**3GPP TSG-RAN WG2 Meeting #113 Electronic *R2-2101989***

**Elbonia, 25 January – 05 February 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.300** | **CR** | **1333** | **rev** | **1** | **Current version:** | **16.3.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Inclusive language in 36.300 | | | | | | | | | |
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| ***Source to WG:*** | Nokia (Rapporteur) | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
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| ***Work item code:*** | TEI17 | | | | |  | ***Date:*** | | | 2021-01-15 |
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| ***Category:*** | **D** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | TSG SA# 90-e has endorsed a proposal to use more inclusive and neutral language in all 3GPP specifications [[SP-201042](https://www.3gpp.org/ftp/tsg_sa/TSG_SA/TSGs_90E_Electronic/Docs/SP-201042.zip)]. TSG SA#90-e has also approved a CR that introduces an Annex into the 3GPP TR 21.801 "Specification drafting rules" that lists all non-inclusive terminology to be replaced [[SP-201142](https://www.3gpp.org/ftp/tsg_sa/TSG_SA/TSGs_90E_Electronic/Docs/SP-201142.zip)]. The corresponding terms are problematic:   1. White list and whitelist 2. Black list and blacklist | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Explain the corresponding changes:   1. Black list is changed to Exclude List and blacklist to exclude-list for measurements 2. Allowed CSG list is replaced with Permitted CSG list   **Impact analysis**  This is an editorial CR. | | | | | | | | |
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| ***Consequences if not approved:*** | | Problematic terms remain in the specification | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 4.9.3.3, 10.1.1.2, 10.1.2.0, 10.5.1.1, 10.5.1.1, 10.7.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS36.331 CRXX, TS36.304 CRYY**,** TS36.306 CRZZ | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
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| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

*First Modified Subclause*

## 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

**Access Control:** the process that checks whether a UE is allowed to access and to be granted services in a closed cell.

**Aerial UE communication**: functionality enabling Aerial UE function as defined in 23.17.

**Anchor carrier**: in NB-IoT, a carrier where the UE assumes that NPSS/NSSS/NPBCH/SIB-NB for FDD or NPSS/NSSS/NPBCH for TDD are transmitted.

**Carrier frequency**: center frequency of the cell.

**Cell:** combination of downlink and optionally uplink resources. The linking between the carrier frequency of the downlink resources and the carrier frequency of the uplink resources is indicated in the system information transmitted on the downlink resources.

**Cell Group**: in dual connectivity, a group of serving cells associated with either the MeNB or the SeNB.

**CHO candidate cell: a** candidate cell for CHO, for which UE has been configured with a CHO configuration.

**Conditional Handover (CHO): a** handover procedure that is executed only when execution condition(s) are met.

**Control plane CIoT 5GS Optimisation**: Enables support of efficient transport of user data (IP, Ethernet and Unstructured) or SMS messages over control plane via the AMF without triggering user-plane resource establishment, as defined in TS 24.501 [91]. In the context of this specification, a NB-IoT UE that only supports Control plane CIoT 5GS Optimisation is a UE that does not support User plane CIoT 5GS Optimisation and NG-U data transfer but may support other CIoT 5GS Optimisations.

**Control plane CIoT EPS optimisation**: Enables support of efficient transport of user data (IP, non-IP or SMS) over control plane via the MME without triggering data radio bearer establishment, as defined in TS 24.301 [20]. In the context of this specification, a NB-IoT UE that only supports Control plane CIoT EPS optimisation is a UE that does not support User plane CIoT EPS optimisation and S1-U data transfer but may support other CIoT EPS optimisations.

**CSG Cell:** a cell broadcasting a CSG indicator set to true and a specific CSG identity.

**CSG ID Validation:** the process that checks whether the CSG ID received via handover messages is the same as the one broadcast by the target E-UTRAN.

**CSG member cell:** a cell broadcasting the identity of the selected PLMN, registered PLMN or equivalent PLMN and for which the Permitted CSG list of the UE includes an entry comprising cell's CSG ID and the respective PLMN identity.

**DAPS Handover:** a handover procedure that maintains the source eNB connection after reception of RRC message for handover and until releasing the source cell after successful random access to the target eNB.

**DCN-ID:** DCN identity identifies a specific dedicated core network (DCN).

**Dual Connectivity**: mode of operation of a UE in RRC\_CONNECTED, configured with a Master Cell Group and a Secondary Cell Group.

