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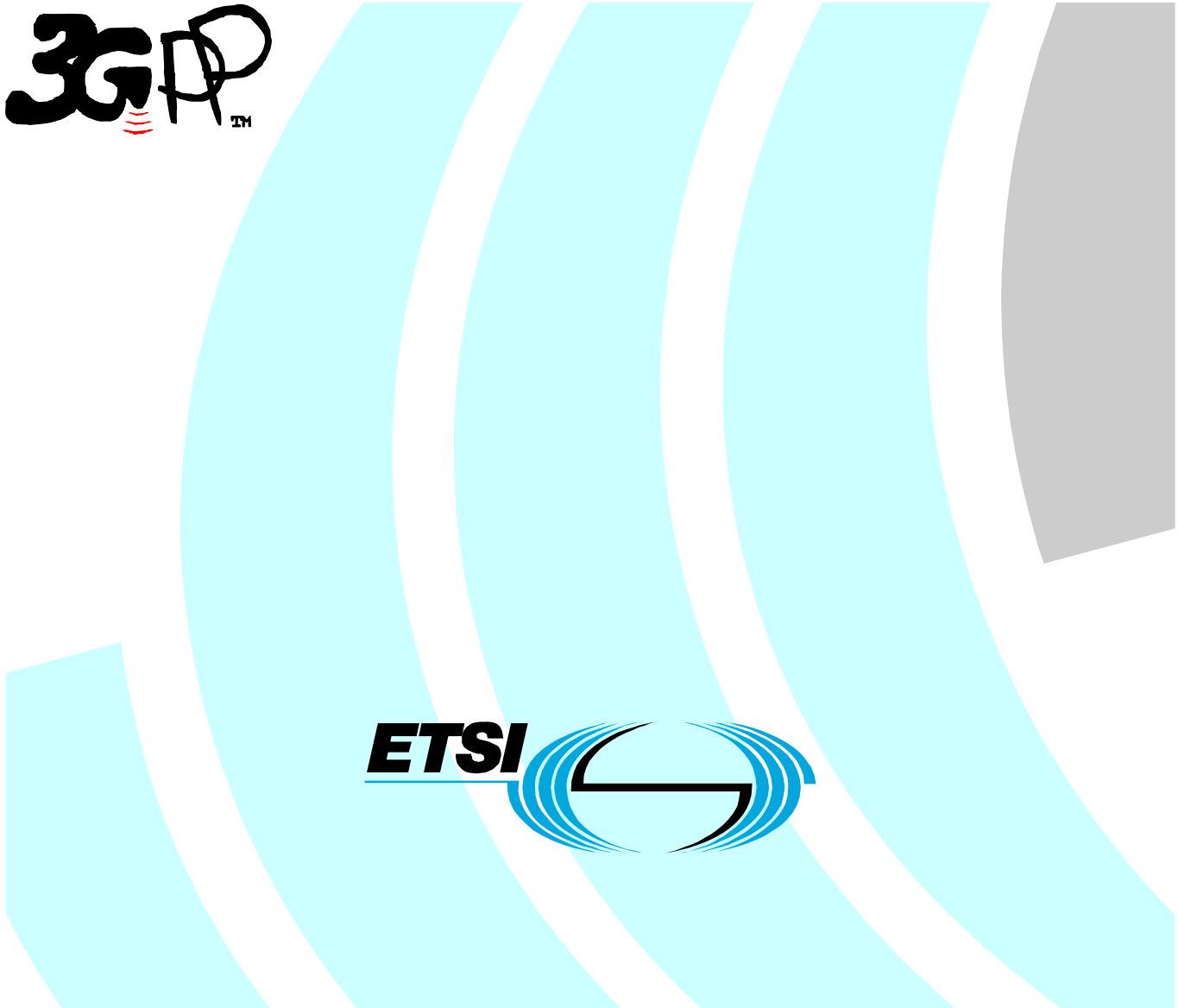
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Service requirements for Home Node B (HNB)
and Home eNode B (HeNB)
(3GPP TS 22.220 version 9.1.1 Release 9)



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Foreword

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Contents

Foreword

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

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Introduction

In Rel-8, 3GPP has specified the basic functionalities for the support of Home Node B (HNB) and Home eNodeB (HeNB). The requirements for these basic functionalities were captured in TS 22.011.

From Rel-9 onward, it has been agreed to consolidate all the requirements from Rel-8 and further requirements for HNB and HeNB in a new TS, which is this specification.

1 Scope

This specification defines the service requirements for the basic functionalities for the support of Home NodeB (HNB) and Home eNodeB (HeNB) – jointly referred to as H(e)NB – and the further functionalities that will enable the mobile operators to provide more advanced services as well as improving the user experience.

