ETSI TS 132 582 V13.0.0 (2016-02)

Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication 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 32.582 version 13.0.0 Release 13)

Reference
RTS/TSGS-0532582vd00

Keywords
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

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

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:

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)".

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)".

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)".

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 architecture for Home NodeB (HNB) Management and Data class definition for Fault Management, Configuration Management and Performance Measurements. The stage 2 definitions captured in this document shall be met via type 1 interface between HNB and Domain Manager.

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 32.101: "Telecommunication management; Principles and high level requirements".

[3] 3GPP TS 32.102: "Telecommunication management; Architecture".

[4] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[5] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[6] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol specification".

[7] TR-069 Amendment 2, HNB WAN Management Protocol v1.1, Broadband Forum, viewable at http://www.broadband-forum.org/technical/download/TR-069Amendment2.pdf

[8] 3GPP TR 25.820: "3G Home NodeB Study Item Technical Report".

[9] 3GPP TS 25.413: "UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling".

[10] 3GPP TS 25.401 "Radio Access Network UTRAN Overall Description".

[11] 3GPP TS 25.433: "UTRAN Iub interface Node B Application Part (NBAP) signalling".

[12] 3GPP TR 32.821: "Study of Self-Organizing Network(SON) related OAM for Home NodeB".

[13] 3GPP TS 25.467: "UTRAN architecture for 3G Home NodeB, stage 2".

[14] TR-106, *"DSLHome™ Data Model Template for TR-069-Enabled Devices'* Broadband Forum

[15] TR-196, *"Femto Access Point Device Data Model"*, Broadband Forum, 2009.

[16] 3GPP TS 32.432 "Telecommunication management; Telecommunication management; Performance measurement: File format definition".

[17] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[18] 3GPP TS 32.111-6: "Telecommunication management; Fault Management; Part 6: Alarm Integration Reference Point (IRP): Solution Sets (SS)".

[19] 3GPP TS 33.320: "Security of Home Node B (HNB) / Home evolved Node B (HeNB)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] 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

Home NodeB, 3G Home NodeB and HNB: These terms, their derivations and abbreviations are used synonymously throughout this document.

3.2 Abbreviations

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

DM	Domain Manager
EM	Element Manager
FFS	For Further Study
HMS	Home NodeB Management System
HNB	Home NodeB
IP	Internet Protocol
LTE	Long Term Evolution
MME	Mobile Management Entity
NGMN	Next Generation Mobile Networks
OAM	Operations, Administrator and Maintenance
PnP	Plug and Play
SAE	System Architecture Evolution
SON	Self-Organising Networks
TBD	To Be Discussed
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Radio Access Network

4 Purpose

The purpose of this document is to specify the Information Model for Home NodeB Type 1 Interface for the remote management using the TR-069 CWMP Ref [7].
The strategy used to define the data model is as defined below :

- Configuration Management: An abstraction of the data model definition from Broadband Forum Ref [15]
- A complete information model is defined for Fault Management and Performance Management

5 Structure of HNB Information Model

Each of the three boxes represents the logical grouping of the parameters in the Information Model.

