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TECHNICAL SPECIFICATION

**Digital cellular telecommunications system (Phase 2+) (GSM);
GSM Cordless Telephony System (CTS), Phase 1;
Service description;
Stage 1
(3GPP TS 42.056 version 15.0.0 Release 15)**

A GLOBAL INITIATIVE

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Contents

Foreword

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Introduction

Today, there exists a clear distinction between the public mobile telephone systems for wide area coverage on the one hand, and private cordless telephone systems for local area coverage on the other hand. Recently, attempts have been made to integrate the wide area cellular and the local area cordless function into one and the same Mobile Equipment (ME). However, because of the incompatibility between the existing cellular and cordless standards, this results in ME implementations with rather low cost-efficiency.

The intention of the GSM Cordless Telephony System (CTS) is therefore to provide cordless functionality to a standard GSM Mobile Station (MS) with minimum impact on the MS. The impact would ideally be limited to an upgrade of the ME and SIM software. This can only be accomplished if the radio interface of the cordless system is identical, or very similar, to the standard GSM radio interface.

1 Scope

The scope of the present document is to describe the Service aspects of a GSM Cordless Telephony System (CTS), which provides the possibility for users of GSM terminals to have cordless access to a fixed network, such as PSTN/ISDN or a radio network such as GSM.

Due to the time constraints to have a first specification ready for market needs, a phased approach is necessary. The first phase aims primarily at an application supporting the speech teleservice (including DTMF support) in a residential single cell environment. The focus is on the requirements necessary to elaborate the radio interface and the security aspects for such an application.

To not prevent or impede the evolution of CTS to additional services and functions, later phases may have to be considered when now defining the means to fulfil the above mentioned requirements for the first phase of CTS. Therefore, additional support on the CTS radio interface for later phase services (e.g. SMS, subscriber authentication and GSM supplementary services), is included already in CTS Phase 1, provided that such services are clearly defined. Other expected services and functions in later phases are included in annex A.

The standardisation of the physical layers of the GSM-CTS fixed network interface is not in the scope of the present document. However, consideration may need to be given to communication of application data between CTS and PLMN via the fixed network.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.101: "UMTS Service Principles".

[3] 3GPP TS 42.009: "Security aspects".

[4] 3GPP TS 22.081: "Line identification Supplementary Services - Stage 1".

[5] 3GPP TS 22.096: "Name identification Supplementary Services - Stage 1".

[6] 3GPP TS 23.040: "Short Message Service (SMS)".

[7] ETSI ETS 300 111 (1992): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice, service description".

[8] ETSI ETS 300 109 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer, service description".

[9] ETSI ETS 300 110 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer, service description".

[10] ETSI EN 301 144-1 (V1.1): "The Signalling application for the mobility management service on the alpha interface; Part 1: Protocol specification".

[11] 3GPP TS 22.030: "Man Machine Interface (MMI) of the Mobile Station (MS)".

3 Definitions and abbreviations

3.1 Definitions

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

FP Enrolment: procedure where a CTS-FP is loaded with data necessary to obtain CTS operation. After this procedure CTS operation may commence.

MS Enrolment: procedure where a CTS-MS is associated for the first time with a CTS-FP. After this procedure CTS-MS has access to this CTS-FP.

Attachment: procedure where an MS attaches to a certain CTS-FP. When attached, it is possible to make and receive calls via the CTS-FP. The CTS-MS must have been initialised correctly to the CTS-FP before attachment can take part.

Generic Frequency List (GFL): Generic Frequency List (GFL) contains all absolute radio frequency channel numbers (ARFCN), as defined in GSM 05.05, on which the CTS-FP is allowed to operate. The CTS-FP will never use frequencies which are not listed in the GFL.

CTS Mobile Station: GSM MS with CTS capability.

CTS Fixed Part: CTS-FP is a device which offers a personnal cordless coverage and acts as a link between the CTS-MS and the fixed network or the GSM network.

GSM Operator: GSM operator is the operator who provides GSM cellular service to the MS.

CTS licence exempt frequencies: frequency band that may be allocated by national regulator to CTS usage outside of a GSM licence allocated to a GSM operator.

CTS operator: CTS operator is the operator who provides the GFL to the CTS-FP. The CTS operator may be the same than the GSM operator.

FP-SIM: FP-SIM is the SIM card inserted in the CTS-FP, which materialised the CTS subscription. The FP- SIM belongs to the CTS operator.

CTS subscription: when a GSM licensed band is used, the right to use a CTS operator's frequency spectrum for communication between a CTS-FP and CTS-MS(s).

CTS-FP owner: person who has the CTS-FP control and may authorise MS Enrolment.

CTS user: person who has a CTS-MS which is allowed to do CTS operations.

CTS-MS local number: number in the range of 0-99 optionally assigned to the **CTS-**MS at enrolment. This number is used for CTS internal calls.

CTS-Roaming: right for an additional CTS-MS to be enrolled to a CTS-FP which is initialised to an operator other than the HPLMN operator of the additional CTS-MS.

3.2 Abbreviations

In addition to those below, abbreviations used in the present document are listed in GSM 01.04.

CTS	Cordless Telephony System
CTS-FP	Cordless Telephony System - Fixed Part
CTS-MS	Cordless Telephony System - Mobile Station
FP – SIM	Fixed Part – Subscriber Identity Module
GFL	Generic Frequency List
IFPEI	International Fixed Part Equipment Identity
ISDN	Integrated Services Digital Network
MS	Mobile Station
PSTN	Public Switched Telephone Network
SMS - MO	Short Message Service - Mobile Originated
SMS - MT	Short Message Service - Mobile Terminated

4 Description

4.1 System overview

The GSM Cordless Telephone System (GSM-CTS) described in the present document is a radio communications system based on a GSM-compatible cellular interface between a private radio base station called CTS Fixed Part (CTS-FP) and a CTS mobile station (CTS-MS). The CTS-FP is connected either via a wireline to the PSTN/ISDN network or via a radio connection to a GSM network.

When connected to the fixed network, the CTS-FP will be compliant with the existing fixed network standards (e.g. support the telephony 3,1 kHz teleservice (see [7]), the speech bearer service (see [8]) and the 3,1 kHz audio bearer service (see [9] in case of an ISDN CTS-FP and the relevant national standards in case of PSTN CTS-FP). There is no direct radio communication between different CTS-FPs. However, this does not preclude indirect communication, e.g. via the fixed network or via the MS.

When connected to a GSM network, the CTS-FP is compliant with the existing ETSI standards applicable to a GSM mobile. From the GSM network point of view, the CTS-FP is seen as a standard GSM mobile including a standard GSM SIM card. (i.e. the CTS-FP may include 2 SIM cards: one for the GSM subscription and one for the CTS subscription).

An illustration of the CTS concept is shown in figure 1. Due to the low transmit power of the CTS-FP, the coverage area is restricted and limited. When the CTS-MS comes in range of the CTS-FP, it may attach to the CTS. When connected to the fixed network, from then on, the user can make and accept calls directly via the PSTN without the intervention of the public cellular network. When attached, the MS checks whether it is still in range of the CTS and whether it is paged. As an option, the MS may simultaneously work in both the cellular and the cordless mode, in a so called parallel mode, i.e. be attached both in the GSM PLMN and the CTS. When the MS comes out of range of the CTS it may switch to the GSM mode. This switch shall be indicated to the user. When the CTS-MS is in either CTS mode or GSM mode and is searching for a potential channel to attach with in the other mode, it shall be able to respond to paging messages from the mode in which it is currently attached.

The radio interface between the CTS-FP and the CTS-MS is a modified GSM interface. The carrier frequencies used are the same as assigned for cellular service. These carrier frequencies can be part of a licence exempt band or a licensed band.

When CTS-FP operates in a licenced band:

- these frequencies can be reserved by the operator for GSM-CTS usage, or can be shared with the cellular system. In every case, however, the GSM operator controls, on an area and time basis, on which frequencies the CTS is allowed to operate. In case of co-existence in the same operating area, a procedure shall be deployed to minimise interference between GSM PLMN and CTS users.

NOTE: The frequencies used for CTS could be in any frequency band defined for GSM, i.e. GSM900, DCS1800 or PCS1900. This applies both to the CTS-FP and the CTS-MS.

The quality of service (e.g. service accessibility, call set-up time, bit rate for data services) of the 'GSM only' subscribers shall remain unaffected by the introduction of CTS. Means to guarantee that the quality of service of GSM subscribers does not degrade due to CTS introduction have to be defined.

Since the MS uses the same frequency spectrum both for the cellular mode and the cordless mode, the ME hardware can be reused. The intention is that hardware modifications in the radio transceiver of a standard GSM ME should not be necessary. It is also a requirement that the introduction of CTS shall not destabilise any existing GSM mobile equipment or degrade the mobile equipment's dedicated (e.g. in call) or idle mode performance.

When a licensed band is used:

- the CTS operator can administer all CTS-FPs and the corresponding CTS. When the CTS is initialised, the required operation parameters are downloaded into the CTS. This can either be done via the fixed network or via the GSM radio interface.