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] Void

[3] 3GPP TS 22.246: "Multimedia Broadcast/Multicast Service (MBMS) user services; Stage 1".

[4] 3GPP TS 22.101: "Service Aspects; Service Principles".

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

[6] 3GPP TS 25.304: "User Equipment (UE) procedures in idle mode and procedures for cell reselection in connected mode".

[7] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".

[8] 3GPP TS 22.115: "Service aspects; Charging and billing".

[9] 3GPP TS 22.268: "Public Warning System (PWS) requirements".

[10] 3GPP TS 22.011: "Service accessibility".

3 Definitions, symbols 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 [1].

Closed access mode: H(e)NB provides services only to its associated CSG members.

Home based network: An IP based network in the same premises as, and is connected to, the H(e)NB.

Hybrid access mode: H(e)NB provides services to its associated CSG members and to non-CSG members.

Open access mode: H(e)NB operates as a normal NodeB or eNodeB.

HNB: A HNB is a Customer-premises equipment that connects a 3GPP UE over UTRAN wireless air interface to a mobile operator's network using a broadband IP backhaul.

HeNB: A HeNB is a Customer-premises equipment that connects a 3GPP UE over EUTRAN wireless air interface to a mobile operator's network using a broadband IP backhaul.

H(e)NB Gateway: H(e)NB Gateway is a mobile operator's equipment (usually physically located on mobile operator premises) through which the H(e)NB gets access to mobile operator's core network.

H(e)NB Hosting Party: A Hosting Party has a contractual relationship with the operator, related to one or more H(e)NBs..

NOTE: A H(e)NB Hosting Party is likely to have the billing relationship with the operator. A H(e)NB Hosting Party will typically be the "lead" user in a household, but could be e.g. the corporate IT manager in an enterprise context.

H(e)NB Subsystem: A H(e)NB Subsystem consists of the H(e)NB and the H(e)NB Gateway.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

CSG	Closed Subscriber Group
HNB	Home NodeB
HeNB	Home eNodeB
H(e)NB	HNB and HeNB

4 General

4.1 Description

Access to 3G and evolved 3G (EPS) services may be provided via UTRAN or E-UTRAN cellular base stations belonging to e.g. domestic, business, commercial enterprises. This type of access may be provided by the PLMN by means of HNB and HeNB (jointly referred to as H(e)NB). The H(e)NB provides services either only to a Closed Subscriber Group (CSG) or to other mobile subscribers too. The H(e)NB is connected to the operator core network via an IP access (e.g. ADSL).

5 Common requirements for Home NodeB / Home eNodeB

5.1 HNB and HeNB Installation, identification and location requirements

- H(e)NB shall have a unique equipment identity.
- All the H(e)NBs serving the same CSG share the same unique (within the PLMN) identity called CSG Identity.

NOTE: CSGs of different PLMNs are considered different, even if the PLMNs are indicated to the UE as "equivalent PLMNs" [10].

- It shall be possible to support at least 125 million CSG Identities within a PLMN of an operator.

- The radio transmitter of a H(e)NB shall not be activated until configured and authorised by the operator.
- When installing, provisioning, configuring or re-configuring an H(e)NB the operator shall be able to:
  - verify the H(e)NB's identity.
  - obtain the geographical location of the H(e)NB.

NOTE: The scenario where a H(e)NB is connected to one operator's network and later changed to another operator's network is not required.

- The operator shall be able to determine that the H(e)NB is installed and operated in accordance with all relevant regulatory requirements.
- The operator shall be able to configure the settings of the H(e)NB. In the case where the H(e)NB has detrimental impact on the spectrum usage, the H(e)NB can be set to out-of-service by the operator.
- Installation and activation of a new H(e)NB shall require no reconfiguration of the operators network.
- The impact of H(e)NB on the core network should be minimised.

5.2 OA&M Requirements

- H(e)NB shall support the automatic discovery of an operator's management platform.
- It shall be possible to make use of the operator's management platform to carry out OA&M functions for H(e)NB. The management connection between H(e)NB and the operator's management platform shall be end-to-end secure.
- H(e)NB shall support OA&M procedures which allow the operator to remotely configure the H(e)NB, deploy software upgrades, detect and report changes in RF conditions and perform general OA&M tasks. The OA&M procedures shall be as closely aligned as possible with those that are commonly used in broadband access networks such as defined in TR-069 Amendment 2 [5].
- If the connection between H(e)NB and the rest of the operator network is out of service, then the H(e)NB shall not provide any service and may deactivate the air-interface.