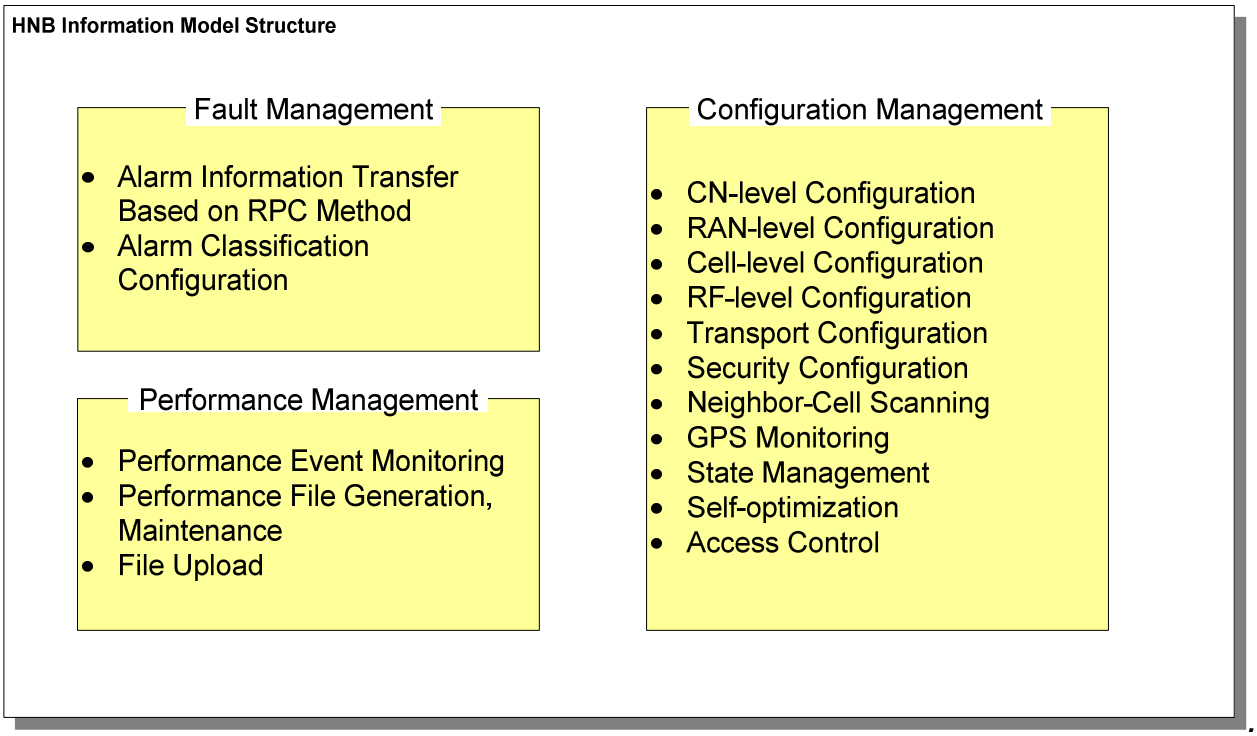

Figure 1. HNB Information Model Structure

6 Information Model Definition

6.1 Configuration Management

NOTE: State Management (Operational Status, Administrative status of the device) is covered as part of configuration management

6.1.1 HNB Access Network

Table 6.1.1: HNB Access Network Related Parameter Types

Parameter Type	Description	Reference
HNB-GW Gateway Identity	Identity of the HNB-GW the HNB connects to. The type of identity may be either 'name' or IP address.	25.467
Security Gateway Identity	Identity of the Security GW the HNB connects to. The type of identity may be either 'name' or IP address.	25.467
Access Mode	Indicates the type of access mode the HNB is to operate; it can be either 'Open Access,' 'Closed Access,' or 'Hybrid Access.'	22.011
ACL list	Defines the ACL, which consists of one or more IMSI of the UE that the access to the HNB is allowed. It is applicable to either 'Closed Access' and 'Hybrid Access.'	22.011
CSG Identity	Defines the CSG ID to which the HNB is a member of. It consists of one or more than one CSG ID.	22.011
CSG specific info	Defines the CSG specific split information including Primary Scrambling Code (PSC) and UARFCN dedicated to the CSG. This information is intended in the BCCH SIB information for the UEs under the HNB.	25.331, 10.3.2.8,10.3.2.9, 10.2.48.8.14a
HNB ID	Home NodeB Identifier broadcasted when it operates as CSG cell and is to be displayed on the UE.	22.011
Home Zone Name	String with a length 48 Bytes encoded in UTF-8 that defines the 'home zone name' that is to be displayed to the UE that camps on to the HNB.	36.331 section 6.3.1
URA list	List of one or more URA that the HNB belongs to.	25.331, sec.10.3.2.6
RNC ID	RNC-ID of the HNB.	25.413, sec.9.2.1.39, 9.2.1.39a
RANAP Timers	RANAP message related timers, typically named as 'T-xxx'	25.413, sec.9.5
Cell ID	Cell Identity, bit string (28).	25.331, sec.10.3.2.2
HSDPA related parameter	HSDPA specific parameters including: 1) HSDPA is used in the cell or not, 2) number of codes at the defined spreading factor within the code tree, 3) number of HS-SCCHs used in the HNB.	32.642, sec.6.3.9
Measurement related parameter	Measurement related parameters including: 1) measurement quantity, 2) minimum Rx signal level, 3) offset to the minimum Rx level, 4) cell re-selection hysteresis, 5) timers for re-selection, 6) threshold for re-selection. Note that separate sets of parameters exist for intra-frequency, inter-frequency, and inter-RAT frequency measurements.	25.331, sec.10.3.2.3, 10.3.2.4
HCS related parameter	Measurement related parameters including: 1) timers, threshold, hysteresis for HCS to determine when the UE enters or exists the high-mobility state, 2) quality threshold level for HCS, 3) flag to indicate HCS is used or not in the HNB, 4) HCS priority value for the HNB if the HCS is used.	25.331, sec.10.3.2.3, 10.3.7.12, 10.3.7.47, 10.3.7.54a
RACH related parameter for UE	RACH related parameters for UE when accessing the PRACH, including: 1) Maximum Tx power level a UE may use, 2) initial Tx power, 3) ramp-up step, 4) maximum preamble retransmission value, 5) maximum RACH preamble cycles, 6) back-off period lowerbound/upperbound.	25.331, sec.10.3.2.3, 10.3.6.11, 10.3.6.54, 10.3.6.67 25.304, sec.5.2.3
DRX related parameter	DRX related parameters including: DRX cycle length coefficient.	25.331, sec.10.3.3.6, 10.3.3.49
Cell Barred related parameter	Cell barred related parameters including: 1) Indicates whether the HNB is barred from service or not, 2) indicates whether the intra-frequency cell re-selection is allowed or not, 3) time period which the UE is barred from accessing the HNB, 4) list of Access Class barred, 5) indicates whether the HNB is reserved for operator use or not.	25.331, sec.10.3.2
Intra-frequency measurement related parameter	Intra-frequency measurement related parameters including: 1) measurement quantity, 2) weighting factor, 3) hysteresis, 4) time-to-trigger, 5) threshold.	25.331, sec.10.3.7.38, 10.3.7.39, 10.3.7.64

