.1	Services	57
11.1.1	Packet data service.....	57
11.1.2	Optional user facilities.....	57
11.2	Applications	57
11.2.1	X.25 Packet-mode terminal	57
11.2.2	Cordless PAD facility	57
11.2.3	ISDN applications	58
12	GSM extension applications	58
12.1	Basic services.....	58
12.2	Supplementary services.....	58
12.3	Identified applications	59
12.3.1	DECT mobile public access (telepoint)	59
12.3.2	DECT network interworking.....	59
13	Local area network (IEEE 802) applications	59
13.1	Services	59
13.1.1	LAN data service requirements	59
13.1.2	Data integrity and security.....	60
13.1.3	Addressing.....	60
13.2	Applications	60
13.2.1	Single station attachments.....	60
13.2.2	Multi-station attachments	60
13.2.3	Network gateway	61
14	Data applications.....	61
15	Key systems applications.....	62
15.1	Equipment status indications	62
15.2	Route selection capability.....	62
15.3	Call alerting to multiple parties.....	62
15.4	Synchronised call alerting termination.....	62
15.5	Calling party/equipment identification.....	62
15.6	Incoming call by-pass facility	62
15.7	Incoming call offer selection	62
15.8	Broadcast call facility	63
15.9	Single cell direct call transfer facility.....	63
15.10	Conventional key system and PBX supplementary services	63
16	Technical information applicable to a number of DECT applications	64

16.1	Minimum operating distance	64
16.2	Grade of service	64
16.3	Quality of service	64
16.3.1	Service operability performance	65
16.3.2	Serviceability performance	65
16.3.3	Service integrity	65
16.4	Capacity	65
16.5	Range	67
16.6	Application and presentation	68
16.6.1	End-of-destination-address indication	68
16.6.2	Service codes	68
16.7	Supervisory tones/signals	68
16.7.1	ISDN signalling information messages	69
16.7.2	GSM supervisory tone control	69
16.7.3	PBX and key system tones/signals	69
16.8	ADPCM codecs	69
16.9	Security, authentication and encryption requirements	69
16.9.1	Encryption	69
16.9.2	Authentication	70
16.9.3	Portable part lock	70
16.9.4	Physical security	70
17	Definitions	71
17.1	Fixed part	71
17.2	Operating range	71
17.3	Cell	71
17.4	Single radio fixed part coverage	71
17.5	Multicell fixed part coverage	71
17.6	Bearer service	71
17.7	Teleservice	71
17.8	Supplementary telephone services	71
17.9	Telecommunication service (see service, telecommunication service)	71
17.10	Service	71
17.11	Packet-mode operation	72
17.12	Circuit switched connection	72
17.13	Telecommunication network	72
17.14	Terminal equipment	72
17.15	Capability	72
17.16	Function	72
17.17	Outgoing call	72
17.18	Outgoing call queuing	72
17.19	Incoming call	72
17.20	Handover	72
17.21	Inter-operator roaming	72
17.22	Multiple subscription registration	73
17.23	Emergency service	73
17.24	Tandem use with other mobile systems	73
17.25	Alphanumeric text messaging and radiopaging service	73
17.26	Voice and data traffic encryption	74
17.27	Signalling traffic encryption	74
17.28	Dialling and calling security	74
17.29	Authentication	74
17.30	Portable part authentication	74
17.31	User authentication	74
17.32	Authentication of fixed part	74
17.33	Validation	74
17.34	Validation of portable part user	74
17.35	Validation of portable part	74
17.36	Validation of DECT authentication module	74
17.37	User Personal Identity (UPI)	74

17.38	Portable part access security (portable part lock).....	75
17.39	'Portable part inaccessible' information.....	75
17.40	In-range indication.....	75
17.41	User indication of teleservice available.....	75
17.42	Portable parts register on other units.....	75
17.43	ZAP.....	75
17.44	Other definitions.....	75
Annex A:	PSTN supplementary services.....	76
A.1	Absent subscriber service.....	76
A.2	Diversion if number busy service.....	76
A.3	Do not disturb service.....	76
A.4	Customer dialled operator assisted call.....	76
A.5	Freephone service.....	76
A.6	Wide area telephone service.....	76
A.7	Automatic transferred debiting of charges.....	76
A.8	Radio paging.....	76
A.9	Direct calling-in (direct dialling-in).....	76
A.10	Incoming call barring.....	76
A.11	Registration of incoming calls.....	77
A.12	Completion of calls to busy subscriber service.....	77
A.13	Automatic transferred charge call.....	77
A.14	Remote call forwarding.....	77
A.15	Three party services.....	77
A.16	Conference call services.....	77
A.17	Calling number indication.....	77
A.18	Subscriber's alpha-numerical display.....	77
A.19	Private number ringing signal.....	77
A.20	Voice Mailbox Service (VMS).....	77
A.21	Abbreviated dialling services.....	78
A.22	Alarm call services.....	78
A.23	Automatic booked call.....	78
A.24	Diary service.....	78
A.25	Restriction in the outgoing direction service.....	78

A.26	PBX line hunting services	78
A.27	User call charge meter.....	78
A.28	Automatic verbal announcement of charges applied service	78
A.29	Printed record of duration and charge of call service	78
A.30	Automatic credit card service	78
A.31	Selective accounting	78
A.32	Customer recorded information service	79
A.33	Public recorded information service.....	79
A.34	Emergency call service	79
A.35	Centrex service	79
A.36	Babyphone	79
A.37	Transmission of verbal message.....	79
A.38	Universal access number	79
A.39	Message relay	79
A.40	Interruption of call in progress	79
A.41	Fixed destination call services	79
A.42	Pick-up facility.....	80
A.43	Call waiting services	80
A.44	Dual telephone numbers.....	80
A.45	Voice dialling.....	80
A.46	Number repetition service.....	80
A.47	Lecture call.....	80
Annex B:	ISDN supplementary services	81
B.1	Introduction.....	81
B.2	Number identification services	81
B.2.1	Direct Dialling-In (DDI).....	81
B.2.2	Multiple Subscriber Number (MSN).....	81
B.2.3	Calling Line Identification Presentation (CLIP).....	81
B.2.4	Calling Line Identification Restriction (CLIR)	81
B.2.5	Connected Line Identification Presentation (COLP).....	81
B.2.6	Connected Line Identification Restriction (COLR).....	81
B.2.7	Malicious Call Identification (MCI).....	81
B.2.8	Sub-addressing (SUB).....	81
B.3	Call offering services	81
B.3.1	Call Transfer (CT).....	81

B.3.2	Call Forwarding Busy (CFB).....	81
B.3.3	Call Forwarding No Reply (CFNR)	82
B.3.4	Call Forwarding Unconditional (CFU).....	82
B.3.5	Call Deflection (CD).....	82
B.3.6	Line Hunting (LH).....	82
B.4	Call completion services.....	82
B.4.1	Call Waiting (CW).....	82
B.4.2	Call Hold (HOLD)	82
B.4.3	Completion of Calls to Busy Subscriber (CCBS)	82
B.5	Multiparty services.....	82
B.5.1	Conference Call Add-on (CONF)	82
B.5.2	Conference Call Meet-me (MMC).....	82
B.5.3	Three Party service (3PTY)	82
B.6	Community of interest services	82
B.6.1	Closed User Group (CUG)	82
B.6.2	Private Numbering Plan (PNP).....	82
B.7	Charging services	82
B.7.1	Credit Card Calling (CRED).....	82
B.7.2	Advice of Charge (AOC)	83
B.7.3	Reverse Charging (REV).....	83
B.8	Additional information transfer services	83
B.8.1	User-to-User Signalling (UUS)	83
Annex C:	DECT character set	84
Annex D:	Glossary of abbreviations	86
Annex E:	DECT network configurations	88
Annex F:	References.....	91
History	94

Foreword

ETSI Technical Reports (ETRs) are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim-European Telecommunication Standard (I-ETS) status.

An ETR may be used to publish material which is either of an informative nature, relating to the use or application of an ETS or I-ETS, or which is immature and not yet suitable for formal adoption as an ETS or I-ETS.

This ETR has been produced by the Technical Committee radio Equipment and Systems (TC-RES) sub-technical committee 3 (RES 3) of the European Telecommunications Standards Institute (ETSI).

This ETR describes the range of services and facilities which Digital European Cordless Telecommunications (DECT) will be required to provide and support.

Blank page

1 Scope

To facilitate the identification of the requirements for the DECT common air interface, this report describes the range of services and facilities which DECT will be required to provide and support.

The DECT Reference Model shows a functional configuration in which a DECT system is attached to an DECT Local Network which in turn may be attached to a global network. In general a DECT system should support the services and facilities offered by the global or DECT Local Network to which it is attached. The scope of this report is the support by DECT systems of those services and facilities offered by the global or DECT Local Network to which a DECT system may be attached. It is not intended that the scope of this report should be restricted to any particular types of attached network but does specifically include networks of different ownership, e.g. public, private, and of different technologies and service characteristics e.g. PSTN, ISDN, and cellular networks.

This report is not an overall description of DECT system concepts for which reference should be made to the DECT Reference Document [1], see Annex F for references.

It is outside the scope of this report to define specific products or equipment or particular implementations of such products. Nevertheless, such products may be required to provide, implement, or use services in accordance with requirements of the specification which may be based on the contents of this report.

The development of a DECT specification based on this report should follow the three-stage method recommended by the CCITT. The identification of the necessary interworking scenarios, and their checking for completeness, is outside the scope of this document.

The teleservices appropriate to particular applications are described in Clauses 6 to 15.

The bearer services required to support teleservices are defined in Clause 4.

The basic facilities to access and control these bearer and teleservices are identified in Clause 5.

2 Philosophy

DECT is considered in this report as an interface specification to enable access to a number of different types of network services. DECT services and facilities are described in terms of a range of bearer service capabilities and DECT facilities that provide the necessary access to the bearer and teleservices of the network services addressed.

The bearer service categories provided by DECT are specified according to conventional definitions contained within appropriate CCITT recommendations. Where necessary, special DECT categories are defined to achieve bearer service capabilities that are unique to DECT or previously undefined.

DECT facilities are identified as a set of information flows that DECT must support to allow certain bearer and teleservices of host networks to be accessed. DECT facilities are specified by way of a general description of the requirement, a determination of the origin of the information flow, a determination of the direction and symmetry of the information flow, and a determination of the point of termination of the information flow. The DECT facilities described in this report do not purport to represent particular messages but rather a body of information contained within one or a number of messages that are transferred across an interface.

DECT is required to allow access to a number of different network types. This report identifies the DECT facilities and bearer services appropriate to achieving access to the nominated network services (bearer services or teleservices). These network service access definitions identify the minimal requirements for achieving a desired level of access to particular network services. These requirements represent a recommended minimum level of DECT services and facility provision at DECT interfaces.

DECT shall support functional methods of service invocation for services common to a variety of networks.

DECT shall support stimulus mode access to any network service that supports stimulus invocation by other terminal apparatus connected to that network.

DECT shall support (by mandatory processes) transparent transmission of messages or other signalling necessary to support the supplementary services of those networks identified to which DECT will interwork/interconnect. Annexes A and B identify PSTN and ISDN supplementary services which DECT may have to support by transporting in a transparent manner. It is not the intention that DECT should develop processes to provide these services. This may conflict with the generalised ideal expressed elsewhere in the document that all services are accessed in a similar manner (i.e. it is not possible to fully achieve this ideal)

There are three possibilities for transporting supplementary services in DECT:

- keypad protocol - keypad information elements and display information elements
- feature key management protocol - feature activation elements and feature indication elements
- functional protocol - facility information elements to convey ISDN functional protocol

The message sets and coding for the functional protocol only shall be defined (see Clause 3).

3 General

In the context of this document the word 'system' should be taken to mean the combination of DECT definitions, procedures and protocols and other technical standards which taken together provide the functional capability for telecommunication. It does NOT imply any particular physical implementation or network.

3.1 Services and facilities implementation

The provision of any particular DECT service or facility may be mandatory or optional, the process by which this service or facility is achieved may be mandatory or optional, and the usage of a service or facility may be mandatory or optional. This document lists the services or facilities and indicates (for public access (telepoint)) whether the provision and process are mandatory or optional.

It may be necessary to provide different classifications of process, provision and usage for DECT fixed part and DECT portable part.

3.2 DECT applications

DECT is essentially an access technology, and while the air interface will be specified to encompass the major requirements of existing (and, where possible, future) networks, the details of DECT interfaces to specific networks are to an extent product specific and hence outside the scope of this document. In general a DECT system should support the services and facilities offered by the global or DECT Local Network to which it is attached.

The following market applications and networks have been specifically identified for consideration. This is a non-exhaustive list and does not limit other applications.

DECT covers cordless telecommunications from one line systems ranging through key systems to large complex systems such as wireless PBX and private network applications. Many of the technical requirements for business use are similar or identical to the requirements for public access (telepoint) applications, and reference should be made to the appropriate section of this document. Normal PBX functions must be supported.

Additional requirements include provision for more than one line; provision for 2 or more portable parts; "portable part inaccessible" indication from the system at call set-up; intercom facilities, including portable part to portable part, via the fixed part; call transfer between portable parts; fixed part ringer or independent ringer.

DECT shall also provide secure authentication of portable part user; the ability for independent systems to be interconnected to achieve coverage expansion without handover; the ability for portable parts to enrol on other fixed parts; real-time file access supporting e.g. X.400 protocols P3 and P7; general ISDN connection based services.

3.2.1 Public access

Localised public access to telecommunications networks.

3.2.1.1 Public access (telepoint) in the fixed environment

Public access (telepoint) is defined as a short range radio telecommunications system whereby a portable part user can gain access to teleservices via a publicly accessible network of fixed parts.

DECT will be used in such public access (telepoint) applications. See Clause 8 for public access (telepoint) requirements.

3.2.1.2 Public access (telepoint) in a mobile environment e.g. on trains

There is a definite market need for DECT portable parts to be used as cordless extensions to GSM mobile stations on trains for the purpose of mobile public access (telepoint) service.

3.2.2 Extension to public networks

Provision of access from customer premises to public telecommunications network distribution point.

3.2.3 Distributed networks

Centrex type service; distributed radio fixed part with centralised processing such as codecs, control and signalling; distributed radio coverage; transmission ranges over cable up to at least 5 km should be supported without requiring special planning, special implementation or incurring capacity loss.

3.2.4 Extension to private networks

DECT will be used as an extension to private networks.

3.2.5 Extension to cellular radio

There is a definite market need for DECT portable parts to be used as cordless extensions to cellular radio mobile stations.

3.2.6 DECT-specific implementation of existing services

3.2.6.1 DECT encapsulation supplementary service

A DECT encapsulation supplementary service to transport other networks' supplementary services shall be provided.

3.2.6.2 ETSI-ISDN functional list

The messages and coding for the following selected set of supplementary services shall be defined (This set is selected from the supplementary services defined by ETSI for the ISDN protocol):

- Malicious Call IDentification (MCID)
- Call Forwarding Busy (CFB)
- Call Forwarding Unconditional (CFU)
- User to User Signalling (UUS)
- Calling Line Identification Presentation (CLIP)
- Calling Line Identification Restriction (CLIR)
- COnnected Line identification Presentation (COLP)
- COnnected Line identification Restriction (COLR)
- Completion of Calls to Busy Subscriber (CCBS)
- FreePHONE (FPH)
- Advice of charge : charging information at call set-up time
- Advice of charge : charging information during the call
- Advice of charge : charging information at the end of the call
- SUB-addressing (SUB)
- Terminal Portability (TP)
- Call Waiting (CW)
- Direct Dialling In (DDI)
- Multiple Subscriber Number (MSN)
- Closed User Group (CUG)
- Explicit Call Transfer (ECT)
- Single step Call Transfer (SCT)
- Call Forwarding No Reply (CFNR)
- Call Deflection (CD)
- CONFerence call add-on (CONF)
- Conference Call Meet-me (MMC)
- Call hold (HOLD)
- Three party (3PTY)

3.2.6.3 DECT data services

The data capabilities of DECT will open up a new market involving cordless access to data networks. Potential application areas include cordless extensions to X.25 packet mode services and Local Area Networks (LANs), with access from both fixed and portable terminals. Commonly agreed standards, a European spectrum allocation and seamless integration of voice and data will be attractive features of DECT in exploiting this market.