5.3 Access Control requirements

5.3.1 General

- Subject to operator and H(e)NB Hosting Party agreement, the operator shall be able to configure the H(e)NB with open, hybrid or closed access mode.
- When the H(e)NB is configured for open access mode, it shall be possible for the H(e)NB to provide services to subscribers of any PLMN, subject to roaming agreement.
- When the H(e)NB is configured for hybrid access mode, it shall be possible for the H(e)NB to provide services to:
  - its associated CSG members, and
  - subscribers of any PLMN not belonging to its associated CSG, subject to roaming agreement.
- When the H(e)NB is configured for closed access mode, only users that belong to its associated CSG shall be able to obtain services.
- CSG members may include subscriber of any PLMN subject to roaming agreement.

5.3.2 Closed Subscriber Group

- The CSG manager shall be able, under the operator supervision, to add, remove and view CSG membership

NOTE: the interaction of the user with the application that manages the allowed CSG Lists is out of scope of 3GPP (e.g. Web interface).

- The UE shall contain a user controlled list of allowed CSG identities (Allowed CSG List). It shall be possible to store the Allowed CSG List in the USIM. When available, the list on the USIM shall be used.

- In addition to the Allowed CSG list, the UE shall maintain an operator controlled list of allowed CSG identities (Operator CSG list). It shall be possible to store the Operator CSG list in the USIM. When available, the list on the USIM shall be used.

- All CSG cells belonging to a CSG identity not included in the Allowed CSG List or Operator CSG list shall be considered not suitable by the UE ("not suitable" as specified in TS 25.304 [6] and TS 36.304 [7]).

- Each CSG identity shall be associated to a subscriber group which identifies the subscribers allowed to access the CSG.

- When the subscriber group is updated, the affected UE shall be informed accordingly.

- For temporary members, it shall be possible to limit the period of time during which the subscriber is considered a member of a CSG (granted access rights).It shall be possible to configure a time period for each temporary member.

- The time period shall be configurable by the CSG manager and/or the operator operating the CSG and shall span from 1 decihour to several days. Unlimited membership to the CSG is allowed.

- When a CSG is no longer considered available to provide services, except for emergency calls (i.e. due to time period expiry or removal of the CSG membership), it shall be possible to continue the established communication in another cell not belonging to this CSG.

- In hybrid access mode when services cannot be provided to a CSG member due to a shortage of H(e)NB resources it shall be possible to continue the established communication of non-CSG members in another cell.

- In hybrid access mode, to minimise the impact of non-CSG established communication on CSG members, it shall be possible for the network to allow the data rate of established PS communication of non-CSG members to be reduced.

5.4 Display requirements

5.4.1 CSG Type

The CSG Type is an indicator provided by the UE that is configured by the operator.

- It shall be possible for the operator to associate a CSG identity in the UE's Allowed CSG List or the Operator CSG List with a CSG Type. Therefore, it is possible that a CSG identity stored in different UEs may either be associated with the same CSG Type or with different CSG Types.

NOTE: The CSG Type allows, for example, information on the applied billing regime to be given to the user.

- When a UE camps on a cell with a CSG identity that is part of the UE's Allowed CSG List and or the Operator CSG List has an associated CSG Type, a UE that has a display capability shall provide the user with the associated CSG Type. A UE that does not have a display capability may provide the CSG Type by other means, e.g. voice notification.

- If the CSG Type for a CSG identity has not been configured in the UE, the UE may provide the HNB Name instead. In this case, the user is notified that the UE is providing the HNB Name rather than CSG Type.

- It shall be possible to store the CSG Type in the USIM. As an option, the CSG Type may be stored in the ME. If the CSG Type is present in the USIM, a CSG Type stored in the ME shall be ignored.

- The CSG Type shall be stored in text and/or graphical format. When the CSG Type has a text component, the CSG Type text length shall not exceed 12 characters in any language.

5.4.2 HNB Name

Note: HNB Name is a common name referring to HNB/HeNB as defined in TR 21.905 [1].

- It shall be possible for a and for a hybrid cell CSG cell to broadcast a HNB Name in free text format. The UE may display the HNB Name when camping on the cell where it is broadcast. The HNB Name, if broadcasted or stored in the UE, shall be available to the user during manual CSG selection. The HNB Name shall be configurable by the operator or the H(e)NB Hosting Party at the discretion of the operator.

- The HNB Name length shall not exceed 48x8 bits.

NOTE: In order to allow the maximum flexibility in the way the HNB Name is configured in any language, UTF-8 coding should be used; this allows a maximum length of 48 characters coded on one byte, 24 characters on two bytes, 16 characters on 3 bytes down to a minimum of 12 characters if all characters are encoded on 4 bytes.