	These parameters are configurable for each event instance separately.	
Inter-frequency measurement related parameter	Inter-frequency measurement related parameters including: 1) filter coefficient, 2) measurement quantity, 3) weighting factor, 4) hysteresis, 5) time-to-trigger, 6) threshold. These parameters are configurable for each event instance separately.	25.331, sec.10.3.7.9, 10.3.7.18, 10.3.7.19, 10.3.7.64,
Inter-RAT measurement related parameter	Inter-RAT measurement related parameters including: 1) filter coefficient, 2) BSIC verification required, 3) weighting factor, 4) hysteresis, 5) time-to-trigger, 6) threshold. These parameters are configurable for each event instance separately.	25.331, sec.10.3.7.9, 10.3.7.29, 10.3.7.30, 10.3.7.64,
RRC timers and constants	Timers and constants used in RRC. Timers and constants have names designated as 'T3xx,' and 'N3xx,' respectively.	25.331, sec.13.1, 10.3.3.43, 10.3.3.44
UE Internal Measurement related parameters	UE-internal measurement related parameters including: 1) filter coefficient, 2) UE Tx power threshold and time-to-trigger.	25.331, 10.3.7.9, 10.3.7.79, 10.3.7.80,
Radio physical layer related parameters	Radio physical layer related parameters including: 1) UARFCN, 2) Primary Scrambling Code, 3) Max HNB Tx power, 4) Max UL Tx power, 5) P-CPICH power, 6) PDPDCH power, 7) P-SCH power, 8) S-SCH power, 9) PICH power, 10) PCH power, 11) FACH power, 12) BCH power, 13) AICH power, 14) Noise Rise Limit 15) Coverage edge Ec/Io and pathloss.	25.433, sec. 9.2.2.33, 9.2.2.34, 9.1.3.1, 9.1.6.1, 9.1.24, 9.2.1.21, 9.2.1.40, 9.2.1.49A, 9.2.1.65, 9.2.2.D. 25.331, sec. 10.3.6.3, 10.3.6.39, 10.3.6.50. 25.104. 32.642, sec.6.3.9, 6.3.11, 9.3.11
Intra-frequency neighbour list	Intra-frequency neighbour list parameters including: 1) PLMN-ID, 2) RNC ID, 3) LAC, 4) RAC, 5) URA, 6) P-CPICH Scrambling Code, 7) P-CPICH Tx power, 8) Collocation indicator, 9) Maximum Tx Power, 10) Maximum DPCH Tx Power.	25.413, 9.2.1.39, 9.2.1.39a, 9.2.3.6, 9.2.3.7 23.003, sec.4.1, 4.2 24.008 25.331, sec.10.3.2.6 25.433, sec.9.2.2.33 32.642, sec.6.3.11
Inter-frequency neighbour list	Inter-frequency neighbour list parameters including: 1) PLMN-ID, 2) RNC ID, 3) LAC, 4) RAC, 5) URA, 6) UARFCN, 7) P-CPICH Scrambling Code, 8) P-CPICH Tx power.	25.413, sec.9.2.3.7, 9.2.1.39, 9.2.1.39a, 9.2.3.6, 9.2.3.7 23.003, sec.4.1, 4.2 24.008, 25.331, sec.10.3.2.6 25.433, sec.9.2.2.33 32.642, sec.6.3.11
Inter-RAT neighbour list	Inter-RAT neighbour list (GSM only) parameters including: 1) PLMN-ID, 2) LAC, 3) BSIC, 4) Band Indicator, BCCH ARFCN.	25.413, sec.9.2.3.33, 23.003 sec.4.1,51.011, sec10.3.42, 24.008
State management related parameters	State management related parameters such as: 1) enable/disable (operational state), 2) lock/unlock (administrative state)	32.671
LIPA administrative state	Lock/unlock the Local IP Access (LIPA) functionality.	22.220

Editor"s Note: alignment of access parameter fields in 32.582 and 32.592 is FFS.

