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Digital Enhanced Cordless Telecommunication (DECT); Global System for Mobile communications (GSM); DECT/GSM integration based on dual-mode terminals

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Digital Enhanced Cordless Telecommunications (DECT), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure (TAP).

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

1 Scope

The purpose of the present document is to specify the additional requirements to the existing Global System for Mobile communications (GSM) and Digital Enhanced Cordless Telecommunication (DECT) standards needed for DECT/GSM Dual Mode Terminals (DMTs) that can perform background scanning and switch automatically between GSM and DECT modes, but cannot be active in both modes at the same time.

For the DECT side, the DECT/GSM Interworking Profile (IWP) is not considered.

2 References

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ETS 300 434-2: "Digital Enhanced Cordless Telecommunications (DECT) and Integrated Services Digital Network (ISDN) interworking for end system configuration; Part 2: Access profile".

[2] ETS 300 444: "Digital European Cordless Telecommunications (DECT); Generic Access Profile (GAP)".

[3] ETS 300 511: "European digital cellular telecommunications system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS) (GSM 02.30)".

[4] ETS 300 607: "Digital cellular telecommunication system (Phase 2); Mobile Station (MS) conformance specification; (GSM 11.10)".

[5] ETS 300 824: "Digital Enhanced Cordless Telecommunications (DECT); Cordless Terminal Mobility (CTM); CTM Access Profile (CAP)".

[6] ETR 341: "Digital Enhanced Cordless Telecommunications / Global System for Mobile communications (DECT/GSM) interworking profile; Profile overview".

[7] TR 101 072: "Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile Communications (GSM); DECT/GSM integration based on dual-mode terminals".

3 Definitions and abbreviations

3.1 Definitions

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

active communication: A state, where a communication link has been established between the DMT and a fixed part in either GSM or DECT mode.

active mode: GSM or DECT mode after being selected and switch on procedures for that mode being performed.

background scanning: The process whereby the DMT attempts to identify the existence of available networks in the other mode than the one it is in.

basic dual mode terminal: A DMT that can only be in one mode at the time and that can be switched either manually or automatically between modes. The basic DMT is always be in one mode.

dual mode terminal: A terminal comprising both GSM and DECT parts.

GSM coverage: The sum of all GSM Public Land Mobile Network (PLMN) coverages where the DMT has at least limited service.

GSM: In the present document, the GSM part of a DMT can be GSM 900, Digital Cordless System 1800 (DCS 1800) or GSM/DCS dual band.

mode selection: A DMT based procedure, whereby operating mode, GSM or DECT, is chosen.

mode: A basic DMT is in either of the two modes GSM and DECT. In GSM mode the DMT behaves as a GSM Mobile Station (MS) and in DECT mode the DMT behaves as a DECT Portable Part (PP).

3.2 Abbreviations

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

ARI	Access Rights Identity
CAP	CTM Access Profile
CTM	Cordless Terminal Mobility
DCS	Digital Cordless System
DECT	Digital Enhanced Cordless Telecommunications
DMT	Dual Mode Terminal
GAP	Generic Access Profile
GSM	Global System for Mobile communication
IAP	ISDN Access Profile
IMSI	International Mobile Subscriber Identity
IWP	Interworking Profile
MS	Mobile Station
PARK	Portable Access Rights Key
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PP	Portable Part
SIM	Subscriber Identity Module

4 General on DECT/GSM DMTs

A DMT is a terminal comprising both GSM and DECT parts, see TR 101 072 [7]. The DMT is in either GSM or DECT mode. When in either mode, the DMT operates as the corresponding single mode terminal (except that it may perform background scanning) and shall fully comply with the relevant standards for that single mode terminal (see ETS 300 607 [4] and ETS 300 444 [2], ETS 300 824 [5] or ETS 300 434-2 [1]), unless specified in the present document.

When one mode is entered the DMT operates like a single mode terminal that is switched on (except for what is specified in subclause 5.2.2.1). When one mode is left the DMT operates like a single mode terminal that is switched off (except for what is specified in subclause 5.2.2.3). When the DMT switches mode, it leaves the first before entering the second, and operates as two single mode terminals where the first is switched off before the second is switched on.

In DECT mode it shall always be possible to switch to GSM mode to make an emergency call.