- The HNB Name may be stored in the USIM. If the HNB Name stored on the USIM is available, it shall take precedence over the broadcasted HNB Name.

- The HNB Name may be stored optionally in the ME. If the HNB Name is present in the USIM, the HNB Name in the ME shall be ignored.

NOTE: The HNB Name is necessary in order to aid the user in choosing the correct CSG identity when performing a manual CSG identity selection.

5.5 Mobility Aspects for Home NodeB and Home eNodeB

5.5.1 PLMN selection

The standard automatic and manual network selection procedures are used to register a UE on a PLMN via a H(e)NB.

5.5.2 Idle-mode operation

In addition to normal cell reselection procedures, the following requirements apply:

- It shall be possible to support idle mode mobility between a H(e)NB cell and other cells and between H(e)NB cells.

- A UE in idle mode shall prefer to select a cell whose CSG Identity is in the UE's Allowed CSG List or in the Operator CSG list, when the cell reselection criteria has been met.

NOTE: All CSG identities on the Allowed CSG list and the Operator CSG list have the same priority.

- The cell reselection procedure should not result in excessive power consumption in the UE.

5.5.3 Connected mode operation

- It shall be possible to support service continuity, including handover, between a H(e)NB cell and other cells and between H(e)NB cells.

5.5.4 Manual CSG selection

The user shall be able to request the UE to perform a scan for available CSGs. When such request is received the UE shall perform a scan of available CSGs, their CSG Identities and their HNB Names. In the UE display, the available CSGs shall be represented by their associated HNB Names and PLMN Name(s). If the HNB Name is not available, the CSG Identity shall be displayed instead.

An indication shall be given to the user as to which of the available CSGs is contained in the Allowed CSG List or Operator CSG list. The available CSGs shall be displayed in the following order:

- The CSGs, whose CSG Identities are contained in the Allowed CSG list.

- The CSGs, whose CSG Identities are contained in the Operator CSG List.

- Any other CSG, whose CSG Identity is not included in the Allowed CSG List or the Operator CSG list.

When the user selects an entry in the list, the UE shall reselect any of the available cells with the CSG chosen by the user.

The UE shall attempt to register to the PLMN.

If the registration attempt is accepted, the UE shall add the CSG identity to the Allowed CSG list unless the cell is a hybrid cell or the identity is already present in the list.

If the registration attempt is rejected and the CSG entry is in the CSG list, that CSG shall be removed from the list.

In addition, when the user manually selects a CSG in a PLMN, which is different from the last registered PLMN, the following behaviour applies:

- The UE shall enter into Manual PLMN Selection state.
- The UE shall attempt to register to the PLMN. This PLMN shall not be stored as the Last Registered PLMN.
- When the UE is no longer in the service area of the CSG the UE shall return to the previous PLMN Selection state.

5.6 Services support

5.6.1 General

- Subject to availability of network resources there shall be no difference in the user experience when using the PLMN provided services via H(e)NB or via NodeB/eNodeB (NB/eNB).

- Depending on operator preferences and in compliance with regulatory requirements ETWS and PWS [9] shall be supported.

- Any additional registration and paging load as a result of H(e)NB deployment shall be minimized.

- Deployment of H(e)NBs and NB/eNBs on the same spectrum should not degrade the performance of UEs receiving service from NB/eNBs.

- Deployment of H(e)NBs and NB/eNBs on the same spectrum should not degrade the NB/eNB’s coverage and capacity.