6.1.2 Core Network

Table 6.1.2: CN Related Parameter Types

Parameter Type	Description	Reference
PLMN information	PLMN information includes parameters including: 1) PLMN type, 2) PLMN ID.	24.008 23.003
Equivalent PLMN ID	Zero or more of equivalent PLMN ID.	24.008, sec.10.5.1.13, 23.003
LAC	Location Area Code.	23.003, sec.4.1 25.413, sec.9.2.3.6
RAC	Routing Area Code	23.003, sec.4.2, 25.413, sec.9.2.3.7
SAC	Service Area Code.	23.003
Service Area For Broadcast	String with a length of 2 bytes that specifies the 'Service Area For Broadcast'.	25,469, sec. 9.1.3
CS domain specific parameters	CS domain specific CN parameters including: 1) T3212, 2) ATT (Attach/Detach flag)	24.008, sec.10.5.1.12.2
PS domain specific parameters	PS domain specific CN parameters including: 1) RAC, 2) NMO (Network Mode of Operation)	23.003, sec.4.2 25.413, sec.9.2.3.7 23.060, 24.008, sec.10.5.1.12.3

6.1.3 Transport Network

Transport Network Related Parameter Types

Parameter Type	**Description**	**Reference**
SCTP related parameters	**SCTP related parameters including: 1) heartbeat interval, 2) maximum number of retransmit, 3) retransmission timeout, 4) valid cookie life during the 4-way start up handshake procedure, 5) association peer status, 6) peer IP address and port number,**	**n/a**
RTP/RTCP related parameters	**DSCP values for CS traffic (Conversation, Streaming). DSCP values for PS traffic (Conversation, Streaming, Interactive, Background)**	**n/a**
IPsec usage indicator	**Indicates whether or not to use IPsec for subsequent connections. This parameter is writable.**	**TS 33.320 [19]**
Tunnel related parameters	**IKE specific information including: 1) status, 2) peer IP address, 3) virtual IP address and subnet mask assigned by IKEv2, 4) DNS and DHCP servers assigned by IKEv2. Child SA specific information including: 1) Parent ID, 2) SPI, 3) direction, 4) creation time.**	**n/a**
Security related parameters	**Shared secret information including: 1) type, 2) status, 3) UICC card ID. Public key information including: 1) last modification time, 2) serial number in X.509 certificate, 3) issuer of X.509 certificate, 4) valid period of X.509 certificate. Crypto profile information including: 1) selector destination IP address and port number, 2) selector protocol, 3) IKEv2 encryption algorithm, 4) IKEv2 pseudo-random function, 5) IKEv2 integrity function, 6) IPsec encryption algorithm, 7) IPsec integrity function, 8) anti-replay window size, 9) rekey lifetime (in second, in byte), 10) DPD timeout, 11) NATT keepalive timer**	**n/a**

6.2 Fault Management

6.2.1 Common Alarm Attributes

The HNB Fault Management utilises a common set of alarm parameters as follows:

Parameter Name	Description	Valid values	Traceback
ManagedObjectInstance	It specifies the instance of the Informational Object Class in which the HNB event occurred by carrying the Distinguished Name (DN) of this object instance. This object may or may not be identical to the object instance actually emitting the notification to the HMS It contains two components dnprefix and identifier of the Managed Object. The combination of both convey the uniqueness of all managed objects	Encode the Managed Objects representation in string format as defined in reference [4], 3GPP TS 32.300.	**REQ-OAMP_FM-FUN-004**
EventType	It indicates the type of HNB Alarm	See 3GPP TS32.111-2 [17] Annex A for information on pre-defined alarm types from the 3GPP standards for alarm type and 3GPP TS32.111-6 [18] for supported Event Type values	**REQ-OAMP_FM-FUN-004**
ProbableCause	It qualifies the alarm and provides further information than Alarm Type.	See 3GPP TS32.111-2 [17] Annex B for information on pre-defined Probable Causes from the 3GPP standards and 3GPP TS32.111-6 [18] for supported Probable Cause values.	**REQ-OAMP_FM-FUN-004**
SpecificProblem	It provides further qualification on the alarm than ProbableCause This identifies the specific alarm over and above the Probable Cause which occurred on the HNB which is vendor defined.	Vendor defined This will be empty if the HNB doesn"t support inclusion of this information for this particular alarm	**REQ-OAMP_FM-FUN-004**
PerceivedSeverity	It indicates the relative level of urgency for operator attention for an alarm, please see ITU_T Recommendation X.733.	See 3GPP TS32.111-2 [17] for information on pre-defined Perceived Severity and 3GPP TS32.111-6 [18] for supported Perceived Severity values	**REQ-OAMP_FM-FUN-004**
AdditionalText	This provides a textual string which is vendor defined.	Vendor defined This will be empty if the HNB doesn"t support inclusion of this information for this particular alarm	**REQ-OAMP_FM-FUN-004**
AdditionalInformation	This contains a list of additional information about the alarm and is vendor defined	Vendor defined This will be empty if the HNB doesn"t support inclusion of this information for this particular alarm	**REQ-OAMP_FM-FUN-004**

