**3GPP TSG-RAN2 Meeting #115-e *R2-210xxxx***

**Online, 2021-08-09 - 2021-08-27**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.300** | **CR** | **CRNum** | **rev** | **RevNum** | **Current version:** | **16.7.0** |  |
|  |
| *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 | **x** |

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|  |
| ***Title:***  | Running 38300 CR for RedCap |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_redcap-Core |  | ***Date:*** | 2021-10-05 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 canbe 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)* |
|  |  |
| ***Reason for change:*** | This is a draft of the running RedCap CR for 38.300. To be updated as the work progresses. |
|  |  |
| ***Summary of change:*** | Agreements and if/how they have been captured:

|  |
| --- |
| **RAN2#115:** |
| 1. The number of DRBs supported by RedCap UEs is less than legacy value (which is 16). There will be a single mandatory value (FFS if 4 or 8). FFS if it will be possible to have an optional capability | No impact |
| 2. “RRC processing delay” is not relaxed for RedCap UE | No impact |
| 3. PDCP/RLC AM 12 bits SN is mandatory for RedCap UE, and PDCP/RLC AM 18bits SN is optional supported by RedCap UE; FFS on how to capture this in specification | No impact |
| 4. NE-DC, and (NG)EN-DC are not supported by RedCap UE; FFS on how to capture it in the specification | Captured |
| 5. DAPS and CAPC related capabilities are not applicable for RedCap UE; [8/20] FFS on CHO. FFS on how to capture this in the specification; | Captured |
| 1. Maximum 8 DRBs is mandatory supported by RedCap UEs. | No impact |
| 2. From RAN2 perspective, inter RAT mobility related capabilities are applicable for RedCap UE; | Captured |
| 3. From RAN2 perspective, measurement related capabilities are applicable for RedCap UE; | No impact |
| 4. From RAN2 perspective, URLLC related capabilities are applicable for RedCap UE except those affected by CA/DC; | Partly captured |
| 5. From RAN2 perspective, IAB related capabilities are not applicable for RedCap UE, i.e. the RedCap UE is not expected to act as IAB node; | Captured |
| 6. Do not introduce capability signalling on the supported Rx number for RedCap UE since the number of Rx branches for RedCap is implicitly indicated by the corresponding capability parameter maxNumberMIMO-LayersPDSCH in the existing UE capability framework; | No impact |
| 1. Msg1 identification which can be configured to be enabled/disabled can be specified from RAN2 point of view. | Captured |
| 2. Solution for early identification for 2-step RACH will be specified. | No impact |
| 3. Specify separate indications in SIB1 for barring RedCap UEs with 1 Rx chain and 2 Rx chains. | Captured |
| 4. Specify a RedCap specific IFRI in SIB1. | Captured |
| 1. IFRI for RedCap UEs in SIB1 is common for UEs with 1 Rx or 2 Rx branches. | No impact |
| 2. If RedCap-specific IFRI is absent from broadcast SI, the UE considers the cell does not support RedCap. | Captured |
| 1. A Msg3 early identification based on dedicated LCID is supported (if SA3 confirms there is no problem) | Captured |
| 1. RedCap UE applies the existing cellBarred field in MIB | No impact |
| 1. When IDLE eDRX cycle is longer than 10.24s, PH calculation formula defined in LTE is re-used, i.e.  PH\_CN: H-SFN mod TeDRX,\_CN,H= (UE\_ID\_H mod TeDRX\_CN,H) - where TeDRX\_CN,H is equal to IDLE eDRX cycle. | No impact |
| 2. When IDLE eDRX cycle is longer than 10.24s, CN PTW\_end calculation formula defined in LTE is re-used, i.e.  PTW\_end is radio frame satisfying SFN = (PTW\_start + L\*100 - 1) mod 1024,  - where L is PTW length configured by upper layers | No impact |
| 3. For RRC\_IDLE UE, when eDRX cycle is no longer than 10.24s, T is determined by IDLE eDRX cycle. When eDRX cycle is longer than 10.24s, during the CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, and default paging cycle. | No impact |