5.6.2 Emergency services

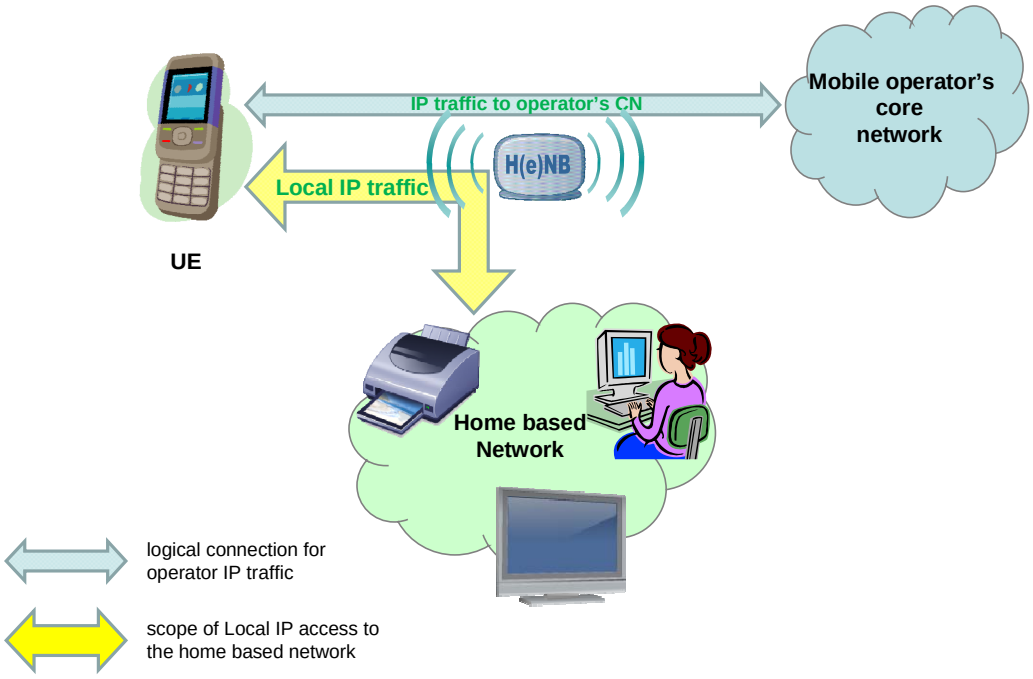
- H(e)NB shall support emergency calls for both CSG and non CSG members as specified in TS 22.101 [4].

- It shall be possible for the operator to provide location information of the UE attempting an emergency call over a H(e)NB. The location information shall be sufficiently accurate to comply with the regulatory requirements that apply to the area where the H(e)NB is deployed.

5.7 Local IP access in the home based network

5.7.1 Description

H(e)NB Local IP Access to the home based network provides access for a directly connected (i.e. using H(e)NB radio access) IP capable UE to other IP capable devices in the home. Traffic for local IP access is expected to not traverse the operator's network except H(e)NB. The home based network itself and the devices in the home based network are not within the scope of 3GPP standardisation.



5.7.2 General requirements

It shall be possible that a H(e)NB supports Local IP Access to the home based network in order to provide access for a directly connected (i.e. using H(e)NB radio access) UE to other IP capable devices in the home. The following requirements apply to support Local IP access to the home based network:

- Simultaneous access from a UE to both the operator's core network and Local IP Access to the home based network shall be supported.
- Local IP Access to the home based network shall be possible without traversing the operator's network except H(e)NB, subject to regulatory requirements.
- Access to local IP through the H(e)NB E-UTRAN/UTRAN-interface shall only be granted to UE with valid subscription.
- Pre-Rel 9 UEs should be able to use Local IP Access to the home based network.
- It shall not be precluded for a device in the home based network to contact a UE via Local IP Access to the home based network.

NOTE: Loss of access to Local IP Access to the home based network is acceptable as a UE moves out of H(e)NB coverage.

- The operator or the H(e)NB Owner, within the limits set by the Operator, shall be able to enable/disable Local IP Access to the home based network per H(e)NB.

- It shall be possible to collect and make available to the operator statistics information (e.g. regular reporting of Local IP traffic volume) for each user on the use of the Local IP Access to the home based network.

- Local IP access to the home based network shall not compromise the security of the operator's network.

5.8 Managed Remote Access to home based network

- The H(e)NB may support remote access for a CSG member to the home based network from a UE via a PLMN in order to provide access to IP capable devices connected to the home based network.

- It shall be possible to restrict the access to the home based network on per-subscriber basis (e.g. some subscribers may have managed access to their home network and others may not).

5.9 Local IP Access to the Internet

It shall be possible that a H(e)NB supports Local IP Access to the Internet to provide access for a directly connected (i.e. using H(e)NB radio access) UE to the Internet. The following requirements apply to support Local IP Access to the Internet:

- It shall be possible to be done without traversing the operator network.

- Simultaneous access from a UE to both the operator's core network and Local IP Access to the Internet shall be supported.

- The operator or the H(e)NB Owner, within the limits set by the operator, shall be able to enable/disable Local IP Access to the Internet per H(e)NB.

- It shall be possible to collect and make available to the operator statistics information (e.g. regular reporting of Local IP traffic volume) for each user on the use of the Local IP Access to the Internet.

- Local IP access to the internet shall not compromise the security of the operator's network.

NOTE: When a UE is using the Local IP Access to the Internet, it is assumed that the H(e) NB does not provide any support to LI.

5.10 USIM and H(e)NB

Optionally, the H(e)NB may support identification and authentication of the H(e)NB Hosting Party by means of a USIM application.

The USIM application may also contain information for the initial provisioning (e.g. the O&M system contact).