**Early Data Forwarding**: data forwarding that is initiated before the UE executes the handover.

**en-gNB**: as defined in TS 37.340 [76].

**E-RAB:** an E-RAB uniquely identifies the concatenation of an S1 Bearer and the corresponding Data Radio Bearer. When an E-RAB exists, there is a one-to-one mapping between this E-RAB and an EPS bearer of the Non Access Stratum as defined in [17].

**Frequency layer**: set of cells with the same carrier frequency.

**FeMBMS:** further enhanced multimedia broadcast multicast service.

**FeMBMS/Unicast-mixed cell**: cell supporting MBMS transmission and unicast transmission as SCell.

**Handover**: procedure that changes the serving cell of a UE in RRC\_CONNECTED.

**Hybrid cell**: a cell broadcasting a CSG indicator set to false and a specific CSG identity. This cell is accessible as a CSG cell by UEs which are members of the CSG and as a normal cell by all other UEs.

**Late Data Forwarding**: data forwarding that is initiated after the source eNB knows that the UE has successfully accessed a target eNB.

**Local Home Network**: as defined in TS 23.401 [17].

**LTE bearer**: in LTE-WLAN Aggregation, a bearer whose radio protocols are located in the eNB only to use eNB radio resources only.

**LWA bearer**: in LTE-WLAN Aggregation, a bearer whose radio protocols are located in both the eNB and the WLAN to use both eNB and WLAN resources.

**LWAAP PDU**: in LTE-WLAN Aggregation, a PDU with DRB ID generated by LWAAP entity for transmission over WLAN.

**Make-Before-Break HO/SeNB change**: maintaining source eNB/SeNB connection after reception of RRC message for handover or change of SeNB before the initial uplink transmission to the target eNB during handover or change of SeNB.

**Master Cell Group**: in dual connectivity, a group of serving cells associated with the MeNB, comprising of the PCell and optionally one or more SCells.

**Master eNB**: in dual connectivity, the eNB which terminates at least S1-MME.

**MBMS-dedicated cell**: cell dedicated to MBMS transmission.

**MBMS/Unicast-mixed cell**: cell supporting both unicast and MBMS transmissions.

**MCG bearer**: in dual connectivity, a bearer whose radio protocols are only located in the MeNB to use MeNB resources only.

**Membership Verification:** the process that checks whether a UE is a member or non-member of a hybrid cell.

**Multi-Connectivity**: Mode of operation whereby a multiple Rx/Tx UE in the connected mode is configured to utilise radio resources amongst E-UTRA and/or NR provided by multiple distinct schedulers connected via non-ideal backhaul.

**NB-IoT:** NB-IoT allows access to network services via E-UTRA with a channel bandwidth limited to 200 kHz.

**NB-IoT UE**: a UE that uses NB-IoT.

**ng-eNB:** node providing E-UTRA user plane and control plane protocol terminations towards the UE, and connected via the NG interface to the 5GC.

**Non-anchor carrier**: in NB-IoT, a carrier where the UE does not assume that NPSS/NSSS/NPBCH/SIB-NB for FDD or NPSS/NSSS/NPBCH for TDD are transmitted.

**NR:** NR radio access

**NR sidelink communication**: AS functionality enabling at least V2X Communication as defined in TS 23.287 [93], between two or more nearby UEs, using NR technology but not traversing any network node.

**PLMN ID Check:** the process that checks whether a PLMN ID is the RPLMN identity or an EPLMN identity of the UE.

**Power saving mode**: mode configured and controlled by NAS that allows the UE to reduce its power consumption, as defined in TS 24.301 [20], TS 23.401 [17], TS 23.682 [57].

**Primary PUCCH group:** a group of serving cells including PCell whose PUCCH signalling is associated with the PUCCH on PCell.

**Primary Timing Advance Group**: Timing Advance Group containing the PCell. In this specification, Primary Timing Advance Group refers also to Timing Advance Group containing the PSCell unless explicitly stated otherwise.

**ProSe-enabled Public Safety UE:** a UE that the HPLMN has configured to be authorized for Public Safety use, and which is ProSe-enabled and supports ProSe procedures and capabilities specific to Public Safety. The UE may, but need not, have a USIM with one of the special access classes {12, 13, 14}.