4 Bearer services

CCITT defines bearer services as "a type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces". For DECT systems, the Air (radio) Interface provides the bearer service between the DECT fixed radio termination and the DECT portable radio termination as in the DECT reference model.

The DECT air-interface shall support both circuit-switched and packet-switched bearer services.

Bearer services for DECT are characterised by a set of attributes including information transfer mode, information transfer rate, information transfer capability, and structure.

4.1 Circuit switched bearer services

DECT shall provide 32 kbit/s duplex bearer channels or multiples thereof up to a maximum of 384 kbit/s in order to support the bearer service defined below. These bearer services may be used to support a variety of higher layer services including those teleservices defined in Clauses 6 to 15.

Design of the DECT system shall incorporate a measure of future proofness such that for example lower bit rate (half length or alternate time slot) bearer channels can be provided as codec technology advances.

DECT shall support the following bearer services:

- DECT Circuit Mode 16 kbit/s unrestricted, 8 kHz structured bearer service category;
- DECT Circuit Mode 32 kbit/s unrestricted, 8 kHz structured bearer service category;
- DECT 32 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer (ADPCM to G.721 is required);
- DECT Circuit mode 32 kbit/s, 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer;
- DECT 2 x 384 kbit/s unidirectional bearer service;
- I.231.1 Circuit Mode 64 kbit/s unrestricted, 8 kHz structured bearer service category;
- I.231.2 Circuit Mode 64 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer;
- I.231.3 Circuit mode 64 kbit/s, 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer;
- I.231.4 Circuit mode alternate speech/64kbit/s unrestricted, 8 kHz structured bearer service category;
- I.231.5 Circuit mode 2 x 64 kbit/s unrestricted, 8 kHz structured bearer service category;
- I.231.6 Circuit mode 384 kbit/s unrestricted, 8 kHz structured bearer service category.

DECT circuit switched bearer services shall be capable of supporting PSPDN and ISDN packet switched bearer services.

NOTE: Where available ETSI standards should now be used instead of the equivalent Iseries.

4.2 Packet switched bearer services

DECT shall support the following packet switched bearer services:

- I.232.1 Virtual call and permanent virtual circuit bearer service category.

In addition the following bearer services shall be considered on completion of their definition within CCITT:

- I.232.2 Connectionless bearer service category;
- I.232.3 User Signalling bearer service category.

In order that DECT may support LAN applications, a packet-mode bearer service category with the following characteristics is recommended:

Transfer mode:	Packet.
Transfer capability:	Unrestricted digital data.
Throughput:	- Variable throughput, fixed delay, up to a maximum of 736 kbit/s. - Variable delay, variable throughput, up to a maximum of 588 kbit/s error corrected.
Structure:	Service Data Unit (SDU) integrity.
Establishment of communication:	Demand.
Link establishment time:	Less than 50 milliseconds (exact value is for further study).
Symmetry:	Bidirectional symmetric or asymmetric, unidirectional.
Communication configuration:	Point-to-point, multicast, broadcast.
Frame transit delay:	For further study.
Maximum undetected error rate:	For further study.

It should be noted that 'link establishment' assumes a connection orientated protocol. A connectionless service is also required for LAN applications, hence the inclusion of unidirectional symmetry and a broadcast configuration.

In order that DECT may support X.25 packet-mode applications, a bearer service category with the following characteristics is recommended. It should be noted that the requirements for X.25 packet-mode data are similar to those defined for ISDN packet-mode bearer service categories in CCITT recommendation I.232.1.

Transfer mode:	Packet.
Transfer capability:	Unrestricted digital data.
Throughput:	Full rate equal to the throughput class of the virtual circuit. (net)
Structure:	Service Data Unit (SDU) integrity.

Establishment of communication:	Demand (virtual call); permanent (permanent virtual circuit).
Link establishment time:	Less than 50 milliseconds (exact value for further study).
Symmetry:	Bidirectional symmetric.
Communication configuration:	Point-to-point.
Frame transit delay:	For further study.
Maximum undetected error rate:	For further study.

Bearer services are also required in order to support character based connection, for example to X.3 PAD equipment. The main characteristics of this application are short frames, low delays and low throughput (typically below 2400 bit/s). The support of this application is for further study.

4.3 GSM bearer services

The basic DECT 32 kbit/s bearer is intrinsically capable of supporting all the GSM bearer services identified in table 3 of GSM 02.02 [2], see Annex F.

DECT shall be capable of interworking with the appropriate GSM bearers to support the GSM teleservices defined in subclause 12.1 of this ETR.

5 DECT facilities

In order to support circuit switched and packet switched bearer services and teleservices, the DECT specification is required to support a minimum set of basic facilities (with mandatory processes), which define the basic requirements of the air interface. Each facility has to be understood as a function and not necessarily as a message.

The description given for each facility deals with the "most normal situation", where the logic state of each extremity of the radio link is the most appropriate for having the facility activated (for example portable part in the on-hook state when the "bell-on" facility is activated). The various sequences of operations which the activation of each facility should lead to, according to the various states in which the portable or fixed parts could be, are not described in the present document. The general requirement applicable to the handling of the various situations is that:

The sequence of operations resulting from the activation of a supported facility must not be the subject of any ambiguity.

The specifications of the first 3 OSI layers must fully determine the sequence of operations for a given service or facility.

This implies that for instance:

- the portable part and fixed part capabilities will be handled as specific information elements in a pre-existing message structure. The message structure shall have adequate spare capacity for handling additional information elements to support future enhancements;
- the information elements contained in messages which are not applicable in a given configuration (portable part and fixed part) may simply be ignored.

5.1 DECT circuit switched facilities

The following are indication of intention and not actuality (which may depend on local conditions). They are NOT a message set.

5.1.1 Speech

Description:	Circuit-mode 32 kbit/s unrestricted 8 kHz structured bearer service category suitable for speech information transfer (G.721 ADPCM speech encoding).
Establishment by:	Fixed part, portable part.
Configuration:	Point to point; point to multipoint.
Symmetry:	Bidirectional symmetric (unidirectional for point to multipoint).
Termination at:	Portable part, fixed part.

5.1.2 Bell on

Description:	Activates bell or other user indication controlling process at the target apparatus (there is a requirement to support cadence following for interworking).
Establishment by:	Fixed part originated.
Configuration:	Point to point; point to multipoint.
Symmetry:	Unidirectional.
Termination at:	Portable part (local process to cater for carrier loss).

5.1.3 Bell off

Description:	De-activates bell or other user indication controlling process at the target apparatus (there is a requirement to support cadence following for interworking).
Establishment by:	Fixed part.
Configuration:	Point to point; point to multipoint.
Symmetry:	Unidirectional.
Termination at:	Portable part.

5.1.4 Off-hook

Description:	The ability to indicate the action of going off-hook, e.g. to start call set-up or accept a call.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Interworking with a network.

5.1.5 On-hook (full release)

Description: The ability to indicate the action of going on-hook, (e.g. to terminate a call) and fully release the radio resource.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Interworking with a network.

5.1.6 Partial release

Description: The ability to release an established call whilst retaining the radio resource for the purpose of accessing further services.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network or fixed part.

5.1.7 Dialed digits (basic)

Description: 0-9, *, #.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Global or DECT local network.

5.1.8 Dialed digits (additional)

Description: A, B, C, D.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Global or DECT local network.

5.1.9 Dialling delimiter

Description: A means to generate or otherwise to indicate 'end-of-destination-address' when dialling or transmitting dialled digits.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part.

5.1.10 Dialling delimiter request

Description: The ability to advise that a dialling delimiter is required.

Establishment by: Fixed part or DECT local network.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.11 Register recall

Description: To hold existing call and seize a register (with dial tone) to permit input of further digits or other action.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.12 Go to DTMF

Description: Go to DTMF signalling, with optional indication of DTMF tone duration.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part or DECT local network.

5.1.13 Go to Pulse

Description: Go to pulse (decadic) signalling.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part or DECT local network.

5.1.14 Pause (interdigit pause)

Description: The ability to generate or indicate an inter-digit pause, e.g. to await further dial tone (detection of dial tone is required as a separate facility).

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part or DECT local network.

5.1.15 Request for an outside line

Description: The ability to obtain an external (outside) line on which to set up a call. Select 1 from 32 - default 0.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.16 Request for an internal line

Description: The ability to obtain an extension or internal party. Select 1 from 32 - default 0.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.17 Specific line selection

Description: The ability to select a specific line (internal or external) on which to make or receive a call. It is recommended (but not provision mandatory) that DECT includes means of selecting a specific line from a minimum number (say 32) of lines. Line 0 is the default selection. Two lines of the remaining 31 shall be reserved for shift functions.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.18 Specific trunk carrier selection

Description:	The ability to select a specific trunk carrier for a call through a global network.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Global network.

5.1.19 Incoming call

Description:	A call received at a DECT portable part.
Establishment by:	Fixed part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Portable part.

5.1.20 Hold call

Description:	The ability to hold calls while other services are accessed.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	DECT local network.

5.1.21 Re-connection of a held call

Description:	The re-connection of a previously held call.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	DECT local network.

5.1.22 Forced re-connection

Description:	The forced re-connection of a call which has been left on hold for an excessive period of time.
Establishment by:	Fixed part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Portable part.

5.1.23 Authentication of portable part

Description: The process by which the identity of a DECT portable part is checked by the network prior to the provision of service, or on demand during a service.

Establishment by: DECT local network or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: DECT local network (via portable part).

5.1.24 Authentication of user

Description: The process by which the identity of a DECT user is checked by the network prior to the provision of service. See UPI.

Establishment by: Fixed part or DECT local network.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Fixed part or DECT local network.

5.1.25 Authentication of fixed part

Description: The process by which the identity of a fixed part may be identified by the portable part prior to establishing a call or before accepting certain instructions from the fixed part, for example ZAP suspend or ZAP terminate.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Portable part.

5.1.26 Silent polling

Description: The ability of a DECT fixed part to establish whether a specific portable part is within range without alerting the user of that portable part.

Establishment by: Fixed part.

Configuration: Point to point; point to multipoint.

Symmetry: Bidirectional.

Termination at: Fixed part.

5.1.27 Status indication signalling

Description: The ability to signal status indications to a portable part.

Establishment by: Fixed part or DECT local network.

Configuration: Point to point; point to multipoint.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.28 Class of service field

Description: A field containing information as to the class of service to be offered to a DECT portable part.

The suggested minimum information contained in this field is:

manufacturer identity code;
handset identity code;
home service identity;
public access (telepoint) class of service;
ZAP field;
telepoint registration data.

NOTE 1: Handset identity code and manufacturer's identity code shall uniquely identify the calling handset.

NOTE 2: Home service identity identifies the parent or home service with which the user is registered. These codes will be allocated by the DECT standard control authority.

NOTE 3: Telepoint class of service will be agreed and published by the DECT standard control authority.

NOTE 4: Telepoint registration data aids in uniquely identifying a public access (telepoint) account.

NOTE 5: The existence of a DECT standard control authority body is assumed.

NOTE 6: PIN, home service identity, and telepoint class of service field shall be mandatory and fixed-length. telepoint registration data may be used or omitted at the discretion of the network operator. Telepoint registration data field is optional and variable length up to a maximum of 20 BCD digits. The number of digits used is determined by the public access (telepoint) network operator.

Establishment by: Not applicable.

Configuration: Not applicable.

Symmetry: Not applicable.

Termination at: Not applicable.

5.1.29 Class of service field indication

Description: Indication to the fixed part by the portable part of the contents of its class of service field. The information passed across may vary depending on the system/network/service provider with whom communication is currently made, as class of service may vary from one subscription to the other.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.30 Inter-operator roaming registration

Description: The ability to exchange inter-operator roaming data in real time over the air interface during the first call-attempt between the portable part of a subscriber of a home DECT service provider A and the fixed part of a visited DECT service provider B, assuming A and B have agreed to offer inter-operator roaming to their respective subscribers. The inter-operator roaming data are the data required in part or all of the process of:

- giving physical access;
- identifying;
- authenticating;
- charging.

the visitor, depending on the terms of the inter-operator roaming agreement between A and B. Depending on the same factors, this facility may be partly or completely fulfilled by the subscription facility.

Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Bidirectional asymmetric.
Termination at: Portable part.

5.1.31 Control of supervisory tones

Description: Control of a variety of supervisory (call progress) tone such as dial tone, busy, equipment busy, system congestion, number unobtainable, etc, which may be generated in the portable part.

Establishment by: DECT local network or fixed part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Portable part.

5.1.32 Regular security handshake

Description: Regular interchange of information (link identifier) between portable part and fixed part during the period between link initiation and link termination to maintain link in normal operation and to reject unauthorised attempts to seize link. Interchange at intervals of the order of 1 second is acceptable.

Establishment by: Portable part/fixed part.
Configuration: Point to point.
Symmetry: Bidirectional.
Termination at: Fixed part/portable part.

5.1.33 Signalling of display characters

Description: The transmission to the portable part of characters to be displayed on the user's portable part display (if provided). See the character set given in Annex C.

Establishment by: DECT local network or fixed part.

Configuration: Point to point; point to multipoint; broadcast.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.34 Display control characters

Description: Characters sent to the portable part to control the user's display in the portable part (if provided). Such characters include cursor control, clear screen, home, flash, inverse video etc. See the character set given in Annex C.

Establishment by: DECT local network or fixed part.

Configuration: Point to point; point to multipoint; broadcast.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.35 ZAP suspend

Description: The ability to re-program the account data held in the portable part so that access rights are suspended subject to other the conditions being met, coupled with the ability to re-program the account data again to reinstate access rights once these conditions have been met. One ZAP field shall be provided per account field. The portable part has the right to authenticate the fixed part.

Establishment by: DECT local network.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.36 ZAP terminate

Description: The ability to re-program the account data held in the portable part so that access rights are terminated and cannot be reinstated except by following a full re-registration procedure. Applications for this include the case where a portable part requests access after a subscription has been cancelled or after the portable part has been reported as lost or stolen. The portable part has the right to authenticate the fixed part.

Establishment by: DECT local network.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.37 Alphanumeric text messaging and radiopaging service

Description: The ability to send short messages consisting of up to 120 characters of the default or other character set (currently under study) or initiate tones when not in-call or when in-call, with or without acknowledgement (cf GSM short messaging service).

A full alphanumeric message service should be based on the ERMES character set for alphanumeric paging (which has been accepted for GSM). This character set covers all west European characters essential for unrestricted pan-European message transfer and inter-operator roaming. Control characters should be added.

See the character set given in Annex C.

Establishment by: DECT local network , portable part or fixed part.

Configuration: Point to point; point to multipoint; broadcast.

Symmetry: Bidirectional.

Termination at: DECT local network, fixed part or portable part.

5.1.38 Voice and user data traffic encryption activation/de-activation

Description: The activation or de-activation of the encryption process applied to voice or user data on the traffic (B) channel.

NOTE: This feature can be with signalling traffic encryption using a common encryption process.

Establishment by: Portable part, fixed part or DECT local network.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Fixed part or portable part.

5.1.39 Signalling traffic encryption activation/de-activation

Description: The activation or de-activation of the encryption process on signalling information (call set-up, call accounting, etc).

NOTE: This feature can be with voice and data traffic encryption using a common encryption process.

Establishment by: Portable part, fixed part, or DECT local network.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Fixed part, portable part.

5.1.40 Debit public access (telepoint)

Description: DECT needs to support a public access (telepoint) system run on the basis of a portable part being pre-loaded by some method with call-value for the system. A secure method of decrementing the call-value from the fixed part, under the control of the public access (telepoint) operator, is required.

Establishment by: DECT local network.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Portable part.

5.1.41 Credit public access (telepoint)

Description: DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account to which call charges are to be attributed.

Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Fixed part or DECT local network.

5.1.42 Credit agency public access (telepoint)

Description: DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account with a credit agency to which call charges are to be attributed.

Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Fixed part or DECT local network.

5.1.43 On-demand (hot-bill) public access (telepoint)

Description: DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account to which call charges are to be attributed. At a billing point, the system must be able to provide a bill for call charges accrued, on demand.

Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Fixed part or DECT local network.

5.1.44 Advice of tariff request

Description: The ability for the user to request an indication of the call tariff. The indication may be given by visual, audible or other means.

Establishment by: Portable part.
Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Portable part.

5.1.45 Advice of charge request

Description: The ability for the user to request an indication of call charge for all or particular calls.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network or fixed part.

5.1.46 Location registration for incoming calls, paging or messages

Description: DECT needs to support a facility whereby a portable part can be registered with a fixed part or a cluster of fixed parts such that incoming calls, radio pages or messages may be routed to it.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.47 Location de-registration for incoming calls, paging or messages

Description: DECT needs to support a facility whereby a portable part can be de-registered with a fixed part or a cluster of fixed parts.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.48 Queue management

Description: Having been given a network congestion indication, a facility to register in a queue is required. Feed-back at regular intervals of information of how the queue is progressing may be provided by the alphanumeric messaging facility.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: DECT local network.

5.1.49 Queue entry request

Description: Request to enter outgoing call queue.
Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Fixed part or DECT local network.

5.1.50 Queue exit request

Description: Request to exit the outgoing call queue.
Establishment by: Portable part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: Fixed part or DECT local network.

5.1.51 "Portable part inaccessible" indication

Description: An indication, based on information derived within the DECT fixed part to indicate that the called DECT portable part cannot be contacted (not attached, not present, or powered down). This may be used to provide indication to the caller in some manner (e.g. by recorded message) that the call cannot be completed.
Establishment by: Fixed part.
Configuration: Point to point.
Symmetry: Unidirectional.
Termination at: DECT local network or global network (if required by DECT fixed part design).

5.1.52 "In-range" indication

Description: A means of indicating to a portable part, without necessarily establishing a full two-way radio link, that it is within range of a fixed part to which it might wish to gain access. (See also definition "user indication of service available").
Establishment by: Fixed part.
Configuration: Broadcast.
Symmetry: Unidirectional.
Termination at: Portable part.

5.1.53 Emergency service access request

Description:	A functional mode request for call set-up to the emergency service.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	DECT local network.

It must be possible for the fixed part to discriminate an emergency service access request from non-emergency service access requests in order to ensure that it is possible to bypass the normal call validation and establishment mechanisms if desired

5.1.54 Indication of teleservices available request

Description:	Request to be given an indication of range of teleservices available at a given location.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Fixed part.

5.1.55 Indication of teleservices available

Description:	Indication of the range of teleservices available at a given location.
Establishment by:	Fixed part.
Configuration:	Broadcast.
Symmetry:	Unidirectional.
Termination at:	Portable part.

5.1.56 Selection of service provider/network operator

Description:	The ability to signal the identity of the desired service provider or network operator with which it is desired to communicate when setting up a call at a particular moment in time.
Establishment by:	Portable part.
Configuration:	Point to point.
Symmetry:	Unidirectional.
Termination at:	Fixed part or DECT local network.

5.1.57 Selection of required teleservice (not selection of service provider)

Description: The ability to select a particular teleservice which is required at a given moment. This is not selection of service provider/system.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part.

5.1.58 Selection of bearer service

Description: The ability to select a particular bearer service for a particular application for the duration or part of the duration of an individual call.

Establishment by: Fixed part or portable part.

Configuration: Point to point.

Symmetry: Bidirectional (request and acknowledge).

Termination at: Portable part or fixed part.

5.1.59 Validation of portable part user

Description: The process carried out by the DECT system/network to identify the class-of-service to be made available to an authenticated DECT user. This feature activates the class of service field indication.

Establishment by: DECT local network or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: DECT local network or fixed part.

5.1.60 Validation of portable part

Description: The process carried out by the DECT system/network to identify the class-of-service to be made available to an authenticated DECT portable part. This feature activates the class of service field indication.

Establishment by: DECT local network or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: DECT local network or fixed part.

5.1.61 Validation of identity module

Description: The process carried out by the DECT system/network to identify the class-of-service to be made available to an authenticated DECT authentication module. This feature activates the class of service field indication.

Establishment by: DECT local network or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: DECT local network or fixed part.

5.1.62 User identification (UPI)

Description: The UPI, a personal identification of 4 to 8 digits, manually entered by the user via the keypad, used for user authentication only, which (having been operated on by the authentication key) generates an authentication result which is then passed over the radio interface and for example used to identify a user to a service provider. See authentication of user.

Establishment by: User.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part or DECT local network.

5.1.63 Group address

Description: The ability to address a group of portable parts for the purposes of simultaneous announcements e.g. through loudspeaking telephones.

Establishment by: DECT local network.

Configuration: Point to multipoint.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.64 Selection of additional character sets

Description: The ability to select additional character sets. DECT shall support the default character set defined in Annex C. Provision shall be made to define [8] character sets.

Establishment by: Fixed part or portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Portable part or fixed part.

5.1.65 Data capability

Description: The ability to transmit and receive data traffic over a communications channel.

Establishment by: Portable part or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional symmetric/asymmetric.

Termination at: Portable part or fixed part.

5.1.66 Support for supplementary services

Description: DECT shall support (by mandatory processes) transparent transmission of messages or other signalling necessary to support the supplementary services of those networks identified to which DECT will interwork/interconnect. This can be achieved using keypad, feature key management or functional protocols. DECT must be capable of supporting at least the ISDN functional protocol. Support for other protocols is not precluded. No standard will be identified for feature key management protocols.

Establishment by: Portable part, DECT local network, or global network.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Global network, DECT local network, or portable part.

5.1.67 Dial tone detection indication

Description: The ability to indicate to the portable part from the fixed part the detection of dial tone.

Establishment by: Fixed part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Portable part.

5.1.68 Request for indication of (temporary) subscriber number

Description: A request to indicate (visually or audibly) to the user the temporary subscriber number allocated to the user during a temporary registration on (for example) a network, other than the usual or home network, to which the user has access rights. See inter-operator roaming registration.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Unidirectional.

Termination at: Fixed part or DECT local network.

5.1.69 Portable part capability/fixed part capability data exchange

Description: The ability for a portable part and a fixed part to exchange data on their respective capabilities so that each can establish the mutual subset which they have in common.

Examples of such capabilities shall include:

- basic capability only;
- type of codec;
- display capability (none, numeric, alphanumeric);
- data handling modes (fax, etc.);
- DECT authentication module (used/not used/algorithms available);
- paging capability;
- handover capability;
- character sets supported;
- tone generation capability (yes/no).

Establishment by: Fixed part/portable part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Portable part/fixed part.

5.1.70 Subscription registration user procedure (on-air)

Description: A standardised (process mandatory) procedure for loading subscription registration data into a portable part in real time over the air-interface.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Bidirectional asymmetric.

Termination at: Portable part.

5.1.71 Subscription registration user procedure (keypad)

Description: A standardised (process mandatory) procedure for loading subscription registration data into a portable part using the keypad.

Establishment by: Local.

Configuration: Local.

Symmetry: Local.

Termination at: Local.

5.1.72 Subscription registration user procedure (DECT authentication module)

Description: A standardised (process mandatory) procedure for loading subscription registration data into a portable part using the DECT authentication module.

NOTE The DECT authentication module needs to be standardised at the mechanical, electrical and transmission interfaces.

Establishment by: Local.

Configuration: Local.

Symmetry: Local.

Termination at: Local.

5.1.73 Subscription data exchange (on-air)

Description: The ability to exchange subscription data between a network and a portable part in real-time over the air interface.

Establishment by: Portable part.

Configuration: Point to point.

Symmetry: Bidirectional asymmetric.

Termination at: Portable part.

5.1.74 Subscription registration message format for public access (telepoint)

Description: The message format (information and sequence) to be used in standard subscription registration procedures for public access (telepoint) applications shall be defined and followed by all manufacturers and operators.

Data fields include:

- identifier for required teleservice;
- identifier for service provider/network operator;
- PIN;
- home service identification code;
- ZAP;
- public access (telepoint) class of service;
- telepoint registration data (identifier for account).

NOTE: Identifier for service provider/network operator, PIN, home service identification code, and telepoint class of service field shall be mandatory and fixed-length. Telepoint registration data may be used or omitted at the discretion of the network operator. Telepoint registration data field is optional and variable length up to a maximum of 20 BCD digits. The number of digits used is determined by the public access (telepoint) network operator.

Establishment by: Not applicable.

Configuration: Not applicable.

Symmetry: Not applicable.

Termination at: Not applicable.

5.1.75 Multicell fixed part coverage

Description: The ability of DECT to provide coverage using a fixed part comprising two or more cells with intercommunicating radio end points.

Establishment by: Not applicable.

Configuration: Not applicable.

Symmetry: Not applicable.

Termination at: Not applicable.

5.1.76 Handover

Description: The action of switching a call in progress from one or more physical channels to other physical channel. There are two forms of handover, intra-cell handover and inter-cell handover.

Establishment by: Portable or fixed part.

Configuration: Point to point; point to multipoint.

Symmetry: Bidirectional.

Termination at: Fixed or portable part.

5.1.77 Intra-cell handover

Description: The switching of a call in progress from one or more physical channels of one cell to other physical channels of the same cell.

Establishment by: Portable or fixed part.

Configuration: Point to point.

Symmetry: Bidirectional.

Termination at: Fixed or portable part.

5.1.78 Inter-cell handover

Description: The switching of a call in progress from one cell to another cell.

Establishment by: Portable or fixed part.

Configuration: Point to point; point to multipoint.

Symmetry: Bidirectional.

Termination at: Fixed or portable part.

5.1.79 Tandem use with other mobile systems

Description:	Use of a DECT portable part as an extension of for example GSM or other mobile radio telecommunications systems. Achieved by an interworking unit, note that delays will be summed.
Establishment by:	Not applicable.
Configuration:	Not applicable.
Symmetry:	Not applicable.
Termination at:	Not applicable.

5.1.80 Multiple subscription registration

Description:	The ability for the portable part to retain details of more than one subscription is required.
Establishment by:	Not applicable.
Configuration:	Not applicable.
Symmetry:	Not applicable.
Termination at:	Not applicable.

5.1.81 All-physical-channel capability

Description:	The capability of portable parts and fixed parts to operate on all available DECT physical channels.
Establishment by:	Not applicable.
Configuration:	Not applicable.
Symmetry:	Not applicable.
Termination at:	Not applicable.

5.2 DECT Packet switched facilities

5.2.1 Point to point packet services

DECT shall support the following packet services:

- X.25 (see Clause 11);
- GSM packet services (see Clause 12);
- LANS (see Clause 13).

In addition, DECT shall provide a general packet capability that can provide for proprietary packet standards, over the application range given in subclause 4.2.

As far as possible, all these shall be provided in a modular manner, using a common set of core procedures.

5.2.2 Data services

In addition to the general packet-mode bearer service categories specified in Section 4.2, DECT shall support the following facilities for individual bearer services:

- framing and frame conversion;
- detection of (and optionally recovering from) transmission, format and operational errors;
- detection of (and optionally recovering from) lost or duplicated frames;
- flow control;
- congestion control;
- acknowledged transport of frames;
- rate adaption.

Combinations of these facilities may be used to provide frame relay and frame switching services, based on the architecture described in CCITT Recommendation I.122 [3], see Annex F. Alternatively, some applications will use a generic packet-mode service together with the specific functions required.

5.2.3 Broadcast packet services

DECT shall support the following broadcast packet services:

- key systems (see Clause 15);
- LAN broadcast packets (e.g. 'datagram' service) (see Clause 13);
- X.25 broadcasts (e.g. 'fast select' service (see Clause 11);
- GSM broadcasts (e.g. relay of location area identification) (see Clause 12).

In addition DECT shall provide a general (connectionless) data broadcast capability that can provide for proprietary broadcast packets, with a maximum data rate of 19,2 kbit/s (a maximum of one DECT channel).

As far as possible, all these shall be provided in a modular manner, using a common set of core procedures.

6 PSTN applications

6.1 PSTN basic service access

The PSTN basic service access is considered to be a service providing basic telephony over analogue lines and basic data communication services over analogue lines using modems. DECT shall provide access to these services.

DECT shall permit transfer of dialled digit information either singly as in manual dialling, or in blocks as for example repertory dialling.

In-band supervisory signals from the extended services or global networks shall be transferred to the DECT portable part via the DECT traffic channel.

6.1.1 PSTN voice service

Satisfaction of the following requirements shall allow generally acceptable speech services (in terms of speech delay and quantisation distortions) and allow voice band data transfer at rates up to 4 800 baud.

6.1.1.1 DECT bearer service requirement

DECT 32 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer (G.721 [4], see Annex F, ADPCM required).

6.1.2 PSTN data service

Satisfaction of the following requirements shall allow access to generally acceptable PSTN data communications services (in terms of throughput, error and re-transmission performance requirements) and allow voice band data transfer at rates up to 14 400 bit/s.

6.1.2.1 DECT bearer service requirement

Circuit mode 32 kbit/s unrestricted, 8 kHz structured bearer service category;

or,

circuit mode 64 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer.

6.2 PSTN supplementary service access

A supplementary service is provided as an addition or supplement to a basic teleservice. It cannot by definition be provided as a stand-alone service.

PSTN supplementary services are listed in Annex A, for information.

For supplementary services of the PSTN or global networks normally accessed by (a sequence of) dialled digits, the DECT system shall provide transparent transmission of such dialled digits from the DECT end system in order to access those services.

6.2.1 DECT bearer service requirement

DECT 32 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer.

6.3 PSTN public access (telepoint) service

The basic PSTN public access (telepoint) service is defined to be that service providing basic telephony service over analogue lines and basic data communication services over analogue lines using modems. DECT processes shall be defined to support access to these services.

The requirements of the public access (telepoint) service are described in Clause 8.

6.3.1 DECT bearer service requirement

DECT 32 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer (G.721 [4], see Annex F, ADPCM required).

Circuit mode 32 kbit/s unrestricted, 8 kHz structured bearer service category;

or,

circuit mode 64 kbit/s unrestricted, 8 kHz structured bearer service category, usable for speech information transfer.

6.4 PSTN residential, PBX and key system applications

6.4.1 Residential

In this application the DECT fixed part and the DECT portable part form the subscriber's equipment which is connected to the PSTN at the D2 interface.

6.4.2 Analogue/digital PBX and key systems

In this application the DECT fixed part and DECT portable part can be connected to an existing PBX, or the DECT fixed part and key system/PBX may be combined.

6.5 PSTN local loop applications

For local loop and cordless access applications see Clause 9.

7 Wireless PBX applications

Many of the technical requirements for business use are similar or identical to the requirements for public access (telepoint) applications, and reference should be made to Clauses 5, 8 and 16 of this document.

In general the basic technical requirements remain the same, commercial aspects will be implemented differently, and there will be greater scope and requirement for proprietary implementations of certain features.

8 Public access (telepoint) applications

In this application the DECT portable part has open access to different DECT fixed parts. The DECT fixed part may itself be connected to the "cordless network" of some other system, e.g. GSM, in order to provide a mobile service.

8.1 Minimum public access (telepoint) service requirements

Public access (telepoint) is defined as a short range radio telecommunications system whereby a portable part user can gain access to teleservices via a publicly accessible network of fixed parts.

The minimum public access (telepoint) service shall provide a secure subscription service.

The minimum public access (telepoint) service shall provide access to PSTN, ISDN, and GSM network services, including (where technically possible) the supplementary services provided by those networks.

Irrespective of whether the fixed part is attached to a PSTN, ISDN, GSM or other network, all necessary transformations (e.g. transmission levels) shall be implemented in the fixed part. The portable part shall not have any network dependency.

The minimum public access (telepoint) service shall provide duplex speech transmission.