| 4. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is not configured, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, RAN paging cycle and default paging cycle. | No impact |
| 5. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and Inactive eDRX cycle is no longer than 10.24s, outside CN PTW, T is determined by INACTIVE eDRX cycle. | No impact |
| 1. RAN2 considers the configuration as an invalid case, where INACTIVE eDRX cycle is configured but IDLE eDRX cycle is not configured. FFS whether to capture this restriction in RAN2 spec. | No impact |
| 2. RAN2 considers the configuration as invalid case, where INACTIVE eDRX cycle is longer than IDLE eDRX cycle. FFS whether to capture this restriction in RAN2 spec. | No impact |
| 3. The maximum PTW length is 40.96s when IDLE eDRX cycle is longer than 10.24s. | No impact |
| 4. The minimum PTW length is 1.28s and the step length/granularity of PTW length is 1.28 when IDLE eDRX cycle is longer than 10.24s. | No impact |
| 5. Introduce an additional new IE for INACTIVE eDRX to contain all values of INACTIVE eDRX cycles (also include values >10.24, if agreed in future). | No impact |
| 6. For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, T is determined by the shortest of IDLE eDRX cycle and INACTIVE eDRX cycle. | No impact |
| 7. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is no longer than 10.24s, during CN PTW, T is determined by the shortest of UE specific DRX cycle, if configured by upper layer, INACTIVE eDRX cycle and default paging cycle. | No impact |
| 8. eDRX feature is optional for any UE (including RedCap and non-RedCap UEs). | No impact |
| 1. eDRX is optional for any gNB (either supporting RedCap or not), which means it is up to gNB implementation whether to support eDRX | No impact |
| Working Assumption:2. When IDLE eDRX cycle is longer than 10.24s, CN PTW\_start calculation formula defined in LTE is re-used as the baseline, as below. FFS whether CN PTW\_start position could be configurable by network and in case which node decides the N value. Note: this formula would be revisited if INACTIVE eDRX cycle can be above 10.24s PTW\_start denotes the first radio frame of the PH that is part of the PTW and has SFN satisfying the following equation: SFN = 1024/N\* ieDRX, where ieDRX = floor(UE\_ID\_H /TeDRX,H) mod N FFS N = 4 or 8, FFS if N can take other values | No impact |
| 1. For RRC\_INACTIVE UE, when IDLE eDRX cycle is no longer than 10.24s and INACTIVE eDRX cycle is not configured, FFS which option below is adopted for paging monitoring: Option 1: T is determined by the shortest of RAN paging cycle, IDLE eDRX cycle, and default paging cycle. Option 2: T is determined by the shortest of RAN paging cycle and IDLE eDRX cycle. | No impact |
| 2. For RRC\_INACTIVE UE, when IDLE eDRX cycle is longer than 10.24s and INACTIVE eDRX cycle is not configured, outside CN PTW, FFS which option below is adopted for paging monitoring: Option 1: T is determined by the shortest of RAN paging cycle and default paging cycle. Option 2: T is determined by RAN paging cycle. | No impact |
| 1. Do not introduce nor reuse not-at-cell-edge threshold for R17 RRC\_CONNECTED UEs.
 | No impact |
| 1. Do not introduce beam change based criterion in Rel-17. | No impact |
| 2. The network provides the configuration of stationarity criterion to the UE via dedicated signalling (e.g. RRCReconfiguration message) in RRC\_CONNECTED. | No impact |
| 3. Send LS to RAN4 to inform RAN2 conclusions for RRM relaxation. | No impact |
| 4. The LS to RAN4 includes the agreed RAN2 conclusions and “For RRC\_IDLE/INACTIVE, RAN4 is asked to study and define corresponding R17 RRM relaxation method” . | No impact |
| 1. Introduce separate Rel-17 not-at-cell-edge threshold, and the new threshold is only associated with Rel-17 stationary criterion (if configured). If configured with a not-at-cell-edge criterion, the R17 stationary criterion can only be configured together with the R17 not-at-cell-edge criterion, not with the R16 one | No impact |