**ProSe Per-Packet Priority:** a scalar value associated with a protocol data unit that defines the priority handling to be applied for transmission of that protocol data unit.

**ProSe UE-to-Network Relay:** a UE that provides functionality to support connectivity to the network for Remote UE(s).

**ProSe UE-to-Network Relay Selection:** Process of identifying a potential ProSe UE-to Network Relay, which can be used for connectivity services (e.g. to communicate with a PDN).

**ProSe UE-to-Network Relay Reselection:** process of changing previously selected ProSe UE-to-Network Relay and identifying potential a new ProSe UE-to-Network Relay, which can be be used for connectivity services (e.g. to communicate with PDN).

**Public Safety ProSe Carrier:** carrier frequency for public safety sidelink communication and public safety sidelink discovery.

**PUCCH group:** either primary PUCCH group or a secondary PUCCH group.

**PUCCH SCell:** a Secondary Cell configured with PUCCH.

**RACH-less HO/SeNB change**: skipping random access procedure during handover or change of SeNB.

**Receive Only Mode:** See TS 23.246 [48].

**Remote UE:** a ProSe-enabled Public Safety UE, that communicates with a PDN via a ProSe UE-to-Network Relay.

**SCG bearer**: in dual connectivity, a bearer whose radio protocols are only located in the SeNB to use SeNB resources.

**Secondary Cell Group**: in dual connectivity, a group of serving cells associated with the SeNB, comprising of PSCell and optionally one or more SCells.

**Secondary eNB**: in dual connectivity, the eNB that is providing additional radio resources for the UE but is not the Master eNB.

**Secondary PUCCH group:** a group of SCells whose PUCCH signalling is associated with the PUCCH on the PUCCH SCell.

**Secondary Timing Advance Group**: Timing Advance Group containing neither the PCell nor PSCell.

**Short Processing Time**: For 1 ms TTI length, the operation with short processing time in UL data transmission and DL data reception.

**Short TTI:** TTI length based on a slot or a subslot.

**Sidelink**: UE to UE interface for sidelink communication, V2X sidelink communication and sidelink discovery. The Sidelink corresponds to the PC5 interface as defined in TS 23.303 [62].

**Sidelink Control period**: period over which resources are allocated in a cell for sidelink control information and sidelink data transmissions. The Sidelink Control period corresponds to the PSCCH period as defined in TS 36.213 [6].

**Sidelink communication**: AS functionality enabling ProSe Direct Communication as defined in TS 23.303 [62], between two or more nearby UEs, using E-UTRA technology but not traversing any network node. In this version, the terminology "sidelink communication" without "V2X" prefix only concerns PS unless specifically stated otherwise.

**Sidelink discovery**: AS functionality enabling ProSe Direct Discovery as defined in TS 23.303 [62], using E-UTRA technology but not traversing any network node.

**Split bearer**: in dual connectivity, a bearer whose radio protocols are located in both the MeNB and the SeNB to use both MeNB and SeNB resources.

**Split LWA bearer**: in LTE-WLAN Aggregation, a bearer whose radio protocols are located in both the eNB and the WLAN to use both eNB and WLAN radio resources.

**Switched LWA bearer**: in LTE-WLAN Aggregation, a bearer whose radio protocols are located in both the eNB and the WLAN but uses WLAN radio resources only.

**Timing Advance Group**: a group of serving cells that is configured by RRC and that, for the cells with an UL configured, use the same timing reference cell and the same Timing Advance value.

**User plane CIoT 5GS Optimisation**: Enables support for change from 5GMM-IDLE mode to 5GMM-CONNECTED mode without the need for using the Service Request procedure, as defined in TS 24.501 [91].

**User plane CIoT EPS optimisation**: Enables support for change from EMM-IDLE mode to EMM-CONNECTED mode without the need for using the Service Request procedure, as defined in TS 24.301 [20].

**V2X sidelink communication**: AS functionality enabling V2X Communication as defined in TS 23.285 [72], between nearby UEs, using E-UTRA technology but not traversing any network node.

**WLAN Termination**: the logical node that terminates the Xw interface on the WLAN side.

*Next Modified Subclause*

#### 4.9.3.3 Support of HeNBs for Dual Connectivity

The following scenarios for Dual Connectivity involving HeNBs are supported as listed in Table 4.9.3.3-1.