The minimum public access (telepoint) requirement is only required to support the portable part origination of calls.

The minimum public access (telepoint) service shall support inter-operator roaming capability (defined below) throughout ETSI Europe.

NOTE: Inter-operator roaming is defined here as: the ability by which a user of a DECT portable part may use services provided by a DECT public access (telepoint) network, irrespective of whether or not the user is a specifically registered subscriber to that network.

Those facilities listed in subclause 8.2 following which are indicated as provision mandatory in either the portable part, or fixed part, or both, represent the minimum public access (telepoint) facility set, or public access profile. See table 8.3.

8.2 Summary of DECT public access (telepoint) voice service facilities which are process mandatory

Those facilities listed below which are indicated as provision mandatory in either the portable part, or fixed part, or both, represent the minimum public access (telepoint) facility set, or public access profile.

The decision to provide a mandatory process whose provision is however optional is determined by a number of criteria:

- the level of service the service provider wants to provide, e.g. all the facilities associated with incoming calls;
- the national regulatory environment, e.g. "register recall" facility is mandatory in France for every kind of public access (e.g. public call box, radiotelephone);
- the terms of the dual inter-operator roaming agreements between individual service providers, e.g. some DECT service providers may agree to offer the incoming calls service to their subscribers when roaming to each other;
- the global or DECT Local Network to which the DECT fixed part is connected, e.g. when the DECT fixed part is connected with GSM and ISDN, some facilities are required in it in order to fulfil the network independency requirement of the portable part;
- the inter-dependency of some optional facilities, e.g. provision of "bell-off" if "bell-on" is provided; provision of DECT fixed part authentication if ZAP etc is provided.

Table 1 following summarises these requirements.

Table 1

	PROVISION		PROCESS	
	FP	PP	FP	PP
Duplex speech - 32 kbit/s ADPCM	M	M	M	M
Bell on	O	O	M	M
Bell off	O	O	M	M (Provision mandatory if bell on provided in respective part)
Off hook	M	M	M	M
On hook (full release)	M	M	M	M
Partial release	M	O	M	M
Dialled digits basic (0-9, *, #)	M	M	M	M
Dialled digits additional (ABCD)	O	O	M	M
Dialling delimiter	O	O	M	M Spectrum efficiency implications.
Dialling delimiter request	O	O	M	M Spectrum efficiency implications.
Register recall	O	O	M	M
Go to DTMF	M	O	M	M
Go to pulse	O	O	M	M
Pause	O	O	M	M
Specific trunk carrier selection	O	O	M	M
Incoming call	O	O	M	M
Hold call	O	O	M	M
Re-connection of held call	O	O	M	M (Provision mandatory if hold call provided in fixed part)
Forced re-connection of held call	O	O	M	M always optional
Authentication of portable part	M	M	M	M standard algorithm
Authentication of user	O	M	M	M Using UPI (inter-operator roaming subject to commercial agreements)
Authentication of fixed part	M	O	M	M Process based on authentication Provision mandatory in FP if ZAP, key management or other PP data amendment feature implemented.
				Provision in PP recommended
Silent polling	O	O	M	M
Class of service field indication	M	M	M	M
Inter-operator roaming registration	O	M	M	M Control of inter-operator roaming subject to commercial agreements.
NOTE:	M: Mandatory O: Optional -: Not applicable			

Table 1 (continued)

	PROVISION		PROCESS		
	FP	PP	FP	PP	
Supervisory tones	M	O	M	M	Provision mandatory only in fixed parts attached to networks offering out-of-band signalling.
Regular security handshake	M	M	M	M	
Signalling of display characters	O	O	M	M	
Display control characters	O	O	M	M	
ZAP (suspend)	O	M	M	M	See authentication of FP
ZAP (terminate)	O	M	M	M	See authentication of FP
Alphanumeric messaging and radio-paging service	O	O	M	M	
Voice/data encryption activation/deactivation	O	O	M	M	
Signalling encryption activation/de-activation	O	O	M	M	
Debit public access (telepoint)	O	O	M	M	
Credit public access (telepoint)	O	O	M	M	Process mandatory on air interface only.
Credit agency public access (telepoint)	O	O	M	M	Process mandatory on air interface only.
On-demand (hot bill) public access (telepoint)	O	O	M	M	Process mandatory on air interface only.
Advice of tariff request	O	O	M	M	
Advice of charge request	O	O	M	M	
Location registration for incoming calls, etc	O	O	M	M	
Location de-registration for incoming calls, etc	O	O	M	M	Provision mandatory if, and only if, location registration for incoming calls is applied
Queue management	O	O	M	M	
Queue entry request	O	O	M	M	
Queue exit request	O	O	M	M	
Portable part inaccessible indication	O	-	M	-	indicate to IWU that call cannot be connected.
In-range indication	O	O	M	M	
Emergency service access request	M	M	M	M	
Indication of teleservices available request	O	O	M	M	
NOTE:	M: Mandatory O: Optional -: Not applicable				

Table 1 (concluded)

	PROVISION		PROCESS		
	FP	PP	FP	PP	
Indication of teleservices available	O	O	M	M	
Selection of service provider network operator	M	M	M	M	
Selection of required teleservice	O	O	M	M	
Selection of bearer service	O	O	M	M	
Validation of portable part user field	M	-	M	-	See class of service indication
Validation of portable part	M	-	M	-	
Validation of identity module	O	-	M	-	
User identification (UPI)	O	M	M	M	Inter-operator roaming subject to commercial agreements.
Group address	O	O	M	M	
Selection of additional character sets	O	O	M	M	
Data capability	O	O	M	M	
Support for supplementary services:					
- Keypad protocol	M	M	M	M	
- Feature key management Protocol	O	O	M	M	
- Functional protocol	O	O	M	M	
Dial tone detection indication	O	O	M	M	
Req. for indication of temp. subscriber number	O	O	M	M	
Fixed part/portable part capability exchange	M	M	M	M	
Subscription registration user procedures					
- On-air (interface plus digit entry)	M	M	M	M	
- Keypad (digit entry only)	O	O	M	M	
- DECT authentication module	O	O	M	M	
Subscription data exchange (on-air)	M	M	M	M	
Multicell fixed part coverage	O	M	M	M	
Handover (implicit in basic DECT):					
- Intra-cell	M	M	M	M	
- Inter-cell	O	M	M	M	
Multiple subscription registration all-physical-channel capability	- M	M M	- M	M M	
NOTE:	M: Mandatory O: Optional -: Not applicable				

8.3 Facilities required to support a public access (telepoint) service

The following process mandatory facilities support a public access (telepoint) service.

8.3.1 Authentication (of portable part, user or detachable module)

- for call accounting and billing purposes;
- in-call re-authentication;
- secure exchange of authentication data.

The provision of a secure authentication process between portable part and fixed part is MANDATORY, whether the process is built-in at manufacture or a detachable authentication module (semi-removable module, or a form of 'smart' card). This is achieved by the provision of a standard (common) authentication algorithm and provision for a private authentication algorithm.

The following implementation matrix is agreed (ETSI RES3, Berne):

	STANDARD ALGORITHM	PRIVATE ALGORITHM
AUTHENTICATION PROCESS	MANDATORY	OPTIONAL
PROVISION (i) Built-in to the portable part	MANDATORY	OPTIONAL
(ii) Detachable authentication module	OPTIONAL	OPTIONAL
USAGE (i) By public access (telepoint) service provider's own customers	OPTIONAL	OPTIONAL
(ii) For authentication of inter-operator roaming (1) Public access (telepoint) Portable part	ACCEPTANCE	OPTIONAL

NOTE 1: Inter-operator roaming is defined (in this context) as: the ability of a cordless portable part equipment to receive or initiate calls on independent public access (telepoint) networks.

A mechanism for by-passing the authentication procedure for the purpose of accessing the emergency services must be provided.

Telepoint portable part authentication shall make provision for use in more than one country.

Portable parts may gain access to more than one public access (telepoint) service provider.

8.3.2 DECT security profile for public access (telepoint).

For full details of DECT security requirements see Annex F of the security experts' group report [5]. This document outlined a number of decisions that needed to be taken in arriving at a security profile for DECT public access (telepoint). The decisions arrived at are recorded below.

Authentication of PP:

Mandatory as in the relevant subclause 8.3.1 of this ETR.

UAK and AC to be supported. Note AC is for temporary registration use (e.g. restaurants) and also provides an over-the-air registration protection mechanism.

Authentication of FP:

It is optional to support the authentication of FP in both the PP and FP. If, however, ZAP, key management or PP data amendment is implemented in the FP then it is mandatory in the FP to support authentication of FP. The process is mandatory, the process is the same as that defined for authentication of PP.

UAK and AC to be supported. Note they are the same as those for PP, but different for each operator.

Mutual authentication:

Authentication of PP and FP is optional, but if ZAP, key management or PP data amendment is implemented in the FP then it is mandatory in the FP to support authentication of FP. The process whereby the ability of the FP to decipher the traffic stream constitutes continuous FP authentication may be used as an optional feature.

UAK and AC to be supported.

Data confidentiality:

Mandatory process, optional to provide. (See subclause 16.9.1 of this ETR.

This refers to the case where authentication is not necessary (e.g. in residential use) or not possible (e.g. no key options) and access security is afforded by the mutual decipherment of the locally set cipher code. Process to be supported in DECT security features set.

User authentication:

Known as user Personal Identity (UPI). Process mandatory, provision mandatory.

Inter-operator roaming considerations:

Inter-operator roaming requires that both public access (telepoint) networks involved must support the same authentication algorithm.

Over-the-air registration:

This is possible with the use of the AC feature yielding an acceptable degree of security when coupled with the one-off nature of the registration process.

On-demand re-authentication during a ciphered call:

Re-authentication during an encrypted call shall be supported.

NOTE 1: There is an ability to stop the cipher process, hence permitting re-authentication as necessary.

NOTE 2: A ciphered call, using the mandatory process, automatically provides continuous authentication of the PP (and the FP).

8.3.3 Authentication constraints

Time from initial request for service to completion of successful authentication process shall not exceed 2 seconds.

Authentication both locally (public access (telepoint) fixed part) and centrally shall be possible.

8.3.4 Authentication of fixed part

It shall be possible for the portable part to authenticate the fixed part.

8.3.5 Portable station identity number

A unique identity number installed at manufacture which cannot be altered by the user.

8.3.6 Public access (telepoint) portable part identity

Each public access (telepoint) usable portable part shall have a unique number which cannot be altered by the user. The portable station identity number satisfies this requirement.

8.3.7 Portable part/fixed part exchange of service provision data capability

The ability is required for a portable part and a fixed part to exchange data on their respective capabilities so that each can establish the mutual subset which they have in common.

8.3.8 Emergency service access request

DECT shall provide two methods of accessing emergency services.

- 1) A normal call access, whereby dialled digits are transmitted. This method will follow standard procedures for opening an air link and authenticating the portable part before connecting the call.

- 2) Functional access, whereby any public access (telepoint) fixed part in range of the portable part will accept the call. The fixed part with which the portable part forms a link shall not apply authentication before connecting the call. If the fixed part has a queue management function, an emergency call shall take priority over any other calls waiting.

Procedures for access to the emergency services vary widely from network to network. DECT does not, as part of the standard, define any one particular procedure. Users will in general need to use the procedure defined by the particular network to which the DECT fixed part is connected. This does not prohibit particular implementations of DECT from specifying procedures which are independent of the network.

8.3.9 Selection of required teleservice request

The ability to select a particular teleservice which is required at a given moment. This is not selection of service provider/network operator.

8.3.10 Selection of service provider/network operator request

The ability to signal the identity of the desired service provider or network operator with which it is desired to communicate when setting up a call at a particular moment in time.

8.3.11 Multiple subscription registration

The ability for the portable part to retain details of more than one subscription is required.

8.3.12 Class-of-service field indication

- class-of-service field associated with each subscription;
- may involve portable part or detachable module.

8.3.13 Supervisory tones

For the minimum public access (telepoint) service, network supervisory signals shall be made available in-band to the portable part by the fixed part, either by relay from the global or DECT local network, or by local generation at the portable part.

The provision of a tone generator is optional for public access (telepoint) portable parts. The following tone translation (interworking) requirements are mandatory for public access (telepoint) fixed parts:

DECT local network	*	Fixed part translation
Tone format	* In-band	Information element
	*	
In-band	* YES (transparent)	Optional
	*	
Information element	* YES (translate)	YES
	*	(information element
	*	translate)
	*	

NOTE: In all cases the incoming speech path shall be connected, so that the special case of an information element announcing "call progress information available in-band" shall require no further action at the fixed part.

A portable part without a tone generator shall always use the in-band tones.

A portable part with a tone generator has the option of generating tones locally (when messages are available) or connecting the in-band tones.

8.3.14 On/off hook

The ability to indicate the action of going off-hook, e.g. to start call set-up or accept a call.

The ability to release an established call whilst retaining the radio resource for the purpose of accessing further services.

The ability to indicate the action of going on-hook, (e.g. to terminate a call) and fully release the radio resource.

8.3.15 Go to DTMF

Go to DTMF signalling, with optional indication of DTMF tone duration.

8.3.16 Dialed digits (basic)

For the minimum public access (telepoint) service, provision of the capability to dial digits 0-9, *, #, pause shall be required.

8.3.17 Public access service provider identity

Each public access (telepoint) service provider shall have a unique identity.

8.3.18 Public access (telepoint) service request code

There shall be a public access (telepoint) service request code.

8.3.19 Public access (telepoint) account identities

The numerical form of account identities shall be the same for all public access (telepoint) service providers.

8.3.20 Authentication of user to portable part (portable part lock)

A method of authenticating the user to the portable part is required, but its use is optional.

8.3.21 Standard subscription registration procedure for public access (telepoint) compatible equipment

Standardised (process mandatory) procedures shall be provided for loading registration data into a portable part.

Standard procedures shall be defined for registration:

- over the air interface;
- using a keypad;
- using a DECT authentication module.

NOTE: The DECT authentication module needs to be standardised at the mechanical, electrical and transmission interfaces.

8.3.22 Subscription data registration (on-air)

The ability to exchange subscription data between a network and a portable part in real-time over the air interface.

8.3.23 Subscription registration message format for public access (telepoint)

The message format (information and sequence) to be used in standard subscription registration procedures for public access (telepoint) applications shall be defined and followed by all manufacturers and operators.

Data fields include:

- Identifier for required service;
- Identifier for service provider/network operator;
- PIN;
- ZAP;
- Public access (telepoint) class of service;
- Identifier for account.

8.3.24 Standard formats and procedures for subscription authentication

Subscription authentication is an on-air procedure carried out at the time of making a call. A procedure needs to be defined that can operate:

- using the standard authentication algorithm;
- using a proprietary authentication algorithm.

8.3.25 Inter-operator roaming

DECT needs to provide facilities such that a public access (telepoint) network can recognise and identify a portable part which is not a subscriber to its services but is requesting access, to the extent that the public access (telepoint) network can assess the access rights of the portable part with an acceptable confidence level.

The information interchange which is required has not yet been fully identified - there are considerable implications of inter-operator roaming, the solutions to some of which lie outside the scope of this requirements specification.

8.3.26 Ability to target a specific service provider

DECT needs to provide facilities such that the user of a portable part can specify which service provider he wishes to access at the time of originating a call.

8.3.27 ZAP per subscription

The on-air ability of an authenticated fixed part to suspend or terminate access rights. The portable part shall have the right to authenticate the fixed part before acting on instructions received from the fixed part which modify subscription or similar data.

8.3.28 On-air ability to suspend access rights (ZAP-suspend)

The ability to re-program the account data held in the portable part so that access rights are suspended subject to certain conditions being met, coupled with the ability to re-program the account data again to reinstate access rights once these conditions have been relaxed. The portable part shall have the right to authenticate the fixed part before acting on instructions received from the fixed part which modify subscription or similar data. One ZAP field shall be provided per subscription field.