| **RAN2#114:** |
| Working assumption: 1. Extend UE-NR-Capability using NCE to capture RedCap capabilities | No impact |
| 2. We will continue the discussion on which capability are applicable to RedCap UE (FFS if we need to have an exhaustive check) | No impact |
| 3. At least for early identification there will be only one RedCap UE (no need to define separate RedCap UE types for FR1 and FR2) | Captured |
| 4. It is up to the network how to prevent RedCap UEs from using radio capabilities not intended for RedCap UEs (no specification impact is foreseen at least in RAN2. FFS whether something is needed from SA2/CT1) | Captured  |
| 1. RAN2 Working Assumption: by default, all non-RedCap UE capabilities are applicable for RedCap UE, and therefore only for non-RedCap capabilities that are not appliable for RedCap UE, we clarify in the definitions for parameters in TS38.306, the value or feature is not applicable for RedCap UE | No impact |
| 2. We will have an email discussion until the next meeting to discuss which higher layer capabilities are not applicable for RedCap UEs (it could result in a draft 38.306 CR) and how to reflect the handling of RedCap specific capabilities (e.g. Maximum BW, Max Rx, MIMO-Layer, 256QAM, CA/DC, HD-FDD, etc) | No impact |
| 3. The network needs to know if the UE is a RedCap UE or not in order to at least correctly identify the set of mandatory features (i.e. baseline capabilities) that the UE supports, including Handover case | No impact |
| 4. The network needs to unambiguously know whether the UE is a RedCap or a non-RedCap UE from its reported UE capability information. | No impact |
| 1. SIB1 (not MIB) indicates cell barring for 1 Rx branch and 2 Rx branches separately for RedCap UEs. Further details of the solution are FFS | Captured |
| 2. The cell barring for RedCap UE is per cell (not per PLMN). | No impact  |
| 3. RedCap UE supports the Intra Frequency Reselection Indicator. | No impact  |
| 4. Either Msg1 and/or Msg3 early identification will be supported | No impact  |
| 1. There is no need to support Rx branches specific early identification from RAN2 perceptive (final decision up to RAN1). | No impact  |
| 2. Send LS to ask RAN3 to consider the coordination between gNBs on whether a neighbour/target gNB supports RedCap UEs, if needed, to avoid handover RedCap to a target cell that it can’t access. We can come back in the next meeting with discussions on other restrictions, e.g. related to number of RX | No impact |
| 1. Lower bound for eDRX configuration in RRC\_IDLE and RRC\_INACTIVE is 2.56 seconds. Inform SA2/CT1 and check if there is any concern. | No impact |
| 2. It is up to RAN to configure the length for PTW for RAN paging, the RAN PTW length can be different from the CN PTW length. | Partly captured  |
| 3. When RAN and CN paging coincide in the same PH, the PTW starting locations are the same. FFS how to calculate the PTW starting location so that it is the same for RAN and CN PTW. | No impact  |
| 1. Continue in the next meeting the discussion on how UE is expected to monitor RAN and CN PTW, e.g. whether UE in RRC\_INACTIVE monitors for only RAN PTW or both CN and RAN PTW when they overlap | No impact  |
| 1. An RSRP/RSRQ based stationarity criterion (Working Assumption: the same as in idle/inactive) can be configured for UEs in RRC Connected. If the criterion is met, this is reported to the network (FFS how/when). It is FFS whether, based on this, besides possibly reconfiguring RRM measurements (up to network implementation), the network can enable RRM measurement relaxation (FFS whether same method as in Idle/Inactive) | Partly captured  |
| 1. Subscription based relaxation criteria will not be considered in Rel-17 RRM relaxation | No impact  |
