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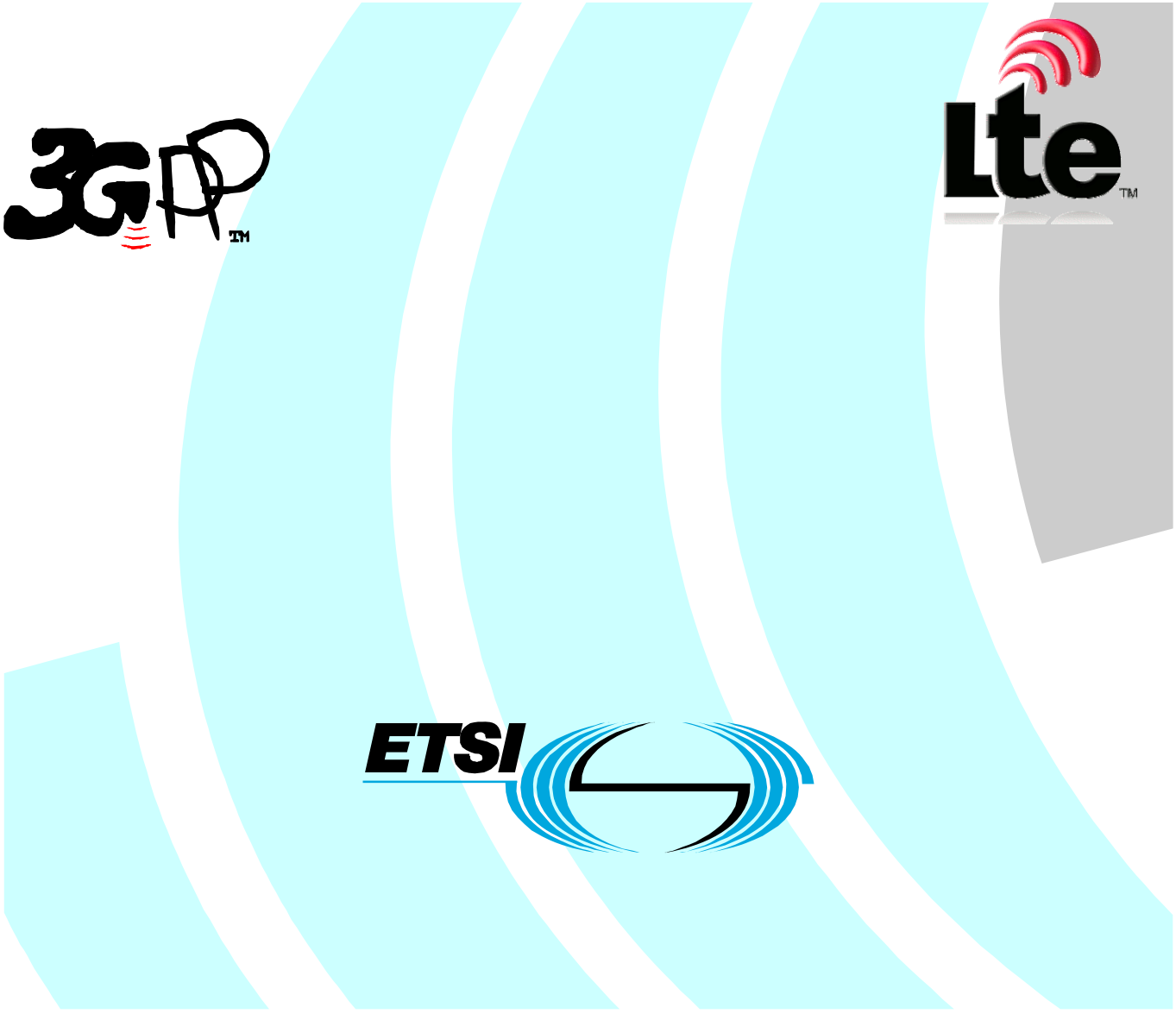
Technical Specification

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 9.3.0 Release 9)



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Foreword

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

Contents

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

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- 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 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 [11].

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.

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 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.

REQ-OAMP_FM-FUN–014 The HNB shall provide a capability allowing the HMS to access information that it may use to diagnose and resolve connectivity or service issues.

6.1.4 Security Management

REQ-OAMP_SM-FUN-001.The HNB shall have the capability to communicate with the HMS via TR-069 CWMP, reference [3], through the support of one of the two security mechanisms determined by the Network Operator"s Security Policies:

- utilising SSL/TLS outside the IPsec Tunnel

  -within the IPsec Tunnel with the option to utilise SSL/TLS within the IPsec Tunnel for additional end-to-end security

TR-069 CPE devices are currently factory programmed with a Bootstrap HMS URL only and therefore the HNB capable CPEs requiring to utilise IPsec for connection to the HMS either require to be factory programmed with Bootstrap Security Gateway/IPsec Information or this information is supplied outside of the IPsec tunnel before tunnel establishment utilising SSL/TLS.

REQ-OAMP_SM-FUN–002 The HNB shall provide a capability to prevent tampering with the interactions that take place between the HNB and the HMS as well as management functions of a HNB.

REQ-OAMP_SM-FUN–003 The HNB shall provide a capability allowing the HMS to authenticate the HNBs.

REQ-OAMP_SM-FUN–004 The HNB shall be able to authenticate the HMS prior to responding to interactions triggered by the HMS.

REQ-OAMP_SM-FUN–005 The HNB shall provide a capability supporting confidentiality for interactionstaking place between the HNB and the HMS.

6.2 Actor roles

Not defined in this version.

6.3 Telecommunications resources

Not defined in this version.

6.4 Use cases

Not defined in this version.

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Mar 2009	SP-43	SP-090067	--	--	Presentation to SA for information and approval	1.0.0	8.0.0
Jun 2009	SP-44	SP-090295	001	--	Add requirements for HNB informing the HMS of the changes in radio environment	8.0.0	9.0.0
Sep 2009	SP-45	SP-090534	003	--	Add missing description of AddObject and DeleteObject RPC method in configuration management according to BBF LS	9.0.0	9.1.0
Sep 009	SP-45	SP-090540	004	--	New CM, FM & SM specification level requirements for HNB Management	9.0.0	9.1.0
Mar 2010	SP-47	SP-100035	006	--	Correction of file transfer mechanisms in HNB type 1 interface	9.1.0	9.2.0
May 2011	SP-52	SP-110288	009	2	Correction of requirements for HNB non-IPsec usage - alignment with 33.320	9.2.0	9.3.0

History

Document history		
V9.1.0	January 2010	Publication
V9.2.0	April 2010	Publication
V9.3.0	June 2011	Publication