8.3.29 On-air ability to terminate access rights (ZAP-terminate)

The ability to re-program the account data held in the portable part so that access rights are terminated and cannot be reinstated except by following a full re-registration procedure. Applications for this include the case where a portable part requests access after a subscription has been cancelled or after the portable part has been reported as lost or stolen. The portable part shall have the right to authenticate the fixed part before acting on instructions received from the fixed part which modify subscription or similar data.

8.3.30 In-range indication

A means of indicating to a portable part, without necessarily establishing a full two-way radio link, that it is within range of a DECT fixed part belonging to a network to which the portable part or user has access rights.

8.3.31 Ability to provide inter-cell handover

The ability for a user whilst making a call to move from a cell of one fixed part into a contiguous cell of another fixed part of the same network with the call continuing without the need of action by the user.

8.3.32 Debit public access (telepoint)

DECT needs to support a public access (telepoint) system run on the basis of a portable part being pre-loaded by some method with call-value for the system. A secure method of decrementing the call-value from the fixed part, under the control of the service provider, is required.

8.3.33 Credit public access (telepoint)

DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account to which call charges are to be attributed.

8.3.34 Credit agency public access (telepoint)

DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account with a credit agency to which call charges are to be attributed.

8.3.35 On-demand (hot-bill) public access (telepoint)

DECT needs to support a public access (telepoint) system run on the basis of a portable part being loaded by some means with identification data sufficient to enable the service provider to securely establish the account to which call charges are to be attributed. At a billing point, the system must be able to provide a bill for call charges accrued, on demand.

8.3.36 Incoming call facility

The ability to support incoming calls for a public access (telepoint) service shall be provided.

8.3.37 Location registration for incoming calls, paging or messages

DECT needs to support a facility whereby a portable part can be registered with a public access (telepoint) fixed part or a cluster of fixed parts such that, for an established period of time, incoming calls may be routed to it. The network on receiving an incoming call for the portable must locate it and route the call to it, causing ringing and subsequent connection.

8.3.38 Location de-registration for incoming calls, paging or messages

DECT needs to support a facility whereby a portable part can be de-registered with a public access (telepoint) fixed part or a cluster of fixed parts. This can be supported by using the DECT feature "detach".

8.3.39 Location registration for radio paging through public access (telepoint) fixed part

Similar to "Location registration for incoming calls", a service can be provided whereby a portable part may register to receive radiopaging messages. This could be 'tone only', 'numeric', or 'alpha-numeric' according to the capability of the portable part and the wishes of the user.

8.3.40 Location de-registration for radio paging through public access (telepoint) fixed part

The ability to de-register for receipt of radiopaging messages is required.

8.3.41 Radio page acknowledge in a public access (telepoint) fixed part

There are two cases for this:

The first is as an adjunct to "location registration for radio paging through public access (telepoint) fixed part", whereby the portable part is simply acknowledging receipt of the radiopage over the link established by the fixed part.

The second applies to a portable part fitted with a pager, given appropriate agreements between the radio paging service provider and the public access (telepoint) service provider. When a radiopage is received, the portable part attempts to make contact with a public access (telepoint) fixed part. If it is successful a call is originated which is routed back to the paging network to acknowledge the radio page.

8.3.42 Indication of teleservices available

Indication to the user that a requested teleservice or range of teleservices is available at a given location.

8.3.43 Queue management

Having been given a "lines engaged" indication, a facility to register in a queue is required, together with feed-back at regular intervals of information of how the queue is progressing.

9 Local loop applications

In this application the DECT network functions as a cordless local loop (or drop wire replacement) to one or more subscribers. The DECT local loop is considered as part of the service provider's local exchange network. The DECT local loop can either provide conventional POT interfaces, in which case the D4 interface may be the subscriber's telephone socket, or can be integrated with the end system as a DECT POT portable part.

10 ISDN applications

10.1 ISDN supported teleservices

See CCITT Recommendation I.241 [6], subclause 5.3 of CCITT Recommendation I.210 [7] (see Annex F for references), and equivalent ETSI ISDN standards where available.

10.2 ISDN supplementary services

For supplementary services of the ISDN or global networks normally accessed by specific messages transmitted via the ISDN D channel, the DECT system shall, where possible, provide transparent transmission of such messages in order to access these services. For list of ISDN supplementary services see Annex B.

10.3 Residential applications

Two approaches are possible. The first is to make the DECT system totally transparent so that the DECT end system 'sees' the ISDN global network, the second is for the DECT fixed network to convert from ISDN to PSTN and to use a PSTN end system. The former method is preferred.

10.4 ISPBX/key systems applications

For DECT application to ISDN PBXs and key systems see Clause 7 on wireless PBX and Clause 15 on key systems.

10.5 Local loop applications

For DECT applications in the ISDN local loop see Clause 19 on local loop.

10.6 ISDN public access (telepoint) applications

DECT public access (telepoint) services may be provided using an ISDN network. For details of such requirements see Clause 8 on public access (telepoint).

11 X.25 applications

It is required that DECT supports certain teleservices and applications. One such application is the support of data terminal equipment operating in the packet mode and conforming to CCITT Recommendation X.25 [8], see Annex F.

11.1 Services

11.1.1 Packet data service

In order to accommodate X.25 applications, DECT should support a bidirectional packet data communication service. In providing this service, the following requirements should be considered:

- it should be possible to set up an X.25 packet layer virtual call across the DECT air interface. Support may also be required for the fast select facilities, which can be used to transfer small amounts of data without the overhead of a full switched virtual call;
- support should be provided for data signalling rates corresponding to user classes 8 to 13 for a DTE conforming to X.25, as defined in CCITT Recommendation X.1 [9], see Annex F;
- an efficient frame relay service should be provide in order to process HDLC LAPB frames for transmission over the DECT air interface. This service should take into account conservation of radio spectrum by removal of redundant information and dynamic allocation of bandwidth;
- the DECT data service should maintain data integrity by means of low undetected error rate. Data security should not be compromised, consideration being given to authentication and data encryption facilities.

11.1.2 Optional user facilities

Where optional user facilities of the X.25 are accessed by specific packet layer messages between DTE and DCE, the DECT system should, where possible, provide transparent transmission of such messages in order to provide access to those facilities. It is possible that the support of some facilities, for example those involving call charging, fast select, or quality of service options might have additional effect on the services provided within DECT. This subject area is for further study.

11.2 Applications

There are several applications that should be considered in interworking DECT with an X.25 data network. These include X.25 packet-mode terminal attachments, cordless drops to character based terminals from an X.3 [10], see Annex F, PAD facility and connection of X.25 packet-mode equipment to an ISDN via an intermediate DECT network.

11.2.1 X.25 Packet-mode terminal

It is envisaged that the DECT air interface may be used to provide a cordless connection between an X.25 DTE and a packet-switched public data network. This facility might be required for portable packet-mode terminal applications, or fixed terminals where cabling is impractical.

11.2.2 Cordless PAD facility

Another of the possible application areas of DECT in a X.25 environment is expected to be cordless terminal attachments to an X.3 PAD facility. In a conventional cable based system, CCITT Recommendation X.28 [11], see Annex F, specifies the protocol used in terminal attachments, including access to the PAD, establishment of a virtual call to the destination DTE and transfer of character data. In this application, the method by which the X.28 protocol is mapped on to the DECT air interface requires further study.

11.2.3 ISDN applications

As outlined above, the DECT system may be required to act as an intermediate network between an X.25 DTE and an ISDN. In this application there are effectively two levels of interworking. The first enables X.25 packet data to be carried over the DECT air interface. The second maps DECT X.25 traffic onto the ISDN data service. In addition, signalling facilities are required to allow the establishment of an ISDN call from the DTE.

12 GSM extension applications

The teleservices defined in this section for GSM should also be assumed to be required for DCS-1 800.

12.1 Basic services

DECT must be able to access GSM networks to support the following basic GSM teleservices:

No.	Name
11	Telephony
12	Emergency calls
21	Short message - mobile terminated
22	Short message - mobile originated
31	Advanced message handling access (X.400)
61	Alternate speech and group 3 fax
62	Automatic group 3 fax

Attributes of these teleservices are defined in GSM specification 02.03 [12], see Annex F.

12.2 Supplementary services

The following GSM supplementary services shall be transparently transported by DECT.

- Calling number identification presentation;
- Calling number identification restriction;
- Connected number identification presentation;
- Connected number identification restriction;
- Malicious call identification;
- Call forwarding unconditional;
- Call forwarding on mobile subscriber busy;
- Call forwarding on no reply;
- Call forwarding on mobile subscriber not reachable;
- Call transfer;
- Call waiting;

- Call hold;
- Three party service;
- Advice of charge;
- Freephone service;
- User to user signalling;
- Call barring.

12.3 Identified applications

Applications foreseen include DECT mobile public access (telepoint) and DECT network interworking.

12.3.1 DECT mobile public access (telepoint)

In this application the DECT fixed systems is connected to a GSM mobile station in order to provide DECT access to a mobile environment, e.g. public access (telepoint) on trains.

12.3.2 DECT network interworking

In this application the DECT network is connected to the GSM/DCS 1800 Mobile Service Switching Centre (MSC) via the 'A' interface in order to provide interworking between the DECT and GSM networks.

13 Local area network (IEEE 802) applications

DECT is required to allow access to a number of different network types and should support the services and facilities offered by the network to which it is attached. One of the target network types that has been identified with which DECT aims to interwork efficiently, are local area networks based on the IEEE 802 standards [13], see Annex F.

13.1 Services

13.1.1 LAN data service requirements

The requirements for efficient transfer of LAN data over an air interface are different from those for speech communication. Data transfers usually consist of bursts of data, at fairly high rates (>200kbit/s), primarily in one direction during a given transaction between stations. In the interests of spectrum conservation, consideration should be given to the provision of the following services:

- the ability to set up connections having asymmetric data throughput characteristics;
- support for virtual connections allowing a logical connection to be maintained whilst suspending the physical communication;
- support for a connectionless 'datagram' service.

In addition, the characteristics of LAN operation require that the following requirements are considered:

- low access latency;
- low frame transit time;
- the capacity for relatively high data throughput rates.

These parameters are determined to an extent by the limitations inherent in the DECT air interface. It should be recognised that in most cases, services provided by DECT will not be at the LAN data rate. Quantitative figures are for further study.

Depending on the application, the DECT air interface may be required to support various packet mode services. Particular consideration should be given to the following:

- a simple frame relay service, providing efficient transport of IEEE 802.2 [14], see Annex F, LLC frames, and possibly those of other protocols.
- a full frame switching service

13.1.2 Data integrity and security

The extension of a LAN by the use of the DECT air interface should not compromise data integrity, or security. Particular consideration should be given to the following requirements:

- low undetected error rate;
- provision of an error correction mechanism;
- restricted access to the network by unauthorised stations;
- security of data during transmission to prevent eavesdropping.

13.1.3 Addressing

To enable DECT portable parts to take part in data communication it is essential that each portable part has a unique identity, or address.

One of the characteristics associated with IEEE 802 LANs is the ability to address multiple, or all, stations. These features, primarily used for connectionless data communication, are provided by multicast and broadcast data services. If the LAN is extended to operate over the DECT air interface then provision should be made to support these services.

13.2 Applications

Possible applications requiring DECT interworking include both single and multi-station attachments and network gateway facilities. Cordless LAN connections potentially offer several advantages over traditional cabled systems:

- flexibility in environments where portable parts do not have a fixed position, or are portable;
- potential savings on cabling costs;
- avoidance of cabling difficulties, particularly in older buildings, or in hazardous environments;
- ease of installation.

13.2.1 Single station attachments

Single station attachments may be defined where a single remote portable part is connected to an IEEE 802 local area network, using the DECT air interface to provide a cordless data connection. Possible applications for this configuration include fixed station cordless drops to a conventional cabled backbone and portable station attachment from a laptop or pocket computer.

13.2.2 Multi-station attachments

The single station application might be extended to provide capability to support multiple portable parts within a given service area. It is envisaged that such a scheme would require an intelligent hub to provide LAN communication services and that the network would form a star topology. Possible applications include LAN connectivity for multiple portable parts, where traditional cabling proved impractical.

13.2.3 Network gateway

One additional use of the DECT air interface in LAN interworking is to provide a cordless bridge or gateway between two IEEE 802 LANs. This might be required where connectivity was desired but cabling proved impractical. In this instance, use of the DECT air interface could be classified as remote bridging and therefore might be affected by the work undertaken by the IEEE 802.1 bridging standards group.

14 Data applications

Table 2: Data requirements in DECT

DATA REQUIREMENTS IN DECT			
Application	Access latency	Transaction duration at full rate	Full rate (without errors)
Remote terminal			
- text	50 ms	100ms- 5 secs	10-20kbit/s
- graphics	50 ms	500ms-10 secs	24-128kbit/s
Batch file transfer			
- light	1-5 secs	1-30 secs	32 kbit/s
- heavy	1-30 secs	5-1000 secs	64 kbit/s
Real-time file access			
- slices	50 ms	200ms-2 secs	64-256kbit/s
- chunks	500ms	1-10 secs	64-256kbit/s

For data applications, variable transaction times 100ms to 10s are anticipated, and transmission is anticipated to be predominantly one-way. Fast link establishment time, under 50 ms (not including portable part verification) is required. Variable rate communication is required.

15 Key systems applications

Simple call routing apparatus (key systems) have a number of features that require support that have direct effect on the signalling and interfacing requirements of DECT portable and fixed parts. These are defined below and are additional to those of traditional PBX architecture.

15.1 Equipment status indications

Considering that the status of the elements of key system apparatus is displayed in fixed line apparatus, similar provision should be made in DECT. These requirements therefore include:

- extension status indication;
- line status indication.

15.2 Route selection capability

Considering that conventional key systems rely on manual route selection facilities, DECT must provide for the following:

- individual line selection (by means of single key depression);
- individual extension selection (by means of single key depression).

15.3 Call alerting to multiple parties

Considering that traditional call routing mode apparatus provides incoming call alerting to multiple extensions DECT should provide facilities to allow:

- simultaneous incoming call alerting to multiple portable parts (group paging).

15.4 Synchronised call alerting termination

Considering that only one extension would normally answer an incoming call in multiparty call offer situations DECT should provide facilities to allow:

- synchronised termination of incoming call alerting at the portable parts (group pick-up).

15.5 Calling party/equipment identification

Considering that multiple parties may be alerted on incoming calls, facilities need to be provided to allow the user to identify calling parties including:

- line identity;
- extension identity.

15.6 Incoming call by-pass facility

Considering that multiple parties may be alerted on incoming calls, facilities need to be provided to allow the user to by-pass incoming calls in order to originate outgoing line or extension calls.

15.7 Incoming call offer selection

Considering that multiple calls may be simultaneously offered to a particular portable facilities must be provided to allow the user to select which incoming call to answer first.

15.8 Broadcast call facility

Considering that many key systems provide the facility to broadcast a call from one extension to multiple extensions for the purposes of public announcements through loudspeaking telephones, the following facility must be provided in DECT:

- unidirectional broadcast call capability.

This shall not require action on the part of the user to terminate (receive) or clear the broadcast call.

15.9 Single cell direct call transfer facility

Considering that many key systems are installed in small areas (departments) that may require only single cell coverage, and that system provisioning is likely to achieve high channel loadings, the facility for direct party to party call transfer utilising a single "channel" should be possible.

For example, a call sequence could be:

- A holds call at key system;
- A instructs key system to transfer call to B;
- A clears;
- Key system sets up call to B;
- B answers held call.

15.10 Conventional key system and PBX supplementary services

For example:

- Call back when free
- Do not disturb
- Three party service
- Diversion
- Etc.

16 Technical information applicable to a number of DECT applications

The following technical information is applicable to a number of proposed applications of DECT, and complements the information in Clause 5.

16.1 Minimum operating distance

In office and other crowded environments it is probable that items of DECT equipment will be required to operate under adjacent and hence potentially interfering conditions. The performance of DECT equipment under such conditions will be determined by such factors as selectivity and unwanted radiation.