| 1. Reuse R16 low mobility criterion, as part or whole of Rel-17 stationary criterion in RRC\_IDLE/INACTIVE. When NW configures both Rel-17 stationary criterion and Rel-16 low mobility criterion, NW configures different Rel-17 thresholds (i.e., SSearchDeltaP\_stationary/TSearchDeltaP\_stationary) from Rel-16 (SSearchDeltaP / TSearchDeltaP). How to configure the criterion (e.g. more stringent) is left to NW implementation (i.e. no specification impact to RAN2).  | No impact |
| 2. Postpone the following discussion until RAN4 defines RRM relaxation method for Rel-17: When NW configures both R16/R17 relaxation criteria and the UE fulfills both, UE performs: - Option 1) UE performs Rel-17 RRM relaxation method - Option 2) It is up to UE implementation to select either Rel-16 or Rel-17 relaxation operation | No impact |
| 1. Working Assumption: If beam-level criterion is adopted for Rel-17 stationary criterion in RRC\_IDLE/INACTIVE, it is configured separately with Rel-16 low mobility criterion reused | No impact |
| 2. When NW configures Rel-17 RRM relaxation for RRC\_IDLE/INACTIVE, Rel-17 stationary criterion is mandatory, and Rel-17 not-at-cell-edge criterion is optional configuration. FFS whether the same applies to RRC Connected | No impact  |
| 3. Continue discussion on Rel-17 not-at-cell-edge criterion in RRC\_IDLE/INACTIVE within two options: - Option 1) Reuse Rel-16 not-at-cell-edge criterion with the same thresholds (i.e., SSearchThresholdP / SSearchThresholdQ) - Option 2) Reuse Rel-16 not-at-cell-edge criterion with the different thresholds | No impact  |
| **RAN2#113bis** |
| 1. RAN decides and configures eDRX via RRC for RRC\_INACTIVE (FFS on the need and details of coordination with the CN) | Captured |
| 2. At least for eDRX cycle, the configurations of the eDRX for RRC\_IDLE and RRC\_INACTIVE can be different (FFS for PTW, e.g. length and starting point, when eDRX cycles are longer than 10.24s) | No impact |
| 1. RAN2 assumes that CN provides necessary assistance information on eDRX config. for RRC\_IDLE to RAN (e.g. reusing eDRX config. defined in “CN Assistance Information for RRC INACTIVE IE” for E-UTRA/5GC). | No impact.  |
| 2. eDRX feature, including the related parameters (i.e. PH, PTW. H-SFN) and corresponding paging operation defined for E-UTRA/5GC is used as baseline to enable eDRX >10.24sec for both RRC\_IDLE and RRC\_INACTIVE in NR/5GC | Captured |
| 3. RAN2 confirms that CN paging and RAN paging use the same paging frame offset and first PDCCH monitoring occasion in PO, which are configured by RAN without involvement of CN. | No impact  |
| 4. RAN2 confirms that SI modification mechanism from LTE is used as a baseline for SI change (other than ETWS and CMAS), i.e. by using an eDRX acquisition period and a flag to indicate SI modification for eDRX in Short Message (e.g. systemInfoModification-eDRX) | No impact  |
| 1. Assuming there will be a stationary property based on subscription (which is FFS), we will not restrict to this and will continue to assume that a UE can use some RSRP/RSRQ based criteria (FFS whether reuse R16 thresholds or new ones. FFS also on the use of a beam based criteria) | No impact |
| At least for RRC idle/inactive, a measurement-based R17 stationarity criterion can be configured separately from R16 low-mobility criterion for R17 UEs supporting the feature. FFS how the configuration is provided. FFS whether this stationarity criterion is based on: - the same algorithm used in R16 low-mobility criterion but with its own specific set of thresholds; and/or - a combination of R16 low-mobility criterion and/or beam-change based criterion. Exact details of beam change criterion are FFS. | Partly captured |
| 1. Network can configure R17 stationarity criterion/criteria together with a not-at-cell-edge criterion, to trigger RRM relaxations in RRC Idle/Inactive for R17 UEs supporting the feature. FFS whether the R16 not-at-cell-edge thresholds can be reused or separate R17 not-at-cell-edge thresholds are needed. | Partly captured |