Switching between the two modes is done manually by the user or automatically by the terminal. The DMT shall not switch mode when in active communication. Automatically switching of mode can be based on background scanning or loss of coverage. In the case the switching of modes is based on background scanning there are requirements to prevent switching too frequently, see subclause 5.2.2.2 (if the switching is done automatically, the terminal may perform background scanning and may then change mode as a result of it).

Entry of the Personal Identification Number (PIN) shall be done in according to. to GSM 02.30 (ETS 300 511 [3]) at switch on of the DMT or insertion of the Subscriber Identity Module (SIM). At the time of entering the PIN the DMT may be in DECT or GSM mode.

NOTE: In DECT mode SIM access is needed, e.g. for the SIM phone book.

Switching of modes may be done without entering the PIN again. Unblocking PIN or PIN2 need not be supported in DECT mode.

The required speech parameters in the DMT shall comply with at least the GSM requirements for speech transmission.

The DECT part of the DMT shall be based on at least one of the DECT profiles: Generic Access Profile (GAP) (ETS 300 444 [2]); Cordless Terminal Mobility (CTM) Access Profile (CAP) (ETS 300 824 [5]) or ISDN Access Profile (IAP) (ETS 300 434-2 [1]).

The DECT/GSM IWP (ETR 341 [6]) is not covered by the present document.

5 Provisions for providing continuity of service

5.1 General

A DMT with valid International Mobile Subscriber Identity (IMSI) and Access Rights Identity / Portable Access Rights Key (ARI/PARK) pairs may access service in the areas authorized by the entitlement of the subscriptions.

NOTE 1: DECT ARI class D is not covered in the present document.

If a communication has been established, the DMT will in principle not suffer an interruption within the GSM PLMN or DECT area (provided the entitlement of the subscription allows it). Exceptions are possible if no network resources or radio coverage are available locally.

However, if the DMT leaves the GSM PLMN or DECT area, an established communication may terminate. If the user then wants to continue, another mode and/or network providing service has to be selected and a new communication has to be established.

NOTE 2: Seamless handover of an active communication between GSM and DECT modes is thus not supported.

5.2 Mode selection

5.2.1 General requirements

The DMT shall support at least the following two mechanisms of mode selection:

- manual mode selection;
- automatic mode selection.

NOTE: Network controlled mode selection is not considered in the present document.

The user shall be given the opportunity to change mode selection mechanism at any time when the DMT is not in active communication.

When the automatic mode selection mechanism is activated, either GSM or DECT shall be considered as the preferred mode according to the users preference. The user shall be given the opportunity to change the preferred mode at any time when the DMT is not in active communication.

When using the manual mode selection the user shall be given the opportunity to change the chosen mode at any time.

The DMT shall give an indication to the user of the mode currently in use.

5.2.2 Procedures

5.2.2.1 At switch-on

The DMT shall use the last selection mechanism used, as the default selection mechanism, at every switch-on.

If the DMT had manual mode selection activated when switched-off it shall go active (at switch-on) in the same mode it was active in when switched-off.

If the DMT with a valid SIM inserted had automatic mode selection activated when switched-off it shall go active (at switch-on) in the preferred mode.

If the DMT with no or invalid SIM inserted had automatic mode selection activated when switched-off it shall go active (at switch-on) in DECT mode.

Entry of the PIN shall be done in according to GSM 02.30 (ETS 300 511 [3]) at switch on of the DMT or insertion of the SIM. At the time of entering the PIN the DMT may be in DECT or GSM mode.

NOTE: In DECT mode SIM access is needed, e.g. for the SIM phone book.

Switching of modes may be done without entering the PIN again. Unblocking PIN or PIN2 need not be supported in DECT mode.

5.2.2.2 Automatic mode selection

When the automatic mode selection mechanism is activated the DMT selects automatically GSM or DECT mode with respect to the preferred mode defined by the user. In the case of a change of the mode, the DMT behaves like a GSM or DECT phone at power up or down.

The switching cycle between non-preferred and preferred modes are illustrated in figure 1. For loss of coverage of networks in the current mode, the terminal shall always switch to the other mode. When in non-preferred mode, the terminal may perform mode selection after doing background scanning in the preferred mode.

Thus three cycles are found in the automatic mode selection procedure. One cycle for loss of coverage, one for background scan where no preferred networks are found, and one for background scanning, which results in change of mode.