Table 4.9.3.3-1: Support of HeNBs for Dual Connectivity

|  |  |
| --- | --- |
| MeNB | SeNB |
| eNB | open access HeNB |
| eNB | hybrid access HeNB |

Membership Verification for the hybrid access HeNB is performed between the MeNB and the MME and is based on membership status information reported by the UE and the CSG ID.

If the cell served by the SeNB is a shared hybrid cell, the UE reports the subset of the broadcasted PLMN identities passing PLMN ID check and the Permitted CSG list of the UE includes an entry comprising of the concerned PLMN identity and the CSG ID broadcast by the cell served by the SeNB. The MeNB performs PLMN ID check for the PLMNs reported by the UE and selects one if multiple pass the PLMN ID check. If the cell served by the SeNB belongs to a different PLMN than the PLMN serving for the UE in the MeNB, the information provided to the MME for membership verification needs to contain the PLMN-ID of the hybrid cell served by the SeNB as well. Finally the MME verifies the CSG membership according to the received CSG ID, the selected PLMN ID and stored subscription CSG information of the UE.

In case the UE has been admitted with SCG resources configured with the split bearer option from a hybrid HeNB and a SeNB Change is performed within the coverage area of the MeNB towards another hybrid HeNB which has the same CSG ID as the first one, the MeNB may re-use the result of the membership verification performed for the first HeNB.

*Next Modified Subclause*

#### 10.1.1.2 Cell reselection

A UE in RRC\_IDLE performs cell reselection. The principles of the procedure are the following:

- The UE makes measurements of attributes of the serving and neighbour cells to enable the reselection process:

- There is no need to indicate neighbouring cells in the serving cell system information to enable the UE to search and measure a cell i.e. E-UTRAN relies on the UE to detect the neighbouring cells;

- For the search and measurement of inter-frequency neighbouring cells, only the carrier frequencies need to be indicated;

- Measurements may be omitted if the serving cell attribute fulfils particular search or measurement criteria.

- Cell reselection identifies the cell that the UE should camp on. It is based on cell reselection criteria which involves measurements of the serving and neighbour cells, except for NB-IoT:

- Intra-frequency reselection is based on ranking of cells;

- Inter-frequency reselection is based on absolute priorities where a UE tries to camp on the highest priority frequency available. Absolute priorities for reselection are provided only by the RPLMN and are valid only within the RPLMN; priorities are given by the system information and are valid for all UEs in a cell, specific priorities per UE can be signalled in the RRC Connection Release message. A validity time can be associated with UE specific priorities.

- Inter-frequency E-UTRAN reselection can be also based on redistribution priority. A UE may be redistributed to a redistribution target (frequency or cell) and will consider the redistribution target (frequency or cell) as having the highest priority (i.e. higher than any network configured priority) for a period of time (i.e. validity timer). The redistribution parameters are defined in system information and can be triggered by Paging.

- For inter-frequency neighbouring cells, it is possible to indicate layer-specific cell reselection parameters (e.g., layer specific offset). These parameters are common to all neighbouring cells on a frequency;

- An NCL can be provided by the serving cell to handle specific cases for intra- and inter-frequency neighbouring cells. This NCL contains cell specific cell reselection parameters (e.g., cell specific offset) for specific neighbouring cells;

- Exclude lists can be provided to prevent the UE from reselecting to specific intra- and inter-frequency neighbouring cells;

- Cell reselection can be speed dependent (speed detection based on UTRAN solution);

- Cell reselection parameters are applicable for all UEs in a cell, but it is possible to configure specific reselection parameters per UE group or per UE.

For NB-IoT, cell reselection identifies the cell that the UE should camp on. It is based on cell reselection criteria which involve measurements of the serving and neighbour cells as follows:

- Intra-frequency reselection is based on ranking of cells (potentially with cell specific offsets);

- Inter-frequency reselection is based on ranking of frequencies (potentially with frequency specific offsets);

- Blind redirection supported for load balancing (potentially with a dedicated offset for the frequency where the UE is redirected to).

Cell access restrictions apply as for UTRAN, which consist of access class (AC) barring and cell reservation (e.g. for cells "reserved for operator use") applicable for mobiles in RRC\_IDLE mode. For NB-IoT UEs, BL UEs or UEs in enhanced coverage, E-UTRAN can also restrict access to the cell based on the level of coverage enhancements that would be needed by the UE.