In order that DECT can specify these parameters, operating distances between potentially interfering equipments are given below:

- separation between PPs: 0,5 metre;
- separation between RFPs: 1,0 metre;
- separation between PP and RFP: 1,0 metre.

The operating distances are the maximum distances between interfering equipments at which impaired performance of the equipments shall be permitted.

NOTE 1: The PPs and RFPs may form parts of different DECT systems.

NOTE 2: This does not preclude a PP from working at closer distances than specified above e.g. a PP operating in a charger which is part of a RFP.

NOTE 3: Separation between RFPs may be controlled by an installation code of practice.

16.2 Grade of service

To ensure an acceptable grade of service, all physical channels shall be available for all applications. All portable parts and fixed parts shall be capable of operating on all available physical channels.

In certain data applications it is possible that large volumes of traffic could be generated by a single user at a single location. To ensure a reasonable grade of service is available to all users of DECT, DECT shall provide mechanisms to ensure equitable access to the service.

NOTE: A variety of mechanisms could be considered including power control, transmission time control, pre-emption facilities, throughput restrictions, spare capacity guarantees, etc.

16.3 Quality of service

Quality of service is the collective effect of service performances which determine the degree of satisfaction of a user of the service. The user perception of a service involves both the 'organisation' (or service provider) and the physical 'network' itself. It is the network aspects of quality of service which are considered here. Three performance aspects of quality of service contribute to the quality of service of any network: service operability performance, serviceability performance and service integrity. The network under consideration is restricted to the DECT network (i.e. the combination of DECT portable and fixed networks) which provides bearer services between the End System and the Global or DECT local network.

The quality of service and capacity for bearer service applications are determined to an extent by the limitations of the DECT air interface. DECT will need to support ISDN services but not necessarily at the ISDN rate.

16.3.1 Service operability performance

This is related to the ease of use of the service, and includes characteristics of the terminal equipment (end system), intelligibility of tones etc. Terminal characteristics are outside the scope of the DECT network except insofar as they are dependent on the layer 3 messages carried by the DECT network, or use signals generated within the DECT network itself such as 'portable part inaccessible'.

16.3.2 Serviceability performance

This is the ability of the service to be obtained and maintained for the required duration. In maximum traffic conditions (see subclause 16.4) the serviceability performance requirements for the DECT network are:

- DECT network access time:
 - less than 1 sec for voice circuits;
 - less than 50 msec for non-voice circuits.
- DECT network connection accessibility:
 - this is the ability of the DECT network to provide the user with a satisfactory DECT network connection. The failure to establish such a connection within the required time shall be less than 1 percent;
- DECT network connection retainability:
 - this is the ability to maintain the DECT network connection once established and to release it when requested. Forced curtailment of an established DECT network connection shall be less than 0,1 percent and preferably less than 0,01 percent.

16.3.3 Service integrity

This is the degree to which the DECT Network connection is provided without excessive degradation. The requirement for voice circuits is for objective and subjective transmission performance of a quality equivalent to that of existing wired public networks. For non-voice DECT Network connections the performance shall be defined in terms of bit error ratios of the transmitted data.

16.4 Capacity

DECT shall allow for the duplex voice traffic densities given in table 3 following.

Table 3

Application	Traffic rate per terminal	Traffic density	Environment
Residential	0,05 E	150 E/km ²	Suburban houses
		200 E/km ²	4 Floor urban apartment blocks
		1 000 E/km ²	Localised peak density (4 Floors 250 E/km ² /floor)
Business	0,2 E	3 000 E/km ²	3 floor suburban buildings
		120 000 E/km ²	20 floor city centre buildings
		10 000 E/km ² /floor	Localised peak, 1 user/20 m ² , per floor
Public areas (examples)	0,1 E	900 E/km ²	Railway stations
		5 500 E/km ²	Heathrow Airport, one terminal
		1 800 E/km ² 320 E/km ²	Madrid, Barajas Airport Frankfurt (Main) Airport

16.5 Range

Table 4 following represents a user oriented view of the range requirements for serviceability, performance and service integrity for DECT.

Table 4

Application	Range required	Other parameters
1 DOMESTIC (Houses - a) and Apartments b)	a) 100/150 m b) 30 m flattened sphere (horizontal radius)	Linear range Vertical 4 floors penetration
2 PUBLIC ACCESS (TELEPOINT)	a) 150 m (line of sight). b) 50 m (obstructed)	Horizontal 1 wall or window
3 a) SMALL BUSINESS (open environment) b) SMALL BUSINESS (Office complex/ hotel) Characterised by single cell	a) 200 m b) 30 m flattened sphere (horizontal radius)	Linear range 1 wall Vertical 5 floors penetration
4 LARGE BUSINESS Characterised by multi cell	Total site coverage (including car parks, yards, etc	Multi cell configuration Will require planned coverage
5 PRIVATE NETWORKS (Voice and Non-voice LAN access)	Total site coverage (including car parks, yards, etc	Multi cell configuration Will require planned coverage
6 EVOLUTIONARY	150/200 m	Linear, with 2 walls

NOTE: Distances quoted are radii, applied to either circles on the ground, or spheres (with the possible exception of the 'evolutionary' application, Item 6).

The above minimum ranges may be enhanced/extended for some applications by the use of antenna directivity.

It is recognised that in some circumstances it may be desirable to restrict range below the above requirements.

16.6 Application and presentation

16.6.1 End-of-destination-address indication

The following requirements allow technical implementations of DECT interworking with systems that require an end-of-destination-address indication when transmitting destination address digits during call set-up.

DECT shall provide messages allowing:

- end-of-address signals to be generated by the portable part;
- end-of-address-request signals to be generated by the fixed part.

Neither of these signals shall be mandatorily generated by the respective part.

End-of-address signals received from the portable part may be:

- utilised to determine end-of-destination-address in a call set-up sequence;
- ignored where not required in other applications.

End-of-address-request signals received from the fixed part may be used:

- to request an end-of-address signal to be inserted at an appropriate point determined by the portable part;
- to request a service indication to the user to initiate a "termination of call set-up" sequence.

See dialling delimiter in Clause 5.

16.6.2 Service codes

It is not considered feasible to establish a full set of common service codes throughout Europe in all potential applications of DECT within sensible timescales.

Accordingly no recommendation is made to suggest particular mandatory service codes. The desirability of achieving some commonality in particular application areas, by negotiation, is however stressed.

16.7 Supervisory tones/signals

Call progress tones or signals may arrive at the DECT fixed part from the DECT local network in one of two forms:

- in-band tones or signals;
- information elements (inside messages).

Both methods shall also be provided between the DECT fixed part and the DECT portable part:

- in-band tones shall be conveyed transparently in the speech path;
- in-band tones shall be generated by the DECT fixed part from the network information elements;
- information elements shall be conveyed with equivalent DECT information elements.

See subclause 8.3.9.

The signalling information messages which shall be supported are identified in subclause 16.7.1.

16.7.1 ISDN signalling information messages

The following ISDN signalling messages shall be supported, see ETS 300 085 [15], Annex F.

- dial tone on;
- ring back tone on;
- intercept tone on;
- network congestion tone on;
- busy tone on;
- confirm tone on;
- answer tone on;
- call waiting tone on;
- tones off.

16.7.2 GSM supervisory tone control

The GSM system utilise a small number of standard supervisory tones which are generated in the mobile equipment in response to numerous messages.

NOTE: Some tones may be controlled by more than one message.

These messages are defined in Annex A of GSM 02.04 (version 3.2.0) [16], Annex F and should be supported by DECT.

16.7.3 PBX and key system tones/signals

For this application some additional supervisory tones not included in the previous two sections may be required, for example an operator intrusion tone. In order to make provision for such tones, and for future tone requirements, the DECT signalling shall have some spare message capability.

16.8 ADPCM codecs

The speech coding algorithm shall be the core ADPCM algorithm defined in CCITT Recommendation G.721 (1988) [4] (see Annex F) 32 kbit/s ADPCM, where the core algorithm is defined as the process in G.721 between the uniform PCM and the 32 kbit/s interfaces. It is only mandatory to provide the G.721 functions associated with the 64 kbit/s compressed interfaces in DECT fixed parts designed for interworking with 64 kbit/s PCM networks.

NOTE: Attention is drawn to the fact that unnecessary use of the compressed interfaces adds unnecessary quantisation distortion which should be considered in the context of total quantisation distortion allocations for national and international calls.

16.9 Security, authentication and encryption requirements

16.9.1 Encryption

In public access (telepoint) applications, the cipher process shall operate (when required) on the A (signalling) and B (traffic) channels, the cipher algorithm (process) being mandatory, while provision (built-in if provided) and usage are optional.

Table 5 following summarises the public access (telepoint) and other applications requirements.

Table 5

ENCRYPTION OF TRAFFIC AND SIGNALLING CHANNELS			
	PROVISION	PROCESS	USE
PUBLIC ACCESS (telepoint) Applications	OPTIONAL (Built-in to fixed and portable parts if provided)	MANDATORY	OPTIONAL
OTHER Applications	OPTIONAL (Built-in to fixed and portable parts if provided)	OPTIONAL	OPTIONAL

NOTE: It may not be appropriate to encrypt all fields of the signalling channel.

16.9.2 Authentication

Authentication requirements have been identified in detail in the public access (telepoint) application (see Clause 8).

See prETS 300 175-7 [17], part 7 of DECT Specification (see Annex F).

16.9.3 Portable part lock

A method of authenticating the user to the portable part, this feature can be enabled or disabled by the user. This is an equipment provision facility only.

16.9.4 Physical security

Considerations of physical aspects of security such as availability or protection against damage are outside the scope of this document.

17 Definitions

These definitions have been developed to support the understanding of this report. Where possible they are consistent with the current DECT glossary (as of December 1990). Those which differ from the DECT glossary are retained as stand-alone definitions for the purpose of this document and this document only, to aid user perception.

17.1 Fixed part

A functional configuration of some or all of the fixed component parts of a DECT system. These would include one or more radio equipments attached to an antenna system. It could also include common control functions and interfaces to PSTN or ISDN networks.

17.2 Operating range

The radial distance from a fixed part over which acceptable service quality (signal strength, BER, SNR) is provided.

17.3 Cell

The domain served by a single antenna system (including a leaky feeder) of a fixed part.

NOTE: A Cell may include more than one source of radiated RF energy, e.g. more than one radio end point).

The size of this domain is determined by transmission quality, availability, grade of service, bearer service quality and blocking.

17.4 Single radio fixed part coverage

Coverage provided by a fixed part using a single antenna or single continuous distribution system, such as a radiating cable. (See cell in subclause 17.3 above).

17.5 Multicell fixed part coverage

Coverage provided by a fixed part comprising two or more cells with intercommunicating radio end points.

17.6 Bearer service

A type of telecommunications service that provides the capability for the transmission of signals between user-network interfaces.

17.7 Teleservice

A type of telecommunications service that provides the complete capability, including terminal equipment functions, for communications between users according to protocols established by agreement between administrations or RPOAs.

17.8 Supplementary telephone services

Any service provided by the telephone network in addition to the basic telephone service.

17.9 Telecommunication service (see service, telecommunication service)

That which is offered by an administration or RPOA to its customers in order to satisfy a specific telecommunications service or facility.

17.10 Service

A set of functions offered to a user by an organisation.

17.11 Packet-mode operation

The transmission of data by means of an addressed packet whereby a transmission channel is occupied for the duration of the packet only. The channel is then available for the transfer of other packets between different data terminal equipment.

17.12 Circuit switched connection

A voice or data connection which is established on demand between two or more DTEs (data terminal equipment) giving the exclusive use of a data circuit and which is maintained until the connection is released.

17.13 Telecommunication network

All the means of providing telecommunications services between a number of locations where the services are accessed via equipment attached to the network.

17.14 Terminal equipment

Equipment that provides the functions necessary for the operation of access protocols by the user.

17.15 Capability

The ability of an item to meet a demand of a given size under given internal conditions.

17.16 Function

A set of processes defined for the purposes of achieving a specified objective.

17.17 Outgoing call

A call initiated from a DECT portable part.

17.18 Outgoing call queuing

A means of registering outgoing call initiation requests from DECT portable parts during congestion (other than on the air interface), and expediting them in a predetermined manner as channel capacity becomes available.

There may be a market need for this, but the needs and problems are different in differing applications, and there may be conflicting needs. Queuing for outgoing calls may cause problems for incoming calls. Needs further study.

17.19 Incoming call

A call received at a DECT portable part.

17.20 Handover

The action of switching a call in progress from one or more physical channels to other physical channels. There are two forms of handover, intra-cell handover and inter-cell handover.

17.21 Inter-operator roaming

The ability for a DECT portable part to make or receive calls on DECT networks other than its parent network.

NOTE 1: Not all DECT portable parts or users will have a parent network (e.g. credit card use, where the user or a hired portable part may not have specific long-term access rights to one particular network) However, SOMEONE, (the user, the portable part owner, or the credit card company, will have some form of commercial agreement with the service provider in respect of each individual call, and which will be subject to the usual DECT public access (telepoint) authentication procedures.

NOTE 2: Inter-operator roaming (user viewpoint)

The ability by which the user of a DECT portable part may gain access to some or all of the facilities provided by a DECT network, irrespective of whether the user is a specifically registered subscriber to that network.

Inter-operator roaming (network viewpoint)

The ability by which a DECT network may grant access, to the user of a DECT portable part, to some or all of the facilities provided by the DECT network, irrespective of whether the user is a specifically registered subscriber to that network.

In-call inter-operator roaming is not required, except in DECT networks controlled by a common management entity.

Due to differing interpretations of 'roaming' it is often necessary to define roaming in terms of the particular context in which it is used.

In addition to the technical aspects, roaming has impact on issues such as authentication and billing.

17.22 Multiple subscription registration

The ability for the portable part to retain details of more than one subscription is required.

17.23 Emergency service

A functional mode open request to each public access (telepoint) fixed part within range requesting call

set-up to the emergency service. The public access (telepoint) fixed part accepting the call shall not apply authentication. The emergency service identification is subsequently needed (police, fire, ambulance, coastguard, etc). If the fixed part operates a queue management system, an emergency call shall take priority over other calls waiting.

17.24 Tandem use with other mobile systems

Use of a DECT portable part as an extension of for example GSM or other mobile radio telecommunications systems.

Achieved by an interworking unit, note that delays will be summed.

17.25 Alphanumeric text messaging and radiopaging service

The ability to send short messages consisting of up to 120 characters of the default or other character set (currently under study) or initiate tones when not in-call or when in-call, with or without acknowledgement (cf GSM short messaging service). A full alphanumeric message service should be based on the ERMES character set for alphanumeric paging (which has been accepted for GSM). This character set covers all (west) European letters essential for unrestricted pan-European message transfer and inter-operator roaming. Control characters should be added.

17.26 Voice and data traffic encryption

The process carried out on digitised speech (or voice data) samples prior to transmission over the DECT radio carrier to protect against unauthorised listening (intentional or otherwise) to the transmitted speech (or voice data) signal. Decryption is carried out in the fixed part prior to onward transmission.

17.27 Signalling traffic encryption

The process carried out on signalling information prior to transmission over the DECT radio carrier to protect against unauthorised recovery of the signalling information. Decryption is carried out in the fixed part prior to onward transmission.

17.28 Dialling and calling security

The protection by encryption of call set-up information such as dialled or keyed digits, portable part identity, subscription data, and PIN, against unauthorised interception.

17.29 Authentication

To prove genuine, to give legal validity to, to prove entitled to acceptance.

17.30 Portable part authentication

The process by which the identity of a DECT portable part is checked by the network prior to the provision of service.

17.31 User authentication

The process by which the identity of a DECT user is checked by the network prior to the provision of service.

17.32 Authentication of fixed part

The process carried out by the DECT portable part or user to confirm that it is communicating with an authenticated fixed part.

17.33 Validation

To confirm, to substantiate, proving to be sound and fulfilling all necessary conditions.

17.34 Validation of portable part user

The process carried out by the DECT system/network to identify the class-of-service to be offered to an authenticated DECT user.

