**3GPP TSG-RAN2 Meeting #118-e *DRAFT- R2-2206203***

**Online, 09-20 May 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.300** | **CR** | **0464** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Corrections on RedCap in TS 38.300 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Huawei | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_redcap-Core | | | | |  | ***Date:*** | | | 2022-05-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. RAN4 will not define new RRM relaxations in CONNECTED in Rel-17 and therefore editors note needs to be removed. 2. Case where NCD-SSB is used for RLM for RedCap UEs is missing. 3. NG-RAN decides eDRX configuration only for RAN paging. 4. It was agreed to introduce separate bits in SIB1 to indicate whether IDLE eDRX and/or INACTIVE eDRX are enabled 5. It is unclear whether minimum value of the eDRX cycle is 2.56 seconds is for both IDLE and INACTIVE. 6. RRM measurement relaxations in CONNECTED should be applicable only for RedCap UE 7. It is defined in TS 38.306 that CPAC (instead of CPC) is not applicable to RedCap i.e. specifications are not aligned 8. RAN4 will not define new RRM relaxations in CONNECTED in Rel-17 and therefore editors note needs to be removed. 9. Editorial corrections. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Removed editors note on possible new RRM relaxations defined in RAN4 specification. 2. Clarified that NCD-SSB could be also used for RLM for RedCap UEs. 3. Clarified that eDRX configuration for RAN paging is decided and configured by NG-RAN. 4. Clarified that eDRX allowed for UEs in RRC\_IDLE and RRC\_INACTIVE is provided separately for both RRC states 5. Clarified that the minimum value of the eDRX cycle is 2.56 seconds for both IDLE and INACTIVE. 6. Clarified that RRM measurement relaxations in CONNECTED are applicable only for RedCap UE 7. Changed CPC -> CPAC 8. Removed editors note on possible new RRM relaxations defined in RAN4 specifications. 9. Editorial corrections. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Various issues remains in the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.9, 9.2.7, 9.2.10, 16.13 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | |  | | --- | | TS/TR ... CR ... | | TS/TR ... CR ... | | TS/TR ... CR ... | | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*First Modified Subclause*

## 7.9 UE Assistance Information

When configured to do so, the UE can signal the network through *UEAssistanceInformation*:

- If it prefers an adjustment in the connected mode DRX cycle length, for the purpose of delay budget reporting;

- If it is experiencing internal overheating;

- If it prefers certain DRX parameter values, and/or a reduced maximum number of secondary component carriers, and/or a reduced maximum aggregated bandwidth and/or a reduced maximum number of MIMO layers and/or minimum scheduling offsets K0 and K2 for power saving purpose;

- If it expects not to send or receive any more data in the near future, and in this case, it can provide its preference to transition out of RRC\_CONNECTED where this indication may express its preferred RRC state, or alternately, it may cancel an earlier indicated preference to transition out of RRC\_CONNECTED;

- If it prefers (not) to be provisioned with reference time information;

- If it prefers to transition out of RRC\_CONNECTED state for MUSIM operation;

- If it wants to include assistance information for setup or release of gaps for MUSIM operation;

- The list of frequencies affected by IDC problems (see clause 23.4 of TS 36.300 [2]);

- Its RRM measurement relaxation status indicating whether RRM measurement relaxation criteria are met or not.

NOTE: Only the Frequency Division Multiplexing (FDM) solution as defined for E-UTRA in clause 23.4 of TS 36.300 [2] is used in NR. The requirements on RRM/RLM/CSI measurements in different phases of IDC interference defined in TS 36.300 [2] are applicable except that for NR serving cell, the requirements in TS 38.133 [13] and TS 38.101-1 [18], TS 38.101-2 [35], TS 38.101-3 [36] apply.

In the second case, the UE can express a preference for temporarily reducing the number of maximum secondary component carriers, the maximum aggregated bandwidth and the number of maximum MIMO layers. In all cases, it is up to the gNB whether to accommodate the request.

For sidelink, the UE can report SL traffic pattern(s) to NG-RAN, for periodic traffic.