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| ***Consequences if not approved:*** | RedCap is not supported in 38.300 |
|  |  |
| ***Clauses affected:*** | TBD |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS TODO CR TODO |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR should be lifted to the latest version of the specification. |
|  |  |
| ***This CR's revision history:*** | This is the initial version of running CR for 38.300 for RedCap WI. |

*First Modified Subclause*

# 3 Abbreviations and Definitions

## 3.1 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], in TS 36.300 [2] 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] and TS 36.300 [2].

5GC 5G Core Network

5GS 5G System

5QI 5G QoS Identifier

A-CSI Aperiodic CSI

AKA Authentication and Key Agreement

AMBR Aggregate Maximum Bit Rate

AMC Adaptive Modulation and Coding

AMF Access and Mobility Management Function

ARP Allocation and Retention Priority

BA Bandwidth Adaptation

BCH Broadcast Channel

BH Backhaul

BL Bandwidth reduced Low complexity

BPSK Binary Phase Shift Keying

C-RNTI Cell RNTI

CAG Closed Access Group

CAPC Channel Access Priority Class

CBRA Contention Based Random Access

CCE Control Channel Element

CD-SSB Cell Defining SSB

CFRA Contention Free Random Access

CHO Conditional Handover

CIoT Cellular Internet of Things

CLI Cross Link interference

CMAS Commercial Mobile Alert Service

CORESET Control Resource Set

CP Cyclic Prefix

CPC Conditional PSCell Change

DAG Directed Acyclic Graph

DAPS Dual Active Protocol Stack

DFT Discrete Fourier Transform

DCI Downlink Control Information

DCP DCI with CRC scrambled by PS-RNTI

DL-AoD Downlink Angle-of-Departure

DL-SCH Downlink Shared Channel

DL-TDOA Downlink Time Difference Of Arrival

DMRS Demodulation Reference Signal

DRX Discontinuous Reception

E-CID Enhanced Cell-ID (positioning method)