6 Requirements for Home NodeB

6.1 Access Control

- It shall be possible to control access (i.e. accept and reject connection requests) of pre-Release 8 UEs.

NOTE: Such mechanisms may be different for those used to access control a Release 8 UE.

- The operation of a HNB shall not adversely impact the performances of a pre-Release 8 UEs operating in the area where the HNB is active and vice versa.

- The total bandwidth from the HNB towards the network for 4 simultaneous TS11 or TS12, including signalling and overhead, shall not exceed 200 kbps

6.2 IMS Interworking

The HNB Subsystem may provide IMS interworking to/from a CS capable UE. Such a HNB Subsystem allows a UE to use CS connectivity to the HNB whilst connectivity between the HNB and the core network is via IMS. The following requirements apply to support IMS interworking:

- It shall be possible to use the IMS rather than the CS domain for services supported in IMS that are equivalent to corresponding CS services (e.g. voice service in IMS Multimedia Telephony).

NOTE: Operators who do not wish to provide CS connectivity to the core network through the HNB need to ensure that none of their subscribers who can connect to such HNBs are provisioned with any TeleServices that do not have an IMS equivalent service (e.g. CS Data, CS Fax).

- It shall be subject to operator policy whether a supported service is delivered to the Core Network via the CS domain or via the IMS.
- It shall be transparent to the UE whether any IMS interworking takes place for a supported service.
- The support of IMS interworking shall not impact the support of existing IMS services.
- It shall be possible to support Pre-Rel 9 UEs
- It shall be possible using OA&M procedures to remotely update a HNB to make it capable of IMS interworking (e.g. by remotely downloading a software upgrade).
- The mobility requirements as specified in section 5.5 apply.

7 Requirements for Home eNodeB

7.1 Services support

7.1.1 Television Service

- It shall be possible to support Television services [3].
- If Television service is supported, it shall be possible for an operator to configure the MBMS Television service so that the typical switching time between different content streams, from the end user's perspective, does not exceed 2 seconds [3].

8 Quality of Service

8.1 General

- It shall be possible to provide information of the QoS treatment used for traffic traversing the H(e)NB to the H(e)NB broadband access mechanism.

8.2 Admission Control

- It shall be possible to perform admission control based on the available H(e)NB backhaul resource.
- It shall be possible for the network to set different criteria for access control in a hybrid cell for CSG and non-CSG members.

9 Security and privacy

9.1 General

- The use of H(e)NB shall not compromise the security of any PLMN or broadband access network.

9.2 Security Requirements

- The H(e)NB shall provide a high level of security, equivalent or better than Rel-8 3GPP systems.
- Security policy shall be under the control of the H(e)NB network operator.
- The H(e)NB shall not impact the security of the UE.

9.3 Privacy

- The H(e)NB shall not compromise user privacy for UEs that are using the H(e)NB, including communication confidentiality, location privacy and identity protection.

10 Charging Aspects

NOTE: Refer to charging requirements in TS 22.115 [8]

Annex A (informative): Use cases

These use cases do not imply any requirement beyond that which is contained in the normative part of this TS.

Usecase-1: H(e)NB Mobility

User A connects to the H(e)NB via mobile device. User A should be able to move around within the H(e)NB coverage in the home or enterprise. User should also be able to invoke additional services based on user policy and operator policy.

Usecase-2: H(e)NB Guest Users

User A and User B are subscribers of Operator 1 and Operator 2 respectively. User A visits User B in his home and User B allows User A to use H(e)NB in User B's home. User A should be able to access all the services he is subscribed to from Operator 1 based on the policies set by User B and operator 2. Operator 1 and Operator 2 have roaming agreement.

Usecase-3: HNB/HeNB – NB/eNB Handovers

User A subcribes to cellular services of Operator 1 and is authorised to access a HNB/HeNB from same or other operator. User A starts service in the H(e)NB coverage and continues moving into a cellular network. Similarly User A starts service in cellular network and continues moving into H(e)NB coverage. User A does not see any impact on services due to mobility in both cases.

Usecase-4: Access to Home based services

User A connects to the H(e)NB via mobile device. User A should be able to access home based services (e.g. local digital media servers and digital media players) from the mobile device. Other users may access the home based services subject to H(e)NB owner policies.

Usecase-5: Media Transfer

User A connects to the H(e)NB via mobile device. User A starts viewing video streaming service on the mobile device. User A then wants to continue viewing the video on a different screen for better viewing. User A should be able to transfer the session to a high-definition TV or PC connected via broadband connection. User A should also be able to transfer the session from the TV or PC to a mobile device and continue the session in the H(e)NB coverage and also in the cellular network.