*Next Modified Subclause*

### 9.2.7 Radio Link Failure

In RRC\_CONNECTED, the UE performs Radio Link Monitoring (RLM) in the active BWP based on reference signals (SSB/CSI-RS) and signal quality thresholds configured by the network. SSB-based RLM is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWP and for DL BWPs containing the SSB associated to the initial DL BWP. Besides, SSB-based RLM can be also performed based on the non-cell defining SSB, if configured for RedCap UEs. For other DL BWPs, RLM can only be performed based on CSI-RS. In case of DAPS handover, the UE continues the detection of radio link failure at the source cell until the successful completion of the random access procedure to the target cell.

*Next Modified Subclause*

### 9.2.10 Extended DRX for RRC\_IDLE and RRC\_INACTIVE

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

- For RRC\_INACTIVE, eDRX configuration for RAN paging is decided and configured by NG-RAN. In RRC\_INACTIVE the UE monitors both RAN and CN paging;

- For RRC\_IDLE, eDRX for CN paging is configured by upper layers. In RRC\_IDLE the UE monitors only CN paging;

- Information on whether eDRX is allowed on the cell for UEs in RRC\_IDLE and RRC\_INACTIVE is provided separately for RRC\_IDLE and RRC\_INACTIVE in system information;

- The maximum value of the eDRX cycle is 10485.76 seconds (2.91 hours) for RRC\_IDLE and 10.24 seconds for RRC\_INACTIVE, while the minimum value of the eDRX cycle is 2.56 seconds for both RRC\_IDLE and RRC\_INACTIVE;

- 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 RRC\_IDLE. The PH and PTW are determined based on a formula (see TS 38.304 [10]) that is known by the AMF, UE and NG-RAN;

- H-SFN, PH and PTW are used if the eDRX cycle is greater than 10.24 seconds;

- When the eDRX cycle is longer than the system information modification period, the UE verifies that stored system information remains valid before establishing an RRC connection.

*Next Modified Subclause*

## 16.13 Support of Reduced Capability (RedCap) NR devices

### 16.13.1 Introduction

A RedCap UE has reduced capabilities with the intention to have lower complexity with respect to non-RedCap UEs. It is mandatory for a RedCap UE to support 20 MHz maximum UE channel bandwidth in FR1 and 100 MHz in FR2.

### 16.13.2 Capabilities

CA, MR-DC, DAPS, CPAC and IAB related capabilities are not supported by RedCap UEs, as defined together with other limitations in TS 38.306 [11]. It is up to the network to prevent RedCap UEs from using radio capabilities not intended for RedCap UEs.

### 16.13.3 Identification, access and camping restrictions

A RedCap UE can be identified by the network during Random Access procedure via MSG3/MSGA from a RedCap specific LCID(s) and optionally via MSG1/MSGA (PRACH occasion or PRACH preamble). For RedCap UE identification via MSG1/MSGA, RedCap specific Random Access configuration may be configured by the network. For MSG3/MSGA, a RedCap UE is identified by the dedicated LCID(s) indicated for CCCH identification (CCCH or CCCH1) regardless whether RedCap specific Random Access configuration is configured by the network.

RedCap UEs with 1 Rx branch and 2 Rx branches can be allowed separately via system information. In addition, Half-Duplex FDD RedCap UEs can be allowed via system information. A RedCap specific IFRI can be provided in SIB1, when absent, RedCap UEs access is not allowed. Information on which frequencies RedCap UE access is allowed can be provided in system information.

### 16.13.4 RRM measurement relaxations

RRM measurement relaxation is enabled and disabled by the network. In RRC\_IDLE and RRC\_INACTIVE a RedCap UE is allowed to relax neighbour cell RRM measurements when the stationary criterion is met or when both stationary criterion and not-at-cell-edge criterion are met. Network may configure stationary criterion for a RedCap UE in RRC\_CONNECTED and the UE shall report its RRM measurement relaxation status using UE Assistance Information when the stationarity criterion is met or no longer met.

### 16.13.5 BWP operation

A RedCap UE monitors paging only in an initial BWP (default or RedCap specific) associated with CD-SSB and performs cell (re-)selection and measurements on the CD-SSB. If a RedCap-specific initial UL BWP is configured, RedCap UEs in RRC\_IDLE and RRC\_INACTIVE shall use only the RedCap-specific initial UL BWP to perform RACH.

A RedCap UE may be configured with multiple NCD-SSBs provided that each BWP is configured with at most one SSB. NCD-SSB may be configured for a RedCap UE in RRC\_CONNECTED to perform RLM, BFD, and RRM measurements when the active BWP does not contain CD-SSB.

*Last Modified Subclause*