EHC Ethernet Header Compression

ETWS Earthquake and Tsunami Warning System

FS Feature Set

GFBR Guaranteed Flow Bit Rate

HRNN Human-Readable Network Name

H-SFN Hyper System Frame Number

IAB Integrated Access and Backhaul

IFRI Intra Frequency Reselection Indication

I-RNTI Inactive RNTI

INT-RNTI Interruption RNTI

KPAS Korean Public Alarm System

LDPC Low Density Parity Check

MDBV Maximum Data Burst Volume

MIB Master Information Block

MICO Mobile Initiated Connection Only

MFBR Maximum Flow Bit Rate

MMTEL Multimedia telephony

MNO Mobile Network Operator

MPE Maximum Permissible Exposure

MT Mobile Termination

MU-MIMO Multi User MIMO

Multi-RTT Multi-Round Trip Time

NB-IoT Narrow Band Internet of Things

NCGI NR Cell Global Identifier

NCR Neighbour Cell Relation

NCRT Neighbour Cell Relation Table

NGAP NG Application Protocol

NID Network Identifier

NPN Non-Public Network

NR NR Radio Access

P-MPR Power Management Maximum Power Reduction

P-RNTI Paging RNTI

PCH Paging Channel

PCI Physical Cell Identifier

PDCCH Physical Downlink Control Channel

PDSCH Physical Downlink Shared Channel

PLMN Public Land Mobile Network

PNI-NPN Public Network Integrated NPN

PO Paging Occasion

PH Paging Hyperframe

PRB Physical Resource Block

PTW Paging Time Window PRACH Physical Random Access Channel

PRG Precoding Resource block Group

PS-RNTI Power Saving RNTI

PSS Primary Synchronisation Signal

PUCCH Physical Uplink Control Channel

PUSCH Physical Uplink Shared Channel

PWS Public Warning System

QAM Quadrature Amplitude Modulation

QFI QoS Flow ID

QPSK Quadrature Phase Shift Keying

RA Random Access

RA-RNTI Random Access RNTI

RACH Random Access Channel

RANAC RAN-based Notification Area Code

REG Resource Element Group

RIM Remote Interference Management

RMSI Remaining Minimum SI

RNA RAN-based Notification Area

RNAU RAN-based Notification Area Update

RNTI Radio Network Temporary Identifier

RQA Reflective QoS Attribute

RQoS Reflective Quality of Service

RS Reference Signal

RSRP Reference Signal Received Power

RSRQ Reference Signal Received Quality

RSSI Received Signal Strength Indicator

RSTD Reference Signal Time Difference

SCS SubCarrier Spacing

SD Slice Differentiator

SDAP Service Data Adaptation Protocol

SFI-RNTI Slot Format Indication RNTI

SIB System Information Block

SI-RNTI System Information RNTI

SLA Service Level Agreement

SMC Security Mode Command

SMF Session Management Function

S-NSSAI Single Network Slice Selection Assistance Information

SNPN Stand-alone Non-Public Network

SNPN ID Stand-alone Non-Public Network Identity

SPS Semi-Persistent Scheduling

SR Scheduling Request

SRS Sounding Reference Signal

SRVCC Single Radio Voice Call Continuity

SS Synchronization Signal

SSB SS/PBCH block

SSS Secondary Synchronisation Signal

SST Slice/Service Type

SU-MIMO Single User MIMO

SUL Supplementary Uplink

TA Timing Advance

TPC Transmit Power Control

TRP Transmit/Receive Point

UCI Uplink Control Information

UL-AoA Uplink Angles of Arrival

UL-RTOA Uplink Relative Time of Arrival

UL-SCH Uplink Shared Channel

UPF User Plane Function

URLLC Ultra-Reliable and Low Latency Communications

V2X Vehicle-to-Everything

Xn-C Xn-Control plane

Xn-U Xn-User plane

XnAP Xn Application Protocol

*Second Modified Subclause*

## 3.2 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], in TS 36.300 [2] 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] and TS 36.300 [2].

**BH RLC channel**: an RLC channel between two nodes, which is used to transport backhaul packets**.**

**CAG Cell**:a PLMN cell broadcasting at least one Closed Access Group identity.

**CAG Member Cell**:for a UE, a CAG cell broadcasting the identity of the selected PLMN, registered PLMN or equivalent PLMN, and for that PLMN, a CAG identifier belonging to the Allowed CAG list of the UE for that PLMN.

**CAG-only cell**: a CAG cell that is only available for normal service for CAG UEs.

**Cell-Defining SSB**: an SSB with an RMSI associated.

**Child node**: IAB-DU's and IAB-donor-DU's next hop neighbour node; the child node is also an IAB-node.

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

**CORESET#0**: the control resource set for at least SIB1 scheduling, can be configured either via MIB or via dedicated RRC signalling.

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

**Downstream**: Direction toward child node or UE in IAB-topology.

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

**gNB**: node providing NR user plane and control plane protocol terminations towards the UE, and connected via the NG interface to the 5GC.

**IAB-donor**:gNB that provides network access to UEs via a network of backhaul and access links.

**IAB-donor-CU**: as defined in TS 38.401 [4].

**IAB-donor-DU**:as defined in TS 38.401 [4].

**IAB-DU**: gNB-DU functionality supported by the IAB-node to terminate the NR access interface to UEs and next-hop IAB-nodes, and to terminate the F1 protocol to the gNB-CU functionality, as defined in TS 38.401 [4], on the IAB-donor.

**IAB-MT**: IAB-node function that terminates the Uu interface to the parent node using the procedures and behaviours specified for UEs unless stated otherwise. IAB-MT function used in 38-series of 3GPP Specifications corresponds to IAB-UE function defined in TS 23.501 [3].

**IAB-node**: RAN node that supports NR access links to UEs and NR backhaul links to parent nodes and child nodes. The IAB-node does not support backhauling via LTE.

**Intra-system Handover**:Handover that does not involve a CN change (EPC or 5GC).

**Inter-system Handover**:Handover that involves a CN change (EPC or 5GC).

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

**MSG1**: preamble transmission of the random access procedure for 4-step random access (RA) type.

**MSG3**: first scheduled transmission of the random access procedure.

**MSGA**:preamble and payload transmissions of the random access procedure for 2-step RA type.

**MSGB**:response to MSGA in the 2-step random access procedure. MSGB may consist of response(s) for contention resolution, fallback indication(s), and backoff indication.