*Next Modified Subclause*

#### 10.1.2.0 General

The Intra-E-UTRAN-Access Mobility Support for UEs in ECM-CONNECTED/CM-CONNECTED handles all necessary steps for

- Handover procedures, like processes that precede the final HO decision on the source network side (control and evaluation of UE and eNB measurements taking into account certain UE specific roaming and access restrictions), preparation of resources on the target network side, commanding the UE to the new radio resources and finally releasing resources on the (old) source network side. It contains mechanisms to transfer context data between evolved nodes, and to update node relations on C-plane and U-plane. A CHO (for more details, see 10.1.2.1a) configuration may be also included in the handover procedures.

- DC specific procedures, like processes that precede the final decision for a certain configuration of a SeNB (control and evaluation of UE and network side measurements), preparation of respective resources on the network side of a SeNB, commanding the UE to the new radio resources configuration for a second connection and, if applicable, finally releasing resources of a SeNB. It contains mechanisms to transfer UE- and bearer-context data between involved nodes, and to update node relations on C-plane and U-plane.

In E-UTRAN RRC\_CONNECTED state, network-controlled UE-assisted handovers and DC specific activities are performed and various DRX cycles are supported.

The UE makes measurements of attributes of the serving and neighbour cells to enable the process:

- There is no need to indicate neighbouring cells to enable the UE to search and measure a cell i.e. E-UTRAN relies on the UE to detect the neighbouring cells;

- For the search and measurement of inter-frequency neighbouring cells, at least the carrier frequencies need to be indicated;

- The E-UTRAN signals reporting criteria for event-triggered and periodical reporting;

- An NCL can be provided by the serving cell by RRC dedicated signalling to handle specific cases for intra- and inter-frequency neighbouring cells. This NCL contains cell specific measurement parameters (e.g. cell specific offset) for specific neighbouring cells;

- Exclude lists can be provided to prevent the UE from measuring specific neighbouring cells.

For the UE measuring discovery signals (i.e. CRS and/or CSI-RS) of the serving and neighbour cells, the E-UTRAN indicates the measurement configuration to the UE, including the measurement timing configuration of the discovery signals.

Depending on whether the UE needs transmission/reception gaps to perform the relevant measurements, measurements are classified as gap assisted or non-gap assisted. A non-gap assisted measurement is a measurement on a cell that does not require transmission/reception gaps to allow the measurement to be performed. A gap assisted measurement is a measurement on a cell that does require transmission/reception gaps to allow the measurement to be performed. Gap patterns (as opposed to individual gaps) are configured and activated by RRC.

In the text and figure(s) in the following clauses, intra-E-UTRA HO description is applicable for both intra-EPC and intra-5GC cases. In addition, the following differences are applicable for intra-5GC:

- ng-eNB should be considered instead of eNB;

- 5GC should be considered instead of EPC, and NG interface should be considered instead of S1 interface;

- Xn interface should be considered instead of X2 interface and the messages sent between ng-eNBs over Xn are defined in TS 38.423 [86];

- AMF should be considered intead of MME, and UPF should be considered instead of Serving Gateway;

- PDU session information should be considered instead of E-RAB QoS, and the QoS flow to DRB mapping rules applied to the UE should be forwarded to the target ng-eNB;

- For the messages sent between MME and Serving Gateway, and between MME and eNB, use AMF/UPF/ng-eNB respectively;

- The data forwarding defined in clause 9.2.3.2.3 in TS 38.300 [79] should be applied instead of clause 10.1.2.3;

- The Dual Connectivity operation in clause 10.1.2.8 is not applicable to intra-5GC mobility. The corresponding Dual Connectivity operations for 5GC are described in TS 37.340 [76].

*Next Modified Subclause*

#### 10.5.1.1 RRC\_IDLE

Cell selection/reselection to CSG cells is based on a UE autonomous search function. The search function determines itself when/where to search, and need not be assisted by the network with information about frequencies which are dedicated to CSG cells.

To assist the search function on mixed carriers, all CSG cells on mixed carriers broadcast in system information a range of PCI values reserved by the network for use by CSG cells. Optionally also non-CSG cells on the mixed carrier can send this information in system information. The reserved PCI range is only applicable to the frequency of the PLMN where the UE received this information. The UE considers the last received reserved range of PCI values for CSG cells to be valid for a maximum of 24 hours within the entire PLMN. UE's use of the received PCI split information is UE implementation dependent.