6.2.2 Current Alarms List

The HNB maintains a list of current alarms not yet cleared on the HNB. Newly raised alarms events result in a new entry in the Current Alarms Table being added, any changes to the alarm as a result of an update event are updated in

the table, and a clear event raised against an alarm results in the alarm being removed from this table, reference **REQ-OAMP_FM-FUN-007**

6.2.2.1 Alarm Indexing Parameters

Entries in the Current Alarm Table shall be uniquely indexable using the following parameters:

Parameter Name	Description	Valid values	Traceback
AlarmIdentifier	It identifies one Alarm Entry in the Alarm List. This is the equivalent to the AlarmId identified in 3GPP TS32.111-2 [17]. The AlarmList assigns an identifier, called alarmId, to each AlarmInformation in the AlarmList. An alarmId unambiguously identifies one AlarmInformation in the AlarmList	value greater than or equal to 0	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.2.2 Alarm Content Parameters

The Alarms List table shall contain a list of entries which shall contain the parmeters identified in 6.2.3.1, the common set of alarm parameters which are identified in clause 6.2.1, and the following additional information:

Parameter Name	Description	Valid values	Traceback
AlarmRaisedTime	It indicates the date and time when the alarm is first raised by the HNB.	dateTime	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**
AlarmChangedTime	It indicates the last date and time when the Alarm Entry is changed by the alarm raising resource. Changes to the Alarm Entry caused by invocations of the HMS would not change this date and time.	dateTime	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.3 Alarm History List

The HNB maintains an alarm history list which contains the alarms raised by the HNB for each alarm that has appeared on the Alarms List as defined in **REQ-OAMP_FM-FUN-007.**

6.2.3.1 Alarm Indexing Parameters

Entries in the Alarms History Alarm Table shall be uniquely indexable using the following parameters:

Parameter Name	Description	Valid values	Traceback
EventTime	It indicates the date and time when the alarm event is raised by the HNB	dateTime	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**
AlarmIdentifier	It identifies an Alarm Entry in the Alarms List. This is the equivalent to the AlarmId identified in 3GPP TS32.111-2 [17]. The AlarmList assigns an identifier, called alarmId, to each AlarmInformation in the AlarmList. An alarmId unambiguously identifies one AlarmInformation in the AlarmList	value greater than or equal to 0	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.3.2 Alarm Content Parameters

The Alarms Event History table shall contain a list of entries which shall contain the parameters identified in 6.2.3.1, the common set of alarm parameters which are identified in section 6.2.1, and the following additional information:

Parameter Name	Description	Valid values	Traceback
NotificationType	It indicates the reason for sending the alarm to the HMS	Can be one of the following : 'NotifyNewAlarm' 'NotifyChangedAlarm' 'NotifyClearedAlarm'	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.4 Expedited and Queued Alarm Handling

The HNB maintains expedited and queued alarm handling lists which contains the alarms raised by the HNB for each alarm that has appeared on the Alarms List which are waiting to be delivered to the HMS within the TR-069 RPC Methods as either Active or Passive Notifications, as defined in **REQ-OAMP_FM-FUN-007**

6.2.4.1 Alarm Indexing Parameters

Entries in the Expedited and Queued Alarm Handling Tables shall be uniquely indexable using the following parameters:

Parameter Name	Description	Valid values	Traceback
EventTime	It indicates the date and time when the alarm event is raised by the HNB	dateTime	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**
AlarmIdentifier	It identifies an Alarm Entry in the Alarms List. This is the equivalent to the AlarmId identified in 3GPP TS32.111-2 [17]. The AlarmList assigns an identifier, called alarmId, to each AlarmInformation in the AlarmList. An alarmId unambiguously identifies one AlarmInformation in the AlarmList	value greater than or equal to 0	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.4.2 Alarm Content Parameters