17.35 Validation of portable part

The process carried out by the DECT system/network to identify the class-of-service to be offered to an authenticated DECT portable part.

17.36 Validation of DECT authentication module

The process carried out by the DECT system/network to identify the class-of-service to be offered to an authenticated DECT authentication module.

17.37 User Personal Identity (UPI)

A personal identification (4 to 8 digits) used for user authentication only, which is passed over the radio interface (having been combined in some way with a key) and for example used to identify a user to a service provider.

17.38 Portable part access security (portable part lock)

The security process which is carried out by the user of a DECT portable part to gain access to that portable part.

17.39 'Portable part inaccessible' information

Information derived within the DECT fixed part to indicate that the called DECT portable part cannot be contacted (not attached, not present, or powered down). This may be used to provide indication to the caller in some manner (e.g. by recorded message) that the call cannot be completed.

17.40 In-range indication

A means of indicating to a portable part, without necessarily establishing a full two-way radio link, that it is within range of a fixed part to which it might wish to gain access. (See also definition "user indication of teleservice available").

17.41 User indication of teleservice available

Indication to the user that a requested teleservice or range of teleservices is available at a given location.

17.42 Portable parts register on other units

The ability of a DECT portable part to be registered or be associated at physical link level with any appropriate DECT fixed parts. This would be required when adding additional DECT portable parts to an existing DECT installation, or in certain public access (telepoint) applications. Such registration would precede any commercial registration procedures for obtaining service. Requires further study by the DAS group. May require storage of information in the portable part, e.g. a default address.

17.43 ZAP

The ability to re-program the account data held in the portable part so that access rights are suspended subject to other the conditions being met, coupled with the ability to re-program the account data again to reinstate access rights once these conditions have been met. There are two categories, ZAP Suspend and ZAP terminate.

17.44 Other definitions

This list of definitions is not exhaustive there may be further services and facilities yet to be identified and defined.

Annex A: PSTN supplementary services

A.1 Absent subscriber service

The possibility for a subscriber who cannot answer his calls, because he is absent, to divert calls to:

- a manual answering service;
- another subscriber's number;
- an announcement.

A.2 Diversion if number busy service

The possibility for a subscriber, who cannot receive calls, to have these calls diverted.

A.3 Do not disturb service

The possibility for a subscriber, who does not wish to answer, to divert incoming calls.

A.4 Customer dialled operator assisted call

With prior indication from a subscriber, an operator may be associated with an automatically dialled call at the appropriate stage to determine if the wanted person is available. The subscriber gives this information as part of his call set-up procedure.

Implementation requires special equipment in the long-distance switching equipment and associated operator positions.

A.5 Freephone service

A subscriber is allocated a special (freephone) number and charges for all calls made to this number are paid by him instead of by the callers.

A.6 Wide area telephone service

For a flat rate charge, a subscriber may make an unlimited number of calls within a prescribed area from a particular telephone termination without the registration of call charges.

A.7 Automatic transferred debiting of charges

The automatic debiting to a subscriber's account of charges for calls made from any telephone by persons nominated by that subscriber and identified by the use of a secret code. This is similar to the existing credit card service but does not involve an operator. It must be provided for throughout a network.

A.8 Radio paging

The service provides the subscriber with the facility, by means of portable equipment used in a given area, to receive an alert by radio initiated by any telephone in a public network. The alert can be accompanied by a spoken message or visual coded display entered by the caller or generated within the network.

A.9 Direct calling-in (direct dialling-in)

Calls can be dialled from a telephone line connected to the public network directly to extensions in a PBX.

A.10 Incoming call barring

The ability of the Administration or the subscriber to prevent all or certain incoming calls to a telephone line.

A.11 Registration of incoming calls

The registration of details of all incoming calls to a particular telephone number (e.g. caller's number, time ringing commences, time of answer or time of abandonment, time of release, but excluding recording of speech).

A.12 Completion of calls to busy subscriber service

The possibility for a subscriber who reaches a busy number to have the call completed when the line becomes free without generating a second call or waiting on the line.

A.13 Automatic transferred charge call

With prior indication and mutual agreement between the two parties, the automatic debiting to a called subscriber's account of relevant charges for a call made to his telephone number.

A.14 Remote call forwarding

The possibility for a subscriber to obtain a telephone number in another area and have all calls to that number automatically forwarded at his cost to a telephone number in his premises.

A.15 Three party services

The possibility for a subscriber to hold an existing call, and make a call to a third party. The following arrangements are then possible:

- switch between the two other parties;
- connection of a common speech path between all three parties;
- connection of the other two parties.

A.16 Conference call services

The service provides the possibility to connect a number of subscribers in the same telephone call.

A.17 Calling number indication

A service whereby the calling subscriber's number can be identified by means of a visual or verbal indication at the called portable part.

A.18 Subscriber's alpha-numerical display

The visual display at a subscriber's telephone terminal of information sent to or received from the public telephone network.

A.19 Private number ringing signal

Each member of the family is given different identification (ID) codes. If the calling party wants a particular member he dials the ID code related to that member. The called member can learn that he is wanted by a particular kind of ringing signal.

A.20 Voice Mailbox Service (VMS)

No CCITT red book definition.

A.21 Abbreviated dialling services

The possibility for a subscriber to make a call by dialling a short code instead of a full telephone number.

A.22 Alarm call services

The possibility for a user to cause an alarm call or call to be made to his line at a time or times specified in advance by him, and to hear an appropriate announcement when the call is answered.

A.23 Automatic booked call

With prior information from a subscriber, a call may be made automatically from his telephone termination to a particular number or service (excluding the alarm call service) at a specific date and time.

A.24 Diary service

With prior information from a subscriber, a call is automatically made to his telephone number at a specific date and time, and when the answer condition is detected a recorded message is connected to this termination to remind him of a particular event e.g. birthday of a relative. Two versions are envisaged:

- the recorded message is dictated by the subscriber in each case;
- the recorded message is selected from a variety of pre-stored messages.

A.25 Restriction in the outgoing direction service

The possibility for a subscriber to prevent all or certain outgoing calls and/or service control operation from his telephone line.

A.26 PBX line hunting services

The automatic selection of a free line from a group of lines serving a subscriber, on receipt of a call to that subscriber's general directory number.

A.27 User call charge meter

Meter at the user's terminal showing call charge information.

Needs further study, e.g. to cater for debit card applications.

A.28 Automatic verbal announcement of charges applied service

The possibility for a user to request a verbal announcement of either total or individual call charges.

A.29 Printed record of duration and charge of call service

The possibility for a subscriber to get a specific printed record of called number, duration and charge of calls.

A.30 Automatic credit card service

Payment of call charges is made by placing a credit card in a specially adapted telephone or by calling the credit number. A telephone bill will be sent to the credit card holder later.

A.31 Selective accounting

A number of separate telephone lines are associated with an exchange termination and the account to which charges for a particular call are to be debited is indicated when making the call.

A.32 Customer recorded information service

This service gives to the customer the possibility of distributing information transmitted from recording equipment to calling subscribers.

A.33 Public recorded information service

Recorded information of public interest provided by telecommunications administrations, possibly in co-operation with appropriate public or private institutions, is given to subscribers calling the respective service numbers.

A.34 Emergency call service

A caller is given a fast and easy means of giving information about an emergency situation to the appropriate emergency organisation (e.g. fire service, police, ambulance).

A.35 Centrex service

The provision to subscribers, by means of a specially equipped public telephone exchange, of services normally only available in PBXs (e.g. automatic internal dialling, operator's desk, client access, direct dialling-in, transfer of calls).

A.36 Babyphone

A service providing for a call to be made to a telephone in the 'off-hook' condition for the purpose of audible supervision at the called subscriber's premises.

A.37 Transmission of verbal message

At the request of a caller (whether subscriber or not), a short message is transmitted by an operator either to one or several telephone numbers at a specified time, or to a specified person (whether a subscriber or not) when he calls the operator.

A.38 Universal access number

A customer with several installations in different parts of the country can be reached from anywhere in the country by dialling one given number. Calls from subscribers in predetermined areas of the country will be routed to installations chosen (with certain restrictions) for the area in question by the customer having the service.

A.39 Message relay

A caller, whether a subscriber or not, may dictate a message into recording equipment and require it to be passed to a particular telephone number by the following morning.

A.40 Interruption of call in progress

Intervention by an operator, interrupting the call in progress, in order to allow another incoming call to be offered.

A.41 Fixed destination call services

The possibility for a subscriber to set up a telephone call to a predetermined number by lifting the handset only in the case of a fixed telephone or, for example, pressing a single button on a DECT portable part.

A.42 Pick-up facility

A subscriber being away from his telephone can pick up a call on his line by dialling his own number and/or possibly a special code from any other telephone, after having been informed by means of a paging signal that there is such a call.

A.43 Call waiting services

A subscriber engaged on an existing call is given an indication that a caller is attempting to obtain connection to his number.

A.44 Dual telephone numbers

Two numbers are given to one subscriber. One is known to the public while the other is revealed by the subscriber only to a limited number of persons. When the subscriber applies diversion to the first number, people using the second will still be connected.

A.45 Voice dialling

Verbal indication of a telephone number or name activates the call set-up without the dialling operation. This service could be implemented in the exchange or on subscriber's terminal equipment. This could be hands-free operation which may have a significant impact on the DECT portable part design.

A.46 Number repetition service

The possibility for a subscriber to repeat a previously dialled number by dialling a short code.

A.47 Lecture call

Lecture call service is the establishment of a connection between one caller and two or more parties, in which the speech path is used in a unidirectional way from the caller to the other connected parties. The call may be set up either by an operator, or by an automatic device programmed by the caller from his own telephone.

Annex B: ISDN supplementary services

B.1 Introduction

NOTE: Definitions and glossary of terms will be found in document RES3 (90) 109 [18] (see Annex F), which is the common glossary for all DECT RES3 working groups.

The following supplementary services are described in CCITT Recommendations I.251 to I.257. Where the service is the subject of an ETSI standard, either published or in preparation, the ETSI reference number is given, otherwise reference is made to the CCITT recommendation.

Where an ETSI standard is in preparation and has not yet been allocated an ETS number, the document number of the draft ETS is given. These numbers will be updated as and when the ETS numbers are allocated.

B.2 Number identification services

B.2.1 Direct Dialling-In (DDI)

See ETS 300 062 (T/NA1(89)19) [19], Annex F.

B.2.2 Multiple Subscriber Number (MSN)

See ETS 300 050 (T/NA1 (89) 20) [20], Annex F.

B.2.3 Calling Line Identification Presentation (CLIP)

See ETS 300 089 (T/NA1 (89) 07) [21], Annex F.

B.2.4 Calling Line Identification Restriction (CLIR)

See ETS 300 090 (T/NA1 (89) 08) [22], Annex F.

B.2.5 Connected Line Identification Presentation (COLP)

See ETS 300 094 (T/NA1 (89) 09) [23], Annex F.

B.2.6 Connected Line Identification Restriction (COLR)

See ETS 300 095 (T/NA1 (89) 10) [24], Annex F.

B.2.7 Malicious Call Identification (MCI)

See ETS 300 128 (T/NA1 (89) 03) [25], Annex F.

B.2.8 Sub-addressing (SUB)

See ETS 300 059 (T/NA1 (89) 16) [26], Annex F.

B.3 Call offering services

B.3.1 Call Transfer (CT)

See DE/NA-012222.7 (T/NA1 (89) 22) [27], Annex F.

B.3.2 Call Forwarding Busy (CFB)

See ETR 011 (T/NA1 (89) 04) [28], Annex F.

B.3.3 Call Forwarding No Reply (CFNR)

See prETS 300 201 (T/NA1 (89) 23) [29], Annex F.

B.3.4 Call Forwarding Unconditional (CFU)

See prETS 300 200 (T/NA1 (89) 05) [30], Annex F.

B.3.5 Call Deflection (CD)

See prETS 300 202 (T/NA1 (89) 24) [31], Annex F.

B.3.6 Line Hunting (LH)

See CCITT Recommendation I.251.6 [32], Annex F.

B.4 Call completion services

B.4.1 Call Waiting (CW)

See ETS 300 056 (T/NA1 (89) 18) [33], Annex F.

B.4.2 Call Hold (HOLD)

See ETS 300 139 (T/NA1 (89) 27) [34], Annex F.

B.4.3 Completion of Calls to Busy Subscriber (CCBS)

See DE/NA-01227 (T/NA1 (89) 11) [35], Annex F.

B.5 Multiparty services

B.5.1 Conference Call Add-on (CONF)

See prETS 300 183 (T/NA1 (89) 25) [36], Annex F.

B.5.2 Conference Call Meet-me (MMC)

See prETS 300 164 (T/NA1 (89) 26) [37], Annex F.

B.5.3 Three Party service (3PTY)

See prETS 300 186 (T/NA1 (89) 28) [38], Annex F.

B.6 Community of interest services

B.6.1 Closed User Group (CUG)

See ETS 300 136 (T/NA1 (89) 21) [39], Annex F.

B.6.2 Private Numbering Plan (PNP)

See CCITT Recommendation I.255.2 [40], Annex F.

B.7 Charging services

B.7.1 Credit Card Calling (CRED)

See CCITT Recommendation I.256.1 [41], Annex F.

B.7.2 Advice of Charge (AOC)

See prETS 300 178 (T/NA1 (89) 13) [42], prETS 300 179 (T/NA1 (89) 14) [43] and prETS 300 180 (T/NA1 (89) 15) [44], Annex F.

B.7.3 Reverse Charging (REV)

See CCITT Recommendation I.256.3 [45], Annex F.

B.8 Additional information transfer services

B.8.1 User-to-User Signalling (UUS)

See T/NA1 (89) 06 [46], Annex F.

Annex C: DECT character set

NOTE: Further study on character sets is needed. The agreement of a common international character set to be used for a variety of telecommunications applications involves bodies outside RES3-S and is therefore not under the direct control of RES3-S.

The following draft text is suggested in the interim.

DECT shall have the capability to support the following character sets:

- ERMES;
- International alphabet 5 (IA5), plus the following control character set:

No action

Move cursor to HOME position

Move cursor to END position

Move BACK one column

Move FORWARD one column

Move DOWN one row

Move UP one row

Clear display and move HOME

Move to start of current row

Turn flash mode off

Turn flash mode on

Resume transmission

Go to decadic

Stop transmission

Go to DTMF

Fast flash

Toggle scroll lock

Clear to end of display

(maintain current cursor position)

Clear to end of line

(maintain current cursor position)

The minimum requirement for any equipment supporting a display is clear display and move home.

Both 'flash' and 'fast flash' features cause all subsequent characters to be displayed in flash mode until a 'flash off' control code is received.

NOTE: Codes used in character sets overlap - a means of signalling a shift from one character set to another is required

The default character set for public access (telepoint) applications shall be international alphabet 5 plus the above control character set.

Spare message capability shall be allocated for manufacturer specific requirements (e.g. icons).

Annex D: Glossary of abbreviations

NOTE: Definitions and glossary of terms will be found in document RES3 (90) 109 [18], Annex F, which is the common glossary for all DECT RES3 working groups.

See also the CCITT red book fascicle X.2 part IV, List of abbreviations and acronyms [47], Annex F.