NOTE: In shared NW scenario, aligned PCI ranges are beneficial in the shared carrier frequency across the involved PLMNs. Furthermore, in deployments where cells broadcast different primary PLMN (with or without multiple PLMN IDs), it is beneficial that CSG and non-CSG cells will broadcast same PCI ranges.

UE checks the suitability of CSG cells (identified by the 1 bit indicator) based on the Permitted CSG list in the UE (provided by upper layers). Only CSG member cells are considered suitable.

The automated searching for the CSG cells by the UE shall be disabled by the search function, if the Permitted CSG list configured in the UE is empty.

In addition, manual selection of CSG cells is supported.

Cell selection/reselection to CSG cells does not require the network to provide neighbour cell information to the UE. The neighbour cell information can be provided to help the UE in specific cases, e.g. where the network wishes to trigger the UE to search for CSG cells.

Cell Reselection between CSG member cells is based on normal cell reselection procedure.

*Next Modified Subclause*

#### 10.5.1.2 RRC\_CONNECTED

While the UE is in RRC\_CONNECTED state, the UE performs normal measurement and mobility procedures based on configuration provided by the network.

The UE is not required to support manual selection of CSG IDs while in RRC\_CONNECTED state.

Handover to a HNB/HeNB follows the framework of UE assisted network controlled handover as described in 10.1.2.1. Handover to a HNB/HeNB is different from the normal handover procedure in four aspects:

**1. Proximity Estimation**: in case the UE is able to determine, using autonomous search procedures, that it is near a CSG member cell, the UE may provide to the source eNB an indication of proximity. The proximity indication may be used as follows:

- If a measurement configuration is not present for the concerned frequency/RAT, the source eNB may configure the UE to perform measurements and reporting for the concerned frequency/RAT.

- The source eNB may determine whether to perform other actions related to handover to HNB/HeNBs based on having received a proximity indication (for example, the source eNB may not configure the UE to acquire system information of the HNB/HeNB unless it has received a proximity indication).

**2. PSC/PCI Confusion:** due to the typical cell size of HNB/HeNBs being much smaller than macro cells, there can be multiple HNBs/HeNBs within the coverage of the source eNB that have the same PSC/PCI. This leads to a condition referred to as PSC/PCI confusion, wherein the source eNB is unable to determine the correct target cell for handover from the PSC/PCI included in the measurement reports from the UE. PSC/PCI confusion is solved by the UE reporting the global cell identity of the target HNB/HeNB.

**3. Access Control:** if the target cell is a hybrid cell, prioritization of allocated resources may be performed based on the UE's membership status. Access control is done by a two step process, where first the UE reports whether the target cell is a CSG member cell based on the UE's Permitted CSG list, and then the network verifies the reported status. When the UE has an emergency call the MME allows inbound mobility to CSG cells even if the access control fails as specified in TS 23.401[17].

**4. PLMN Selection:** If the target cell is a shared CSG/hybrid cell, the UE reports the subset of the broadcasted PLMN identities passing PLMN ID check and the Permitted CSG list of the UE includes an entry comprising of the concerned PLMN identity and the CSG ID broadcast by the target cell. The source eNB performs PLMN ID check for the PLMNs reported by the UE and selects one if multiple pass the PLMN ID check. Finally the MME verifies the CSG membership according to the received CSG ID, the selected PLMN ID and stored subscription CSG information of the UE.

Mobility from eNB/HeNB to a HeNB's CSG/hybrid cell may take place with the S1 Handover procedure. In the following call flow the source cell can be an eNB or a HeNB.

The current version of the specification also supports mobility involving HeNBs by using X2 handover in some cases (see clause 4.6.1). If membership verification is required for X2 mobility, the procedure described in clause 10.1.2.1 applies, with the following additions to the steps described in clause 10.1.2.1.1:

- In Step 4, the source eNB/HeNB includes the CSG membership status reported by the UE handed over in the X2AP HANDOVER REQUEST message to the target HeNB; the target HeNB performs admission control based on the CSG membership status reported by the UE;

- In Step 12, the target HeNB includes the CSG membership status of the UE handed over in the PATH SWITCH REQUEST message to the MME;

- In Step 16, after the MME has performed membership verification for the UE handed over, the MME includes its verified CSG membership status in the PATH SWITCH REQUEST ACKNOWLEDGE message to the target HeNB; the target HeNB updates its membership information if needed.