Usecase-6: IMS capable HNB used for coverage purposes

In this scenario, the reason for an operator to introduce IMS capable HNB is to offload voice traffic from his existing CS core network to IMS. However, as in this scenario the usage of 'legacy' services (e.g. CS Fax) is still assumed - only the utilization of network resources is to be changed - it is requested that IMS capable HNB provides all the services/ capabilities that are provided through regular Node B from the beginning.

Usecase-7: IMS capable HNB for a new business model

This scenario starts with a view that HNB is located in the user's residence and the UE is the preferred equipment to interact with home services/ applications. New business can be expected there. In this scenario, some of the CS services/ capabilities that are provided through regular Node B might not be needed or might be provided in a later step if the operator could instead offer attractive new services under IMS capable HNB only.

Usecase-8: IMS capable HNB for Green field operator

This scenario expects new players to get into the mobile market. In this scenario, they would aim to deploy cost efficient and future proof infrastructure, i.e. no CS domain but IMS/PS domain only, regardless of whether or not UEs have IMS client on them.

Usecase-9: Hybrid access mode

In order to improve the coverage in a shopping mall, H(e)NBs are deployed. The shopping mall owner may have been provided a special deal by the network operator where the employees of the shopping mall will get preferential charging rates and priority access when accessing services via these H(e)NBs. In exchange, the shopping mall owner allows the public to use the H(e)NBs to access the normal network operator services. The H(e)NB owner should not need to manage the public access and the public should not need to do anything special in order to get services on the H(e)NB.

Use case-10: Open access mode

Typically to enhance coverage or capacity of an operator's public network, for example in railway stations, airports, stadiums, etc, taking benefit of the H(e)NBs additional functionality (e.g. uncoordinated deployment).

Usecase-11: HNB interacts with Home network

User A connects with his UE (possibly a pre-Rel 9 UE) to the HNB with IMS Interworking and Local IP Access to the home network capabilities. The home network accommodates home network devices (Intercom, Door lock, Network radio, Photo server, etc.) and the HNB. User A should be able to communicate with a visitor at Intercom via the mobile device.

Usecase-12: HNB interacts with IP-PABX

User A connects with his UE (possibly a pre-Rel 9 UE) to a HNB with IMS Interworking and Local IP Access to the home network capabilities at an office. The HNB might be deployed and interconnect with an enterprise extension telephone system (e.g. SIP based PABX). User A should be able to make/receive an extension call to/from fixed line UE under SIP based PABX. In addition, User A with the mobile device and User B with computers should be able to access a common groupware server at the office and share the same information such as schedule, emails, etc.

Usecase-13: Electronic customer guide in shopping centre, using Local IP access

A department store or shopping centre provides electronic shopping guide. When user A enters into a shopping centre where a shopping centre H(e)NB is installed, an invitation indication shows up on his mobile device which he accepts. This allows him access to the centre's H(e)NB. Subsequently, he accesses the centre's customer service server, which is only accessible through the H(e)NB where he uploads his shopping list. The customer service server responds a list of sale items of similar nature. He accepts or declines the various choices and the final shopping list is downloaded to his UE. While user A is waiting, User A watches free TV show or advertisement provided through the H(e)NB for the shop customer. While in the shopping centre the user has simultaneous access to operator's and local shopping centre services.

Usecase-14: Local IP Access

The user has the subscription through home operator H. The user is served by the home operator H. The UE obtains IP connectivity in both a local gateway to obtain local connectivity for IMS services (e.g. as in local IP access or for enterprise scenarios with call to other terminals in the PABX area) and to a home gateway (as in normal connectivity for IMS services). For IMS sessions to be routed to e.g. remote terminals, the traffic is sent through the connectivity with the home gateway, whereas for IMS session that can be routed locally (e.g. based on local phone number), the traffic is sent through the connectivity with the local gateway through the local IP access. Whether the UE routes a specific IMS session through the local access or the home gateway can be controlled on a per session basis. Also, the UE may obtain local connectivity by default (e.g. based on static configuration by the operator) or dynamically based on indication by the IMS server.

Usecase-15:

Subscriber A from Network A owns HNB/HeNB A because of no macro network coverage .
Guest user B from Network B visits subscriber A's house. Subscriber A wants to allow guest user B access to HNB/HeNB A while the guest user B is visiting.

Usecase-16:

Corporation A has sites in country A, B and C.
Corporation A has employees from country A and B.
Employees in country A are from Operator AA and AB.
Employees in country B are from Operator B.
Corporation A has HNB/HeNB in country A from Operator AA and country B from Operator B.
Employees from country A and B are allowed access to HNB/HeNBs in country A and B.