The Expedited and Queued Event Delivery tablea shall contain a list of entries which shall contain the parameters identified in 6.2.5.1, the common set of alarm parameters which are identified in section 6.2.1, and the following additional information:

Parameter Name	Description	Valid values	Traceback
NotificationType	It indicates the reason for sending the alarm to the HMS	Can be one of the following : 'NotifyNewAlarm' 'NotifyChangedAlarm' 'NotifyClearedAlarm'	**REQ-OAMP_FM-FUN-007 & REQ-OAMP_FM-FUN-004**

6.2.5 Supported Alarms and Reporting Mechanisms

The HNB identifies which Alarm Events can be generated by the HNB and based on the reporting mechanism as defined in **REQ-OAMP_FM-FUN-008** the HNB shall perform the identified actions.

The supported alarm table shall contain a list of entries containing the following information:

Parameter Name	Description	Valid values	Traceback
EventType	It indicates the type of HNB alarm.	See 3GPP TS32.111-2 [17] Annex A for information on pre-defined alarm types from the 3GPP standards and 3GPP TS32.111-6 [18] for supported Event Type values	**REQ-OAMP_FM-FUN-008**
ProbableCause	It qualifies the alarm and provides further information than Alarm Type.	See 3GPP TS32.111-2 [17] Annex B for information on pre-defined Probable Causes from the 3GPP standards and 3GPP TS32.111-6 [18] for supported Probable Cause values. This will be empty if the HNB doesn"t support the distinguishing of different reporting mechanism per level of Probable Cause. The can be set to '*' to indicate the default case if only a subset of Probable Causes are to be contained within the table	**REQ-OAMP_FM-FUN-008**
SpecificProblem	It provides further qualification on the alarm than ProbableCause This identifies the specific alarm over an above the Probable Cause which occurred on the HNB which is vendor ddefined. If the HNB specifies more than one event for a particular combination of alarm type and probable cause, the Specific Problems parameter may be used to uniquely identify the event.	This is vendor defined. This will be empty if the HNB doesn"t support the distinguishing of different reporting mechanisms per level of Specific Problem The can be set to '*' to indicate the default case if only a subset of Specific Problems are to be contained within the table.	**REQ-OAMP_FM-FUN-008**
PerceivedSeverity	It indicates the relative level of urgency for operator attention for an alarm,.	See 3GPP TS32.111-2 [17] for information on pre-defined Perceived Severity and 3GPP TS32.111-6 [18] for supported Perceived Severity values This will be empty if the HNB doesn"t want to distinguish a different reporting mechanism per level of Perceived Severity Can be set to '*' to indicate the default case if only a subset of PerceivedSeverity are to be contained within the table.	**REQ-OAMP_FM-FUN-008**
Reporting Mechanism	Expedited Handling – the HNB connects to the HMS immediately to raise the alarm and logs the alarm in the Alarm History. Queued Handling – the HNB queues the alarm internally pending connection to the HMS, logs the alarmt in the Alarm History,	Indicates the reporting mechanism setting of the alarm. One of: '0 – Expedited' '1 – Queued' '2 – Logged' '3 – Disabled'	**REQ-OAMP_FM-FUN-008 & REQ-OAMP_FM-FUN-009 & REQ-OAMP_FM-**

	and.delivers the alarm on the next connection to the HMS Logged Handling – the HNB does not send the alarm to the HMS and logs the alarm in the Alarm History. Disabled – the HNB does not send the alarm to the HMS and will not log the alarm in the Alarm History.		**FUN-013**

6.2.6 Encoding

6.2.6.1 dateTime

See Broadband Forum TR-069 HNB WAN Management Protocol Amendment 2, Table 9, for a definition of the dateTime and supported values.

6.2.6.2 Event Type

See 3GPP TS32.111-2 [17] Annex A for information on pre-defined alarm types from the 3GPP standards and 3GPP TS32.111-6 [18] for supported alarm type values

6.2.6.3 Probable Cause

See 3GPP TS32.111-2 [17] Annex B for information on pre-defined Probable Causes from the 3GPP standards and 3GPP TS32.111-6 [18] for supported Probable Cause values.

6.2.6.4 PerceivedSeverity

See 3GPP TS32.111-2 [17] for information on pre-defined Perceived Severity from the 3GPP standards and 3GPP TS32.111-6 [18] for supported Perceived Severity values

Although 'Indeterminate' is defined in 3GPP TS32.111-2 [17] it should not be used by the HNB as a Perceived Severity.