**Multi-hop backhauling**: Using a chain of NR backhaul links between an IAB-node and an IAB-donor.

**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.

**NG-C**: control plane interface between NG-RAN and 5GC.

**NG-U**: user plane interface between NG-RAN and 5GC.

**NG-RAN node**: either a gNB or an ng-eNB.

**Non-CAG Cell**: a PLMN cell which does not broadcast any Closed Access Group identity.

**NR backhaul link**: NR link used for backhauling between an IAB-node and an IAB-donor, and between IAB-nodes in case of a multi-hop backhauling.

**NR sidelink communication**: AS functionality enabling at least V2X communication as defined in TS 23.287 [40], between two or more nearby UEs, using NR technology but not traversing any network node.

**Numerology**: corresponds to one subcarrier spacing in the frequency domain. By scaling a reference subcarrier spacing by an integer *N*, different numerologies can be defined.

**Parent node**: IAB-MT's next hop neighbour node; the parent node can be IAB-node or IAB-donor-DU

**PLMN Cell**: a cell of the PLMN.

**RedCap UE:** A UE with reduced capability defined in TS 38.306 [11].

Editor’s Note: The terminology for RedCap will be aligned with other specifications (e.g. 38.306/38.331).

**SNPN Access Mode**: mode of operation whereby a UE only accesses SNPNs.

**SNPN-only cell**: a cell that is only available for normal service for SNPN subscribers.

**SNPN Identity:** the identity of Stand-alone NPN defined by the pair (PLMN ID, NID).

**Transmit/Receive Point:** Part of the gNB transmitting and receiving radio signals to/from UE according to physical layer properties and parameters inherent to that element.

**Upstream**: Direction toward parent node in IAB-topology.

**V2X sidelink communication**: AS functionality enabling V2X communication as defined in TS 23.285 [41], between nearby UEs, using E-UTRA technology but not traversing any network node.

**Xn**: network interface between NG-RAN nodes.

*Last Modified Subclause*

## 16.x Reduced Capability

### 16.x.1 Capabilities

CA/DC, NE-DC, (NG)EN-DC, DAPS, CAPC and IAB related capabilities are not supported by RedCap UE. Inter-RAT mobility and URLLC related capabilities are applicable for RedCap UE. It is up to the network how to prevent RedCap UEs from using radio capabilities not intended for RedCap UEs.

### 16.x.2 Identification, access and camping restrictions

Early identitication of RedCap UEs can be made via both MSG1 (PRACH preamble) and MSG3 (LCID). For MSG1, RedCap specific random access configuration may be provided.

RedCap UEs with 1 Rx chain and 2 Rx chains can be barred via system information.

A RedCap specific IFRI (Intra Freq Reselection Indication) applicable to both 1Rx and 2 RX chains UEs can be provided in SIB1. When absent, the UE considers the cell as not supported for RedCap UEs.

### 16.x.3 Extended DRX for RRC\_IDLE and RRC\_INACTIVE

When extended DRX (eDRX) is used, the following applies:

- In RRC\_INACTIVE, eDRX configuration is decided by NG-RAN and provided via RRC signalling;

- For RRC\_IDLE, the DRX cycle can be extended up to 10485.76 seconds (2.91 hours) while for RRC\_INACTIVE, the maximum value of the DRX cycle is 10.24 seconds;

- The hyper SFN (H-SFN) is broadcast by the cell and increments by one when the SFN wraps around;

- Paging Hyperframe (PH) refers to the H-SFN in which the UE starts monitoring paging DRX during a Paging Time Window (PTW) used in CM-IDLE. The PH is determined based on a formula that is known by the AMF, UE and NG-RAN;

- During the PTW, the UE monitors paging for the duration of the PTW.

### 16.x.4 RRM relaxations

In RRC\_IDLE and RRC\_INACTIVE the UE is allowed to relax neighbour cells RRM measurements when the RSRP/RSRQ stationary criterion and/or not at cell edge criterion is met, otherwise the UE shall not relax RRM measurements. In RRC\_CONNECTED network may configure RSRP/RSRQ based stationarity criterion and the UE shall report when the stationarity criterion is met or not.