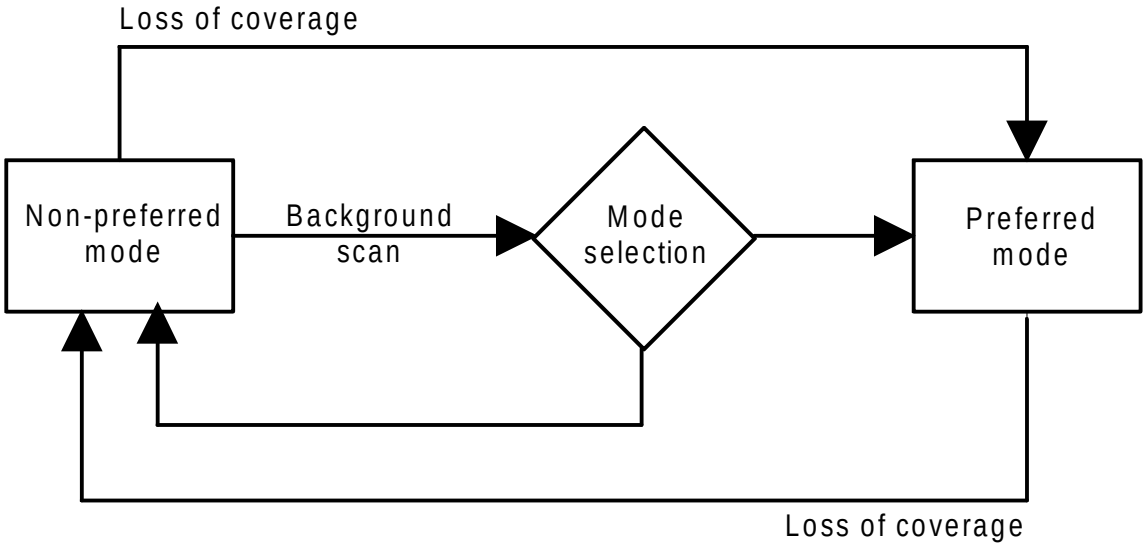

Figure 1: Mode selection cycles

The preferences given in subclauses 5.2.2.2.1 to 5.2.2.2.4 shall be supported.

5.2.2.2.1 Preferred use of GSM networks

The DMT needs not perform any background scan for DECT networks as long as it is in GSM mode and normal GSM service is available. In the case of a loss of GSM coverage the DMT shall switch to DECT mode.

In the case where only GSM limited service is available, the DMT shall perform background scanning for DECT networks. If a DECT network, to which the DMT has access rights, are identified, the DMT shall switch to DECT mode.

While the DMT is in DECT mode, it may perform background scanning for GSM networks. In the case of a loss of DECT coverage, the DMT shall switch to GSM mode.

5.2.2.2.2 Preferred use of DECT networks

The DMT needs not perform any background scan for GSM networks as long as it is in DECT mode and normal DECT service is available. In the case of a loss of DECT coverage the DMT shall switch to GSM mode.

While the DMT is in GSM mode and normal or limited service is available, the DMT shall perform background scan for DECT. In the case of a loss of GSM coverage, the DMT shall switch to DECT mode. If a DECT network, to which the DMT has access rights, is detected, it shall switch to DECT mode.

5.2.2.2.3 Protection against excessive signalling

To avoid excessive signalling load in the networks by frequent switching between the two modes as result of background scanning, the following timer shall be implemented in the DMT.

The DMT may switch from the non-preferred to the preferred mode as a result of background scanning. The DMT may then switch back to the non-preferred mode as a result of lack of coverage in the preferred mode. The loop emphasized in figure 2 illustrates the switching procedure between modes as result of background scanning. This complete loop (solid lines) shall not be run more than twice every 8 minutes, i.e. point A shall not be passed more than twice every 8 minutes.

