

ETSI TS 123 122 V13.6.0 (2016-10)



**Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
Non-Access-Stratum (NAS) functions related
to Mobile Station (MS) in idle mode
(3GPP TS 23.122 version 13.6.0 Release 13)**



Reference

RTS/TSGC-0123122vd60

Keywords

GSM,LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

| | |
|--|----|
| Intellectual Property Rights | 2 |
| Foreword..... | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 5 |
| 1 Scope | 6 |
| 1.1 References | 6 |
| 1.2 Definitions and abbreviations..... | 8 |
| 2 General description of idle mode | 11 |
| 3 Requirements and technical solutions | 12 |
| 3.1 PLMN selection and roaming..... | 12 |
| 3.1A CSG selection / restriction..... | 13 |
| 3.1B PLMN selection triggered by ProSe direct communication | 14 |
| 3.2 Regional provision of service..... | 16 |
| 3.3 Borders between registration areas..... | 16 |
| 3.4 Access control | 17 |
| 3.4.1 Access control..... | 17 |
| 3.4.2 Forbidden LA or TA for regional provision of service | 17 |
| 3.5 No suitable cell (limited service state) | 17 |
| 3.6 CTS fixed part selection (A/Gb mode only)..... | 18 |
| 3.7 NAS behaviour configuration..... | 18 |
| 4 Overall process structure | 18 |
| 4.1 Process goal..... | 18 |
| 4.2 States description..... | 19 |
| 4.3 List of states | 19 |
| 4.3.1 List of states for the PLMN selection process | 19 |
| 4.3.1.1 List of states for automatic mode (figure 2a) | 19 |
| 4.3.1.2 List of states for manual mode (figure 2b)..... | 19 |
| 4.3.2 Void | 19 |
| 4.3.3 List of states for location registration (figure 3) | 19 |
| 4.4 PLMN selection process..... | 21 |
| 4.4.1 Introduction..... | 21 |
| 4.4.2 Registration on a PLMN | 21 |
| 4.4.3 PLMN selection | 21 |
| 4.4.3.1 At switch-on or recovery from lack of coverage..... | 22 |
| 4.4.3.1.1 Automatic Network Selection Mode Procedure | 22 |
| 4.4.3.1.2 Manual Network Selection Mode Procedure..... | 24 |
| 4.4.3.1.3 Manual CSG selection..... | 25 |
| 4.4.3.1.3.1 General..... | 25 |
| 4.4.3.1.3.2 Manual CSG selection within the RPLMN..... | 25 |
| 4.4.3.1.3.3 Manual CSG selection in a PLMN different from the RPLMN..... | 25 |
| 4.4.3.2 User reselection..... | 26 |
| 4.4.3.2.1 Automatic Network Selection Mode | 26 |
| 4.4.3.2.2 Manual Network Selection Mode..... | 27 |
| 4.4.3.2.3 Manual CSG selection..... | 27 |
| 4.4.3.3 In VPLMN | 27 |
| 4.4.3.3.1 Automatic and manual network selection modes | 27 |
| 4.4.3.3.2 Manual CSG selection..... | 28 |
| 4.4.3.4 Investigation Scan for higher prioritized PLMN..... | 28 |
| 4.4.4 Abnormal cases..... | 29 |
| 4.4.5 Roaming not allowed in this LA or TA | 29 |
| 4.4.6 Steering of roaming | 29 |
| 4.5 Location registration process..... | 29 |
| 4.5.1 General..... | 29 |

| | | |
|-------------------------------|--|-----------|
| 4.5.2 | Initiation of Location Registration..... | 30 |
| 4.5.3 | Periodic Location Registration | 31 |
| 4.5.4 | IMSI attach/detach operation..... | 32 |
| 4.5.5 | No Suitable Cells In Location Area | 32 |
| 4.6 | Service indication (A/Gb mode only)..... | 32 |
| 4.7 | Pageability of the mobile subscriber | 32 |
| 4.8 | MM Restart Procedure | 33 |
| 5 | Tables and Figures | 33 |
| 6 | MS supporting access technologies defined both by 3GPP and 3GPP2 | 39 |
| 6.1 | General | 39 |
| Annex A (normative): | HPLMN Matching Criteria | 41 |
| Annex B (normative): | PLMN matching criteria to be of same country as VPLMN | 45 |
| Annex C (informative): | Change history | 46 |
| History | | 51 |

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The present document specifies functions related to Mobile Station (MS) in idle mode and within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document gives an overview of the tasks undertaken by the Core network protocols of a Mobile Station (MS) when in idle mode, that is, switched on but typically not having a dedicated channel allocated. It also describes the corresponding network functions. The idle mode functions are also performed by a GPRS MS as long as no dedicated channel is allocated to the MS. The conditions when the idle mode functions are performed by an MS in the UTRA RRC connected mode states are specified in 3GPP TS 25.331 [33]. The conditions when the idle mode functions are performed by an MS in the E-UTRAN are specified in 3GPP TS 36.304 [43].

The present document defines the PLMN selection for a multi mode MS that supports both 3GPP and 3GPP2 systems. The common PLMN selection logic covers also PLMNs that are available in 3GPP2 system, but the present document makes no changes on the cdma2000[®] signalling towards networks that are available via 3GPP2 system.

The present document gives procedures for using the CSG cells, whenever such use is permitted.

This 3GPP TS outlines how the requirements of the 22 series Technical Specifications (especially 3GPP TS 22.011 [9]) on idle mode operation shall be implemented. Further details are given in 3GPP TS 24.008 [23].

Clause 2 of this 3GPP TS gives a general description of the idle mode process. Clause 3 outlines the main requirements and technical solutions of those requirements. Clause 4 describes the processes used in idle mode. There is inevitably some overlap between these clauses.

NOTE: cdma2000[®] is a registered trademark of the Telecommunications Industry Association (TIA-USA).

The present document does not consider GERAN Iu mode.

1.1 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] | Void. |
| [2] | Void. |
| [3] | Void. |
| [4] | Void. |
| [5] | Void. |
| [6] | Void. |
| [7] | Void. |
| [8] | Void. |
| [9] | 3GPP TS 22.011: "Service accessibility". |
| [10] | Void. |
| [11] | Void. |
| [12] | Void. |