The procedure below applies to any scenario where the CSG ID is provided by the UE or provided by the source eNB.



Figure 10.5.1.2-1: Mobility to HeNB's CSG and hybrid cells.

1) The source eNB configures the UE with proximity indication control.

2) The UE sends an "entering" proximity indication when it determines it may be near a CSG member cell (based on autonomous search procedures). The proximity indication includes the RAT and frequency of the cell.

3) If a measurement configuration is not present for the concerned frequency/RAT the source eNB configures the UE with relevant measurement configuration including measurement gaps as needed, so that the UE can perform measurements on the reported RAT and frequency. The network may also use the proximity indication to minimize the requesting of handover preparation information of CSG/hybrid cells by avoiding requesting such information when the UE is not in the geographical area where its CSG member cells are located.

4) The UE sends a measurement report including the PCI (e.g., due to triggered event A3).

5) The source eNB configures the UE to perform SI acquisition and reporting of a particular PCI.

6) The UE performs SI acquisition using autonomous gaps, i.e., the UE may suspend reception and transmission with the source eNB within the limits defined in TS 36.133 [21] to acquire the relevant system information from the target HeNB.

7) The UE sends a measurement report including (E-)CGI, TAI, CSG ID and "member/non-member" indication. If the target cell is a shared CSG/hybrid cell, the measurement report also includes the subset of the broadcast PLMN identities that pass PLMN ID check and for which the Permitted CSG list of the UE includes an entry comprising the cell's CSG ID and the respective PLMN identity.

8) The source eNB includes the target E-CGI and the CSG ID in the Handover Required message sent to the MME. If the target is a hybrid cell the Cell Access Mode of the target is included.

9) The MME performs UE access control to the CSG cell based on the CSG ID and the selected target PLMN received in the Handover Required message and the stored CSG subscription data for the UE (see TS 23.401 [17]). If the access control procedure fails, the MME ends the handover procedure by replying with the Handover Preparation Failure message. If the Cell Access Mode is present, the MME determines the CSG Membership Status of the UE handing over to the hybrid cell and includes it in the Handover Request message.

10-11) The MME sends the Handover Request message to the target HeNB including the target CSG ID received in the Handover Required message. If the target is a hybrid cell the CSG Membership Status will be included in the Handover Request message.

12) The target HeNB verifies that the CSG ID received in the Handover Request message matches the CSG ID broadcast in the target cell and if such validation is successful it allocates appropriate resources. UE prioritisation may also be applied if the CSG Membership Status indicates that the UE is a member.

13-14) The target HeNB sends the Handover Request Acknowledge message to the MME via the HeNB GW if present.

15) The MME sends the Handover Command message to the source eNB.

16) The source eNB transmits the Handover Command (RRC Connection Reconfiguration message including mobility control information) to the UE.

NOTE: Steps 1-9, 15 and 16 also apply to inter-RAT mobility from LTE to HNB.

After sending an "entering" proximity indication (step 2), if the UE determines that it is no longer near a CSG member cell, the UE sends a "leaving" proximity indication to the source eNB. Upon reception of this indication, the source eNB may reconfigure the UE to stop measurements on the reported RAT and frequency.

In the above procedure, steps 2 and 3 may not be performed in case the UE has not previously visited the HeNB, e.g., when the UE first visits a hybrid cell.

The PCI confusion is resolved by steps 5, 6 and 7. The source eNB can request SI acquisition and reporting for any PCI, not limited to PSCs/PCIs of CSG or hybrid cells.

*Next Modified Subclause*

### 10.7.1 RRC\_IDLE

When the CSG ID and associated PLMN ID of the hybrid cell belong to the Permitted CSG list of the UE, the hybrid cell is considered by the UE as a CSG cell in idle mode cell selection/reselection procedures.

NOTE: The autonomous search for hybrid cells does not imply that a UE needs to constantly check the CSG ID and associated PLMN ID of all cells it sees.

For all other UEs, normal cell selection/reselection procedures apply with hybrid cells (as for non CSG cells).

Manual selection of CSG IDs of hybrid cells is also supported in the same way as for CSG cells.

*End of Changes*