**3GPP TSG-RAN WG2 Meeting #115 Electronic R2-210xxxx**

**Online Meeting, August, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.300** | **CR** |  | **rev** |  | **Current version:** | **16.6.0** |  |
|  |
| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | Stage 2 Running CR of TS 38.300 for eSL |
|  |  |
| ***Source to WG:*** | InterDigital |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_SL\_enh-Core |  | ***Date:*** | 2021-08-11 |
|  |  |  |  |  |
| ***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 CR introduces the support of Rel17 features for SL DRX and resource allocation enhancements. |
|  |  |
| ***Summary of change:*** | Include consideration of SL-DRX into section 3.1 and 5.5, 16.9.2.2, and 16.9.3.2New section of 16.9.5 for SL DRXExtend section 11 for SL-DRX |
|  |  |
| ***Consequences if not approved:*** | Rel17 features for sidelink are not supported in NR |
|  |  |
| ***Clauses affected:*** | TBD |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*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

IAB Integrated Access and Backhaul

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

PRACH Physical Random Access Channel

PRB Physical Resource Block

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

SL DRX Sidelink Discontinuous Reception

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

*Next Modified Subclause*

## 5.5 Transport Channels

The physical layer offers information transfer services to MAC and higher layers. The physical layer transport services are described by *how* and with what characteristics data are transferred over the radio interface. An adequate term for this is "Transport Channel". This should be clearly separated from the classification of *what* is transported, which relates to the concept of logical channels at MAC sublayer.

Downlink transport channel types are:

1. **Broadcast Channel (BCH)** characterised by:

- fixed, pre-defined transport format;

- requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances.

2. **Downlink Shared Channel (DL-SCH)** characterised by:

- support for HARQ;

- support for dynamic link adaptation by varying the modulation, coding and transmit power;

- possibility to be broadcast in the entire cell;

- possibility to use beamforming;

- support for both dynamic and semi-static resource allocation;

- support for UE discontinuous reception (DRX) to enable UE power saving.

3. **Paging Channel (PCH)** characterised by:

- support for UE discontinuous reception (DRX) to enable UE power saving (DRX cycle is indicated by the network to the UE);

- requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances;

- mapped to physical resources which can be used dynamically also for traffic/other control channels.

Uplink transport channel types are:

1. **Uplink Shared Channel (UL-SCH)** characterised by:

- possibility to use beamforming;

- support for dynamic link adaptation by varying the transmit power and potentially modulation and coding;

- support for HARQ;

- support for both dynamic and semi-static resource allocation.

2. **Random Access Channel(s) (RACH)** characterised by:

- limited control information;

- collision risk.

Sidelink transport channel types are:

1. **Sidelink broadcast channel (SL-BCH)** characterised by:

- pre-defined transport format.

2. **Sidelink shared channel (SL-SCH)** characterised by:

- support for unicast transmission, groupcast transmission and broadcast transmission;

- support for both UE autonomous resource selection and scheