



**Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Home Node B (HNB) Operations, Administration,
Maintenance and Provisioning (OAM&P);
Concepts and requirements for Type 1 interface HNB to HNB
Management System (HMS)
(3GPP TS 32.581 version 17.0.0 Release 17)**



ReferenceRTS/TSGS-0532581vh00

KeywordsLTE,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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

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>

If you find a security vulnerability in the present document, please report it through our

Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

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.

© ETSI 2022.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are 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 Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, 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.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

(standards.iteh.ai)

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. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 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
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	5
3.1 Definitions	5
3.2 Abbreviations	6
4 Concepts and background	6
5 Business level requirements	6
5.1 Requirements.....	6
5.1.1 Configuration Management	6
5.1.2 Performance Management	7
5.1.3 Fault Management	7
5.1.4 Security Management	7
5.2 Actor roles	7
5.3 Telecommunications resources	7
5.4 High level use cases	7
6 Specification level requirements	7
6.1 Requirements.....	7
6.1.1 Configuration Management	7
6.1.2 Performance Management	8
6.1.3 Fault Management	9
6.1.4 Security Management	10
6.2 Actor roles	10
6.3 Telecommunications resources	10
6.4 Use cases	10
Annex A (informative): Change history	11
History	12

Foreword

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

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.

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project Technical Specification Group Services and System Aspects, Telecommunication Management; as identified below:

3GPP TS 32.581: "Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Concepts and requirements for Type 1 interface HNB to HNB Management System (HMS)"

3GPP TS 32.582: "Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Information model for Type 1 interface HNB to HNB Management System (HMS)".

3GPP TS 32.583: "Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Procedure flows for Type 1 interface HNB to HNB Management System (HMS)".

3GPP TS 32.584: "Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); XML definitions for Type 1 interface HNB to HNB Management System (HMS)".

1 Scope

The present document describes the concepts and requirements of OAM for Home NodeB (HNB). The requirements captured in this document shall be met via Type 1 interface between HNB and HMS.

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 32.821: "Study of Self-Organizing Network (SON) related OAM for Home NodeB".
- [2] 3GPP TS 25.467: "UTRAN architecture for 3G Home NodeB, stage 2".
- [3] TR-069 Amendment 2, CPE WAN Management Protocol v1.1, Broadband Forum
- [4] TR-106 Amendment 2 Data Model template for TR-069-Enabled Devices v1.1, Broadband Forum.
- [5] TR-196 FAP Access Point Service Data Model v1.00, Broadband Forum.
- [6] 3GPP TS 32.435: "Performance Measurement, eXtensible Markup Language (XML) file format definition".
- [7] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Alarm Integration Reference Point (IRP); Information Service (IS)".
- [8] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".
- [9] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [10] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [11] 3GPP TS 22.220: "Service requirements for Home Node B (HNB) and Home eNode B (HeNB)".
- [12] 3GPP TS 33.320: "Security of Home Node B (HNB) / Home evolved Node B (HeNB)".

3 Definitions and abbreviations

For the purposes of the present document, the terms and definitions given in TS 32.101 [8], TS 32.102 [9] and TS 21.905 [10] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TS 32.101 [8], TS 32.102 [9] and TS 21.905 [10], in that order.

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [10] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [10].

3.2 Abbreviations

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

HMS	Home NodeB Management System
HNB	Home NodeB

4 Concepts and background

Home NodeB has the following characteristics:

- The quantity of Home NodeBs is likely to be large
- There may be many Home NodeB vendors
- Home NodeB may be purchased easily by end users in market
- The location of Home NodeB could be in a private residence which may not be accessible for frequent on-site maintenance

Based on the above characteristics, this specification defines the functionalities needed for the management of Home NodeB over a Type 1 interface.

5 Business level requirements

5.1 Requirements

REQ-OAMP-CON-001 The HNB shall be able to be managed in all management domain aspects defined below as Configuration management, Security management, Performance management and Fault management, without the use of vendor-specific or operator-specific extension capability.

5.1.1 Configuration Management

REQ-OAMP_CM-CON-001 The HNB shall be able to automatically, i.e. without human operator on-line interaction or attention, configure itself to be ready for service when powered up and connected to HMS.

REQ-OAMP_CM-CON-002 The HNB shall be able to automatically, i.e. without human operator on-line interaction or attention, configure itself to be in service when powered up and connected to HMS.

REQ-OAMP_CM-CON-003 The HNB shall be able to automatically, i.e. without human operator on-line interaction or attention, upgrade its software/firmware and configuration.

REQ-OAMP_CM-CON-004 The HNB auto-configuration shall be done in such way that the performance of the surrounding macro cells is not adversely affected.

REQ-OAMP_CM-CON-005 The HNB auto-configuration function should be adaptive to react to change in the network and changes in the radio environment.

REQ-OAMP_CM-CON-006 The operator shall be able to remotely reboot the HNB.

REQ-OAMP_CM-CON-007 The operator shall be able to remotely start/stop the radio transmission of the HNB.

REQ-OAMP_CM-CON-008 In case IPsec is used, the system should be engineered to ensure that the HNB IP address changes as minimally as possible.

REQ-OAMP_CM-CON-009 The operator shall be able to remotely reconfigure the HNB to adapt to changes in the radio environment.

REQ-OAMP_CM-CON-010 The HNB should allow configuration of the IPsec or non-IPsec usage option based on the operator's policy TS 33.320 [12].

5.1.2 Performance Management

REQ-OAMP_PM-CON-001 The HNB may have the capability to collect its performance related data.

REQ-OAMP_PM-CON-002 The HNB shall send performance data based on operator configured policy.

REQ-OAMP_PM-CON-003 Operator shall be able to retrieve performance data file from the HNB.

5.1.3 Fault Management

REQ-OAMP_FM-CON-001 The HNB shall support Fault Management to enable the operator to monitor and manage the HNB.

REQ-OAMP_FM-CON-002 The HNB shall provide alarm related information only on demand by the operator or based on operator configured policy.

5.1.4 Security Management

REQ-OAMP_SM-CON-001 The HNB shall have the capability to protect itself against Denial of Service attack over the Type 1 interface.

5.2 Actor roles

Not defined in this version.

5.3 Telecommunications resources

Not defined in this version.

5.4 High level use cases

Not defined in this version.

iTeh STANDARD
PREVIEW
(standards.itih.ai)

[ETSI TS 132 581 V17.0.0 \(2022-04\)](https://standards.itih.ai/catalog/standards/sist/5b75868b-dc7e-4de8-9ae0-1189d0ddf90f/etsi-ts-132-581-v17-0-0-2022-04)

<https://standards.itih.ai/catalog/standards/sist/5b75868b-dc7e-4de8-9ae0-1189d0ddf90f/etsi-ts-132-581-v17-0-0-2022-04>

6 Specification level requirements

6.1 Requirements

6.1.1 Configuration Management

The requirements for configuration management are as follows:

REQ-OAMP_CM-FUN-001 The HNB configuration shall be administered by the HMS utilising the TR-069 CWMP Protocol, reference [3].

REQ-OAMP_CM-FUN-002 The HNB Information Model used by the HMS for Configuration Management shall be based on the following:

- a. Broadband Forum TR-106 Amendment 2 Data Model [4]
- b. FAP Access Point Service Data Model [5]

REQ-OAMP_CM-FUN-003 HMS shall be able to reboot the HNB.

REQ-OAMP_CM-FUN-004 HMS shall have remote access to the HNB to start/stop the radio transmission.

REQ-OAMP_CM-FUN-005 HMS shall have remote access to the HNB to start/stop the radio transmission on the frequencies specified by HMS.

REQ-OAMP_CM-FUN-006 HMS shall maintain the configuration data of the HNB.

REQ-OAMP_CM-FUN-007 When the HNB is initially powered up and connected to the HMS, HMS shall send the initially needed configuration data to the HNB.

REQ-OAMP_CM-FUN-008 If the inner IPsec tunnel IP address of the HNB changes and HNB is connected to HMS via IPsec Tunnel then the HNB shall notify the HMS using TR-069.

REQ-OAMP_CM-FUN-009 The HMS shall specify which parameters it needs to be notified of when the HNB changes their values through auto-configuration. The HNB shall notify the HMS of changes in the values of any such auto-configured parameters.

REQ-OAMP_CM-FUN-010 The HNB shall inform the HMS of its ability to auto-configure parameters or groups of parameters that are relevant to the HMS.

REQ-OAMP_CM-FUN-011 HMS shall be able to specify a value, or a valid range of values, for any parameter that is auto-configurable by the HNB.

REQ-OAMP_CM-FUN-012 Configuration management capability for the HNB shall be supported by means of TR-069 RPCs SetParameterValues, AddObject and DeleteObject. Optionally a bulk configuration management file may be supported. In this case the TR-069 manager uses the RPC download method to trigger a CM file download from a file server.

REQ-OAMP_CM-FUN-013 The HNB shall be able to inform the HMS of the changes in radio environment.

REQ-OAMP_CM-FUN-014 The HNB shall provide a capability allowing the HMS to manage downloading of HNB software/firmware image files and provide mechanisms for version identification and notification to the HMS of the success or failure of a file download.

REQ-OAMP_CM-FUN-015 The HNB shall support capabilities to inform the HMS about the results of specific actions triggered by the HMS.

REQ-OAMP_CM-FUN-016 It shall be possible to initiate a management connection at the request of either the HNB or the HMS.

REQ-OAMP_CM-FUN-017 If the HNB is unable to offer service for an operator configured time period it will deactivate the air interfaz.

REQ-OAMP_CM-FUN-018 The HNB shall support a capability to allow the HMS to activate Local IP Access.

REQ-OAMP_CM-FUN-019 The HNB shall support a capability to allow the HMS to deactivate Local IP Access.

REQ-OAMP_CM-FUN-020 The HMS should be able to securely configure the HNB according to the operator's policy, whether or not to use IPsec for subsequent connections.

6.1.2 Performance Management

The HNB may support Performance Management to enable the operator to monitor the HNB Network based on the business level requirements (see clause 5.1.2).

The requirements for performance management are as follows.

REQ-OAMP_PM-FUN-001 The HNB may have the Performance Management capabilities administered by the HMS.

REQ-OAMP_PM-FUN-002 The HNB shall support the retrieval of the Performance Information from the HNB utilising the file transfer option of TR-069 CWMP Protocol, reference [3].

REQ-OAMP_PM-FUN-003 The HNB shall be configurable by the HMS to produce an XML File at regular intervals which contains the HNB performance Information and then upload the XML File.

REQ-OAMP_PM-FUN-004 The XML File Formats produced by the HNB shall adhere to the 3GPP XML Performance Management File Formats, reference [6].

REQ-OAMP_PM-FUN-005 The HNB shall upload PM files using TR-069 compliant file transfer protocols.

REQ-OAMP_PM-FUN-006 The HMS shall have the capability to initiate HNB diagnostic testing

REQ-OAMP_PM-FUN-007 HMS shall have the ability to configure policies for the HNB performance data file upload.

6.1.3 Fault Management

REQ-OAMP_FM-FUN-001 The HNB shall have the Fault Management capabilities administered through the HMS.

REQ-OAMP_FM-FUN-002 The HNB shall have the ability to send alarm related information to HMS according to operator configured policy.

REQ-OAMP_FM-FUN-003 The HNB shall be able to send alarm related information to the HMS using TR-069 RPC Methods, reference [3].

REQ-OAMP_FM-FUN-004 The alarm related information to be sent to the HMS by the HNB shall support the inclusion of the appropriate Information attributes, as defined in 3GPP TS.32.111-2, reference [7].

REQ-OAMP_FM-FUN-005 The HNB shall maintain the following information:

- a. Alarm Management Information – which contains the alarm management and reporting parameters configurable by the HMS
- b. Alarms List – Alarms currently active on the HNB
- c. Alarm History – contains the alarms previously created by the HNB.
- d. Pending Delivery Queue – contains the alarms queued to be sent to the HMS on the next management connection

REQ-OAMP_FM-FUN-006. The HNB shall support the following ways of alarm handling:

- a. Expedited handling– the HNB connects to the HMS immediately to raise the alarm and logs the alarm in the Alarm History.
- b. Queued handling– the HNB queues the alarm internally pending connection to the HMS, logs the alarm in the Alarm History, and delivers the alarm on the next connection to the HMS
- c. Logged handling – the HNB does not send the alarm to the HMS and logs the alarm in the Alarm History.
- d. Disabled handling– the HNB does not send the alarm to the HMS and will not log the alarm in the Alarm History

REQ-OAMP_FM-FUN-007 The HMS may configure the alarm handling for each type of HNB alarm according to the HNB alarm handling capabilities and the default handling if not specified by the HMS shall be “Logged handling”.

REQ-OAMP_FM-FUN-008 The HMS shall have the ability to throttle the sending of alarms from the HNB to the HMS

REQ-OAMP_FM-FUN-009 The HMS shall have the capability to retrieve alarm related information from the HNB using TR-069 RPC Method Calls.

REQ-OAMP_FM-FUN-010 The HMS shall have the capability to completely purge on the HNB the Alarms List and the Pending Delivery Queue and may have the capability to completely purge on the HNB the history of Alarms.

REQ-OAMP_FM-FUN-011 The HMS shall have the capability to activate and deactivate the alarm reporting by the HNB.

REQ-OAMP_FM-FUN-012 The HMS shall be able to define the frequency of passive reporting.

REQ-OAMP_FM-FUN-013 The HMS shall be informed immediately of alarms (raised, changed, cleared) classified as expedited notifications only.