6.3 Performance Management

6.3.1 Periodic Performance File Upload

The HNB can be configured to send periodic performance files to a designated File Server as defined in **REQ-OAMP-PM-FUN-003**

The File Management table shall contain the following information:

Parameter Name	**Description**	**Valid values**	**Traceback**
PeriodicUploadEnable	Enables or disables the ability to send HNB information periodically to a designated File Server.	Can be one of the following: FALSE - Disabled TRUE - Enabled	**REQ-OAMP-PM-FUN-003**
URL	URL specifying the destination file location. This argument specifies only the destination file location, and	A valid URL which also indicates the mechanism to tbe used for file transfer	**REQ-OAMP-PM-FUN-003** **REQ-OAMP-**

	does not indicate in any way the name or location of the local file to be uploaded.		**PM-FUN-004**
Username	Username to be used by the HNB to authenticate with the file server.	This string is set to the empty string if no authentication is required.	**REQ-OAMP-PM-FUN-003**
Password	Password to be used by the HNB to authenticate with the file server.	This string is set to the empty string if no authentication is required.	**REQ-OAMP-PM-FUN-003**
PeriodicUploadInterval	The duration in seconds of the interval for which the HNB shall create an Event History File and attempt to upload the file to the designated destination File location if PeriodicUploadEnable is true.	Integer value greater than or equal to 0	**REQ-OAMP-PM-FUN-003**
PeriodicUploadTime	An absolute time reference in UTC to determine when the HNB will initiate the periodic file upload. Each file upload shall occur at this reference time plus or minus an integer multiple of the PeriodicUploadInterval. PeriodicUploadTime is used only to set the 'phase' of the periodic Uploads. The actual value of PeriodicUploadTime can be arbitrarily far into the past or future. For example, if PeriodicUploadInterval is 86400 (a day) and if PeriodicUploadTime is set to UTC midnight on some day (in the past, present, or future) then periodic file uploads will occur every day at UTC midnight. These shall begin on the very next midnight, even if PeriodicUploadTime refers to a day in the future. If absolute time is not available to the HNB, its periodic file upload behavior shall be the same as if the PeriodicUploadTime parameter was set to the Unknown Time value.	An absolute time reference in UTC The Unknown Time value defined as 0001-01-01T00:00:00Z indicates that no particular time reference is specified. That is, the HNB MAY locally choose the time reference, and is required only to adhere to the specified PeriodicUploadInterval.	**REQ-OAMP-PM-FUN-003**

6.3.2 Periodic Statistics

6.3.2.1 Sample Set Management

The HNB contains a collection of sample sets which consist of a collection of periodic statistics for the HNB. Each configured sample set shall contain the following Management Parameters:

Parameter Name	Description	Valid values	Traceback
Enable	Enables or disables collection of periodic statistics for this sample set. When collection of periodic statistics is enabled, any stored samples are discarded, and the first sample interval begins immediately.	True - Enabled False - Disabled	**REQ-OAMP-PM-FUN-001**
Name	The name of this sample set, which uniquely distinguishes each sample set on the HNB.	A value which uniquely distinguishes each defined sample set on the HNB.	**REQ-OAMP-PM-FUN-001**
SampleInterval	The sample interval in *seconds*. Each statistic is measured over this sample interval. The SampleInterval is equivalent to the granularity period referenced in 3GPP TS 32.401 which is the time between the initiation of two successive gatherings of measurement data.	Numerical value in seconds Granularity Period referenced in 3GPP TS 32.401 specifies that the only valid values for the sample interval are 5 minutes, 15 minutes, 30 minutes, 1 hour. The sample interval cannot be modified if the Sample Set Enable Flag is set to False	**REQ-OAMP-PM-FUN-001**
ReportSamples	The number of samples that the HNB will store for each statistic.	Numerical value If the File Upload PeriodicUploadInterval is greater than 0 then the ReportSamples value shall be calculated by dividing the File Upload PeriodicUploadInterval by the SampleInterval value. If the calculation is fractional then the value wil be set to 1.	**REQ-OAMP-PM-FUN-001**
TimeReference	A time used to determine when sample intervals will be completed. Each sample interval shall complete at this reference time plus or minus an integer multiple of *SampleInterval*.	An absolute time reference in UTC If the SampleInterval is set to 5 mins then the mins/secs portions of the Time Reference can be set to one of the following 00/00, 05/00, 10/00, 15/00, 20/00, 25/00, 30/00, 35/00, 40/00, 45/00, 50/00 55/00 If the SampleInterval is set to 15 mins then the mins/secs portions of the Time Reference can be set to one of the following 00/00, 15/00, 30/00, 45/00 If the SampleInterval is 30 mins then the mins/secs portions of the Time Reference can be set to one of the following 00/00, 30/00 If the SampleInterval is 1 hour then the mins/secs portions of the Time Reference can be set to the following 00/00	**REQ-OAMP-PM-FUN-001**