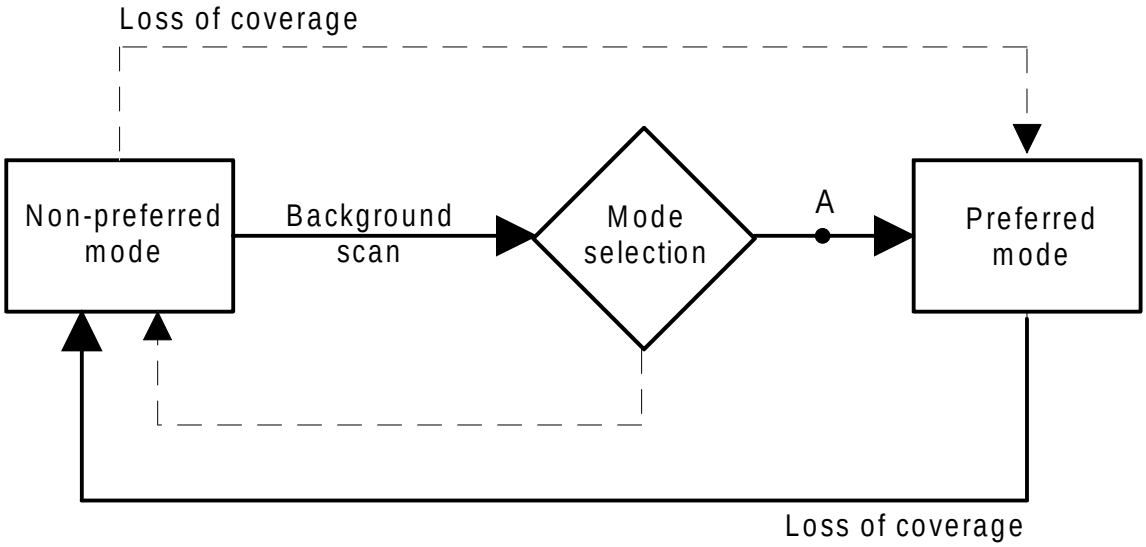

Figure 2: Background scanning cycle

NOTE 1: It is advantageous for the DMT to wait for stable coverage before switching modes in order to not be restricted from further switching by the above timer too often.

NOTE 2: There is no limit on the frequency with which a DMT may switch mode due to loss of coverage. However frequency switching may lead to excessive battery drain.

5.2.2.2.4 Background scanning

The purpose of the background scanning procedure is to inform the terminal about the possibility to get into normal service under stable coverage conditions in the other mode than the one it is in if the currently selected mode would be switched off and the other mode would be switched on. Background scanning is done without leaving the currently active mode. It is a procedure consisting of three steps:

1) searching for coverage in the not active mode;

2) identifying the presence of a network found in step 1 to which the DMT has access rights as far as the broadcast information allows this.

   As the requirements of the mode the terminal is currently active in needs to be kept, the terminal may read some broadcast information during the background scan, but shall not set up an active communication in the other mode;

NOTE 1: There are exceptional cases where it may not be possible for the DMT to identify valid access rights. e.g. active communication may be needed to confirm that full GSM service is available.

3) checking the stability of coverage.

In case the terminal has access rights, according to step 2, to one of the networks found in step 1, it should check the stability of the coverage of this network.

NOTE 2: One criteria for stability could be the field strength measured by the terminal during a certain time interval.

In order to save battery power, the whole procedure may be a periodic process.

NOTE 3: The switching of modes is not part of the background scanning. Switching of modes may be the result of a background scan if the network found is stable according to step 3.

5.2.2.3 Location registration

Location registration within each mode shall be performed according to the relevant standards (for single-mode terminals, see ETS 300 607 [4] and ETS 300 444 [2], ETS 300 824 [5] or ETS 300 434-2 [1]) and the behaviour when switching modes is the same as when one single-mode terminal is switched-off before the second is switched-on.

When switching modes, the behaviour shall be the following:

- when leaving one mode, the applicable behaviour shall be the one specified in the relevant standards for the switch off (e.g. detach procedure, if applicable), see ETS 300 607 [4] and ETS 300 444 [2], ETS 300 824 [5] or ETS 300 434-2 [1];

- when entering one mode, the applicable behaviour shall be the one specified in the relevant standards for the switch on (e.g. attach procedure, if applicable), see ETS 300 607 [4] and ETS 300 444 [2], ETS 300 824 [5] or ETS 300 434-2 [1].

5.2.2.4 User reselection of mode

At any time, the user may force the DMT into GSM or DECT mode using the manual mode selection mechanism.

When the DMT has automatic mode selection activated the user may, at any time, initiate reselection of mode.

If the DMT is in the preferred mode when the reselection of mode is initiated, it shall remain in that mode.

If the DMT is in the non-preferred mode when the reselection of mode is initiated, it should initiate a background scanning but can go directly to the preferred mode. If a network is identified during the background scanning to which it has access rights, it shall switch to the preferred mode.

History

Document history				
V1.1.1	August 1997	Public Enquiry	PE 9748:	1997-08-01 to 1997-11-28