Annex B (informative): Clarification of H(e)NB Access Modes

Table B.1 illustrates the different H(e)NB Access Modes and what access is allowed for UEs of any release depending on whether the UE is allowed access to the CSG.

In Table B.1 “Access” means “Access to services”.

“Preferential access” means the user will get preferential access to the cell.

Table B.1: H(e)NB access for UEs of any release

	H(e)NB Access Mode		
	Open	Closed	Hybrid
UE allowed access to CSG	Access	Access	Preferential Access
UE not allowed access to CSG	Access	No Access	Access

NOTE: Pre Release 8 UEs can only access HNBs

Annex C (informative): Overview of identifiers and names.

Table C.1: Overview of identifiers and names

item	*used for*	*associated with*	*permanently stored in*	*distribution method*	*displayed to user*	*comment*
H(e)NB equipment identity	• administrative purposes	H(e)NB (physical entity)	• H(e)NB • administration database of the operator	O&M procedures	NO	not known to UE, therefore not useable by UE to identify a H(e)NB
CSG identity	• automatic and manual CSG selection • access control to CSG cells	• a CSG, i.e. a group of users (UEs). • One or More H(e)NBs (CSG cells)	• H(e)NB • administration database of the operator • Allowed CSG List in the UE if user (UE) is member of CSG (USIM entry takes precedence over ME)	• provided by O&M to H(e)NBs • provided by home PLMN to UEs (the Home PLMN and Visited PLMN should synchronize this information) o Provided to the UE by OMA DM when stored in the ME, o Provided to the UE by OTA when stored in the USIM • Provided to UE via manual CSG	YES, if HNB Name is not available	A CSG identity is unique within a PLMN. In the UE a CSG ID, together with a network identifier, identifies a CSG globally uniquely.

				• selection • broadcasted by H(e)NB		
HNB name (optional)	for supporting (ease of use) manual CSG selection, display-ing a "friendly" name to the user	CSG identity (relationship: m CSG ID : n HNB names)	• H(e)NB • administration database of the operator • UE	• Provided by O&M to H(e)NBs • Optionally stored by user in UE • broadcasted by H(e)NB	YES during manual selection, OPTIONAL during normal operation. (USIM entry takes precedence over broadcast and ME)	If a HNB name is stored in the UE it needs to be associated with a CSG identity. Initial configuration in the UE may be done by the operator (e.g. at point of sale). Later, a HNB name is implicitly associated to the current CSG identity by the UE when the user stores the HNB name
CSG Type	for additional information (on e.g. billing mode) to the user when camping on a CSG cell (i.e. after CSG has been selected)	CSG identity (relationship: n CSG ID : 1 CSG Type)	• administration database of the operator • UE	• provided by initial UE configuration, OTA and device management to UEs	YES, if CSG is in Allowed CSG List. (USIM entry takes precedence over ME)	UE needs to associate a CSG Type with a CSG identity Association done by operator (the Home PLMN and Visited PLMN should synchronize this information)

Annex D (informative): Change history

TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	WI
SP-43	SP-090087	-	22.220	-	-	-	-	Approved by SA plenary.	2.0.0	9.0.0	EHNB
SP-44	SP-090373	S1-091273	22.220	0002	1	Rel-9	F	Clarification on the displaying of the H(e)NB name during manual CSG selection	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091164	22.220	0004	4	Rel-9	B	Optional USIM support in H(e)NB	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091387	22.220	0011	3	Rel-9	F	Clarification on Local IP Access Requirements	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091083	22.220	0015	-	Rel-9	F	Remove VPLMN CSG support for Rel9	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091382	22.220	0016	2	Rel-9	F	Clarification on the requirement of session diversion.	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091279	22.220	0019	2	Rel-9	F	Allowed CSG list management for hybrid cells	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091158	22.220	0023	3	Rel-9	D	Clarification of H(e)NB Owner / Hosting Party	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091159	22.220	0024	2	Rel-9	D	H(e)NB Operator Change	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091383	22.220	0025	2	Rel-9	F	Clarification of the terminology about H(e)NB access modes	9.0.0	9.1.0	EHNB
SP-44	SP-090373	S1-091274	22.220	0026	1	Rel-9	F	Minor corrections for clarification	9.0.0	9.1.0	EHNB
SP-44	SP-090374	S1-091260	22.220	0005	1	Rel-9	F	Rel 8 Rel 9 CSG lists alignment (approved at SA#44 but not implemented in 9.1.0)	9.1.0	9.1.1	EHNB

History

Document history		
V9.1.1	July 2009	Publication