AOC	Advice Of Charge
CBCS	Cordless Business Communications System
CCBS	Completion of Calls to Busy Subscriber
CCITT	International Telegraph and Telephone Consultative Committee
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CODEC	COder-DECoder
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONF	Conference Call
CRED	Credit Call
CT	Call Transfer
CUG	Closed User Group
CW	Call Waiting
DAM	DECT Authentication Module
DAS	DECT Authentication and Security
DDI	Direct Dialling-In
DECT	Digital European Cordless Telecommunications
DTE	Data Terminal Equipment
DTMF	Dual-Tone Multi-Frequency
ERMES	European Radio Messaging System
GSM	Groupe Speciale Mobile; pan-European Digital Cellular Radio
IEEE	Institution of Electrical and Electronic Engineers

ISDN	Integrated Services Digital Network
IWU	Interworking Unit
LAN	Local Area Network
MCI	Malicious Call Identification
MML	Man-Machine Language
MSN	Multiple Subscriber Number
OSI	Open Systems Interconnection
PBX	Private Branch Exchange
PNP	Private Numbering Plan
PSTN	Public Switched Telephone network
RPOA	Registered Public Operating Agency
SBS	Small Business System
UAK	User Authentication Key
UUS	User-to-User Signalling
VMS	Voice Mailbox Service

Annex E: DECT network configurations

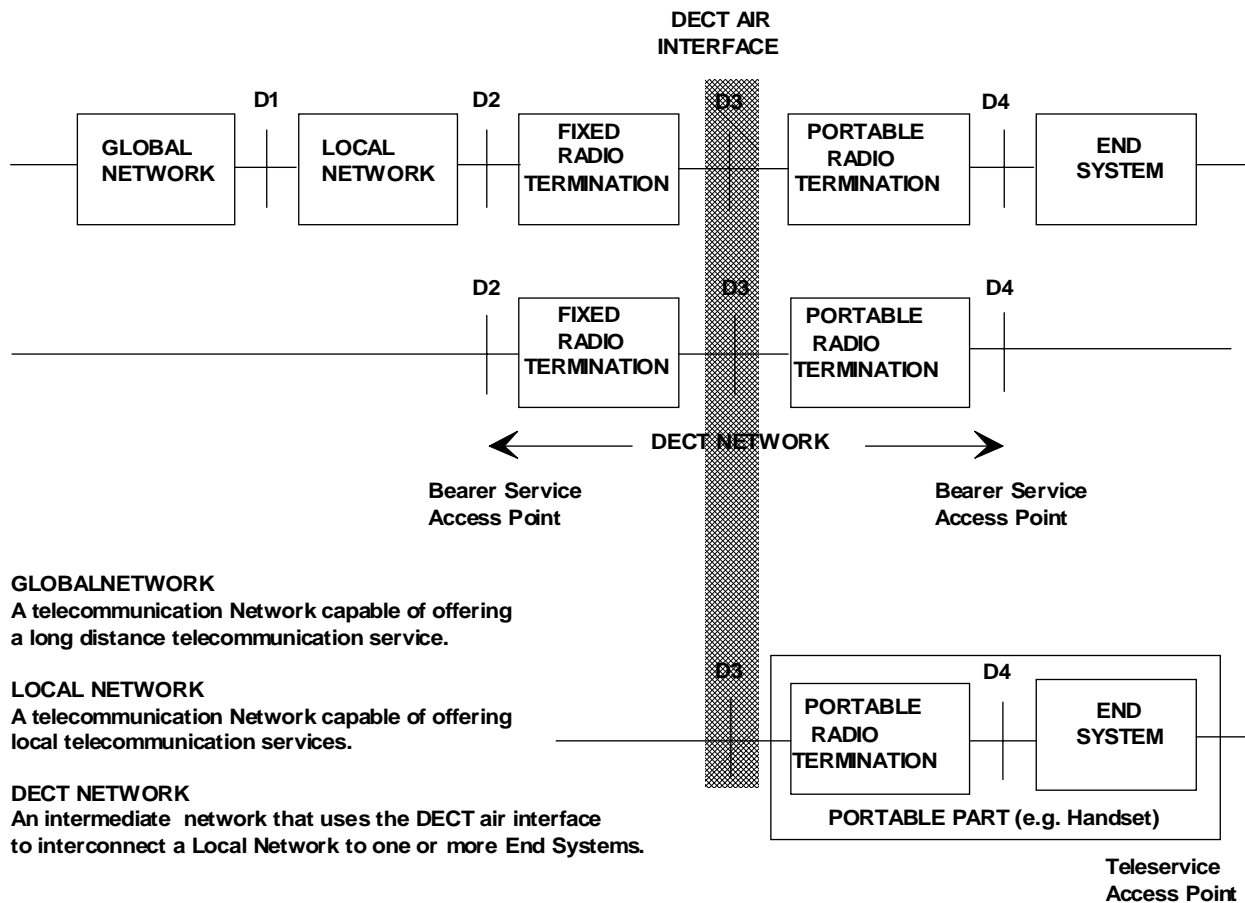


Figure 1: DECT services reference model

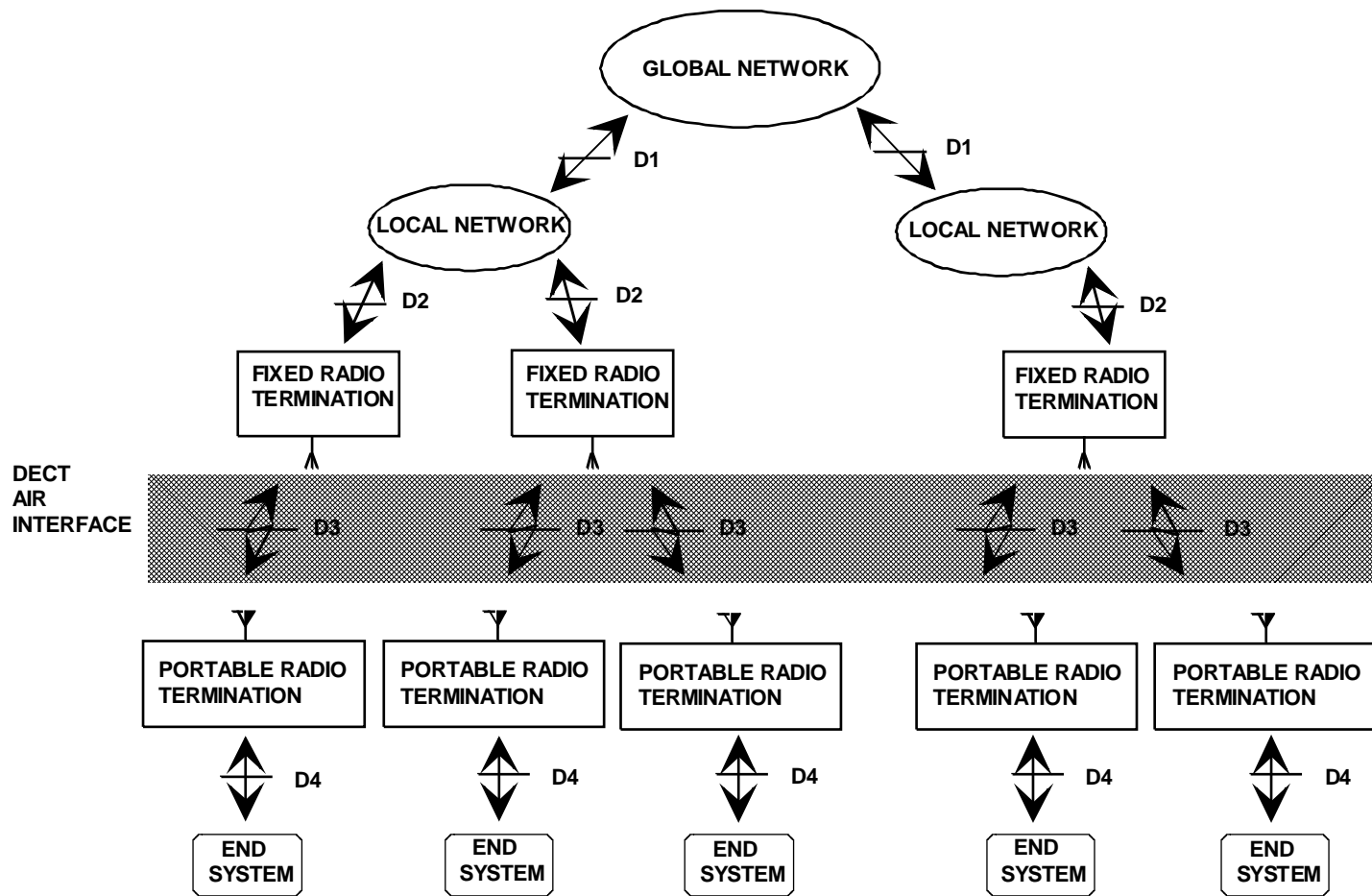


Figure 2: DECT network reference model

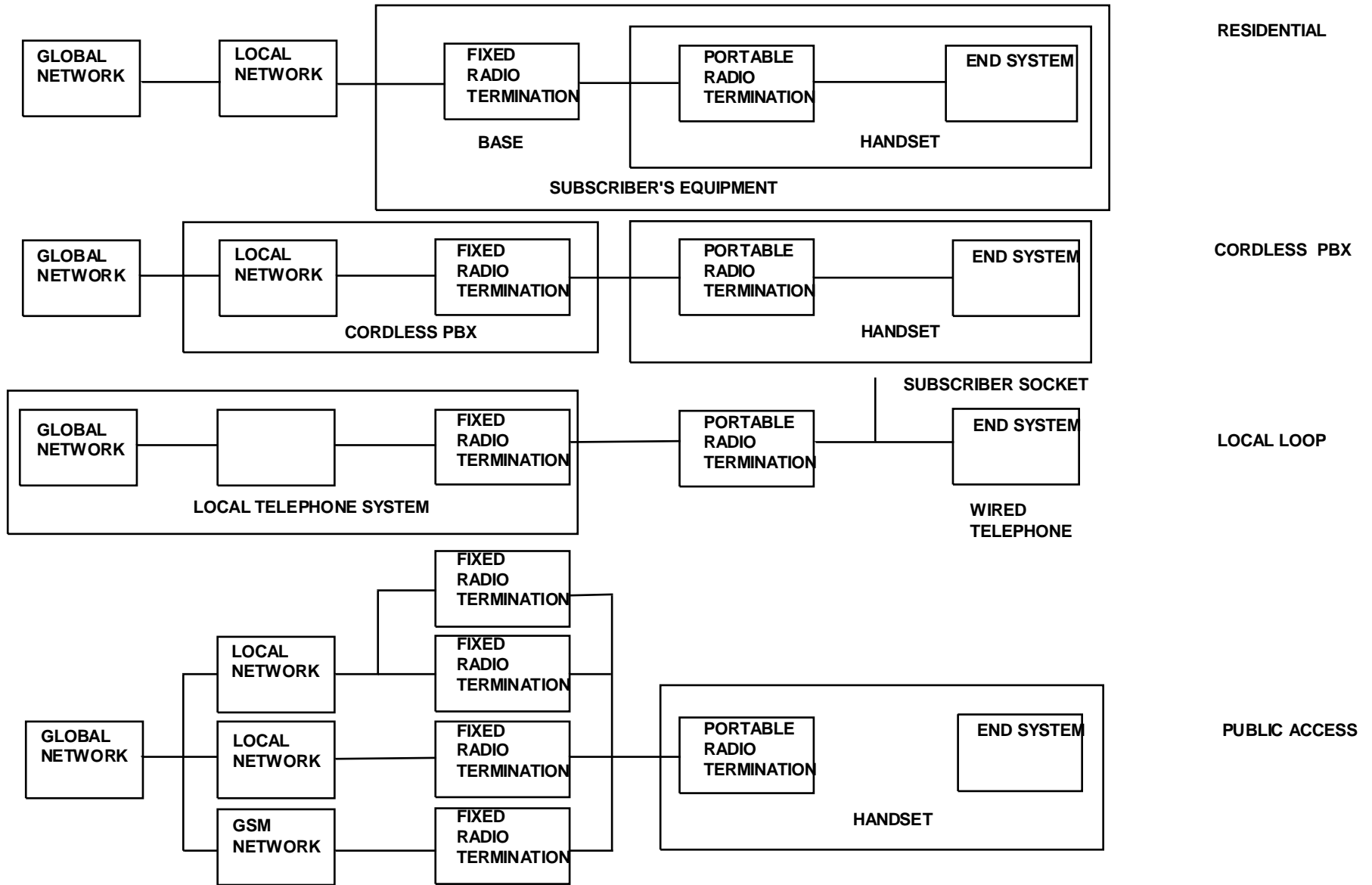


Figure 3

Annex F: References

Within this ETR the following references apply:

- [1] ETR 015: "Digital European Cordless Telecommunications Reference Document".
- [2] GSM 02.02: "Bearer services supported by a GSM PLMN".
- [3] CCITT Recommendation I.722: "Framework for providing additional packet mode bearer services".
- [4] CCITT Recommendations G.721: "32 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
- [5] ETSI RES3 (90) 94: "Security Experts' Group Report".
- [6] CCITT Recommendation I.241: "Teleservices supported by an ISDN".
- [7] CCITT Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to provide them".
- [8] CCITT Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit terminating Equipment (DCE), for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [9] CCITT Recommendation X.1: "International user classes of service in public data networks and Integrated Services Digital Networks (ISDNs)".
- [10] CCITT Recommendation X.3: "Packet assembly disassembly facility (PAD) in a public data network".
- [11] CCITT Recommendation X.28: "DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country".
- [12] GSM 02.03: "Teleservices supported by a GSM PLMN".
- [13] IEEE Std 802-1990: "IEEE Standards for Local and Metropolitan Area Network: Overview and Architecture".
- [14] IEEE 802.2: "Information processing systems - Local area networks - part 2: Logical Link Control".
- [15] ETS 300 085: "Integrated Services Digital Network (ISDN): 3,1 kHz telephony teleservice attachment requirements for handset terminals".
- [16] GSM 02.04: "General on supplementary services".
- [17] prETS 300 175-7: "Radio Equipment and Systems (RES); Digital Cordless Telecommunications (DECT) Common Interface part 7: Security features".
- [18] RES3 (90) 109: "DECT definitions and glossary" version 7.0.0.
- [19] ETS 300 062: "Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service - service description".
- [20] ETS 300 050: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service - service description".

- [21] ETS 300 089: "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service - service description".
- [22] ETS 300 090: "Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service - service description".
- [23] ETS 300 094: "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service - service description".
- [24] ETS 300 095: "Integrated Services Digital Network (ISDN); Connected Line Identification Restriction (COLR) supplementary service - service description".
- [25] ETS 300 128: "Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service - service description".
- [26] ETS 300 059: "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service - service description".
- [27] DE/NA-012222.1: "Integrated Services Digital Network (ISDN): Explicit Call Transfer (ECT) supplementary service - service description".
- [28] ETR 011: "Network Aspects (NA); The relationship between network component performance and the overall network performance".
- [29] prETS 300 201: "Integrated Services Digital Network (ISDN); Call Forwarding No Reply (CFNR) supplementary service - service description".
- [30] prETS 300 200: "Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service - service description".
- [31] prETS 300 202: "Integrated Services Digital Network (ISDN); Call Deflection (CD) supplementary service - service description".
- [32] CCITT Recommendation I.251.6: "Connected Line Identification Restriction (COLR).
- [33] ETS 300 056: "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service - service description".
- [34] ETS 300 139: "Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service - service description".
- [35] DE/NA-012211: "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscribers (CCBS) supplementary service - service description".
- [36] prETS 300 183: "Integrated Services Digital Network (ISDN); Conference call add-on (CONF) supplementary service - service description.
- [37] prETS 300 164: "Integrated Services Digital Network (ISDN); Meet Me Conference (MMC) supplementary service - service description".
- [38] prETS 300 186: "Integrated Services Digital Network (ISDN); Three Party (3PTY) supplementary service - service description".
- [39] ETS 300 136: "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service - service description".
- [40] CCITT Recommendation I.255.2: "Private Numbering Plan (PNP)".
- [41] CCITT Recommendation I.256.1: "Credit Card Calling (CRED)".

- [42] prETS 300 178: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at call set-up time (AOC-S) supplementary service - service description".
- [43] prETS 300 179: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information during the call (AOC-D) supplementary service - service description".
- [44] prETS 300 180: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at the end of the call (AOC-E) supplementary service - service description".
- [45] CCITT Recommendation I.256.3: "Reverse Charging (REV)".
- [46] T/NA1 (89) 06: "Integrated Services Digital Network (ISDN) User-User Signalling (UUS) supplementary service - service description".
- [47] CCITT Volume X - Fascicle X.2: "Index of the red book".

History

Document history	
July 1992	First Edition
February 1996	Converted into Adobe Acrobat Portable Document Format (PDF)