ReportStartTime	The time at which the sample interval for the first stored sample (for each statistic) started.	An absolute time reference in UTC	**REQ-OAMP-PM-FUN-001**
ReportEndTime	The absolute time at which the sample interval for the last stored sample (for each statistic) ended.	An absolute time reference in UTC	**REQ-OAMP-PM-FUN-001**
SampleSeconds	List of time interval values for the sample set indicating the time period between each sample interval.	List of numerical values in seconds	**REQ-OAMP-PM-FUN-001**

6.3.2.2 Sample Set Statistic Parameters

Each Sample set shall include a collection of periodic statistics in a table whose values are to be sampled and each periodic statistic shall contain the following:

Parameter Name	**Description**	**Valid values**	**Traceback**
Enable	Enables or disables the sampling of the specific statistic parameter	True - Enabled False - Disabled	**REQ-OAMP-PM-FUN-001**
Reference	This is the statistic parameter being monitored by the Periodic Statistics mechanism.	A value which uniquely distinguishes the statistic parameter on the HNB.	**REQ-OAMP-PM-FUN-001**

Note: The support of table 6.3.2.1 and 6.3.2.2 is optional by HNB.

6.3.3 PM File Content description

Table below lists all the PM file content items. It also provides a description of the individual items.

PM File Content Description

File Content Item	Description
measDataCollection	See Table 4.1 of [16].
measFileHeader	See Table 4.1 of [16].
measData	See Table 4.1 of [16].
measFileFooter	See Table 4.1 of [16].
fileFormatVersion	See Table 4.1 of [16].
senderName	See Table 4.1 of [16].
senderType	See Table 4.1 of [16].
vendorName	See Table 4.1 of [16].
collectionBeginTime	See Table 4.1 of [16].
neId	See Table 4.1 of [16].
neUserName	See Table 4.1 of [16].
neDistinguishedName	See Table 4.1 of [16].
neSoftwareVersion	See Table 4.1 of [16].
measInfo	See Table 4.1 of [16].
measInfoId	See Table 4.1 of [16].
measTimeStamp	See Table 4.1 of [16].
jobId	See Table 4.1 of [16].
granularityPeriod	See Table 4.1 of [16].
reportingPeriod	See Table 4.1 of [16].
measTypes	See Table 4.1 of [16].
measValues	See Table 4.1 of [16].
measObjInstId	See Table 4.1 of [16].

File Content Item	Description
measResults	See Table 4.1 of [16].
suspectFlag	See Table 4.1 of [16].
timestamp	See Table 4.1 of [16].

Annex A (normative): 3GPP Home Node B Type 1 Data Model

For 3GPP Home Node B Type 1 Data Model the following specification shall be used:

- TR-196 [15].

The following exception shall apply for this release:

- All parameters and objects under TR-196 .FAPService.{i}.AccessMgmt.LocalIPAccess is not applicable for 3GPP and shall not be required to be used nor implemented.

Annex B (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Mar 2009	SP-43	SP-090068	--	--	Presentation to SA for information and approval	1.0.0	8.0.0
Dec 2009	SP-46	SP-090718	001	--	Delete LIPA definition from 32.582	8.0.0	8.1.0
Dec 2009	-	-	-	-	Update to Rel-9 version	8.1.0	9.0.0
Mar 2010	SP-47	SP-100035	002		Clarify 'Home Zone Name' definition	9.0.0	9.1.0
Sep 2010	SP-49	SP-100489	003	--	Reference correction and cleanup	9.1.0	10.0.0
Dec 2010	SP-50	SP-100747	005	--	Adding Service Area For Broadcast parameter - Align with RAN3 TS 25.469	10.0.0	10.1.0
Mar 2011	SP-51	SP-110099	6	-	Add LIPA management parameter definitions	10.1.0	10.2.0
Mar 2011	SP-51	SP-110095	8	1	Add new Home NodeB configuration parameters related to neighbor cell list, coverage edge quality, and noise rise	10.1.0	10.2.0
Mar 2011	SP-51	SP-110095	9	1	Additional HNB configuration parameters related to mobility event configuration	10.1.0	10.2.0
May 2011	SP-52	SP-110288	011	1	Correction of information model for HNB non-IPsec usage-alignment with 33.320	10.2.0	10.3.0
2012-09	-	-	-	-	Update to Rel-11 version (MCC)	10.3.0	**11.0.0**
2014-10	-	-	-	-	Update to Rel-12 version (MCC)	11.0.0	**12.0.0**
2016-01	-	-	-	-	Update to Rel-13 version (MCC)	12.0.0	**13.0.0**

History

Document history		
V13.0.0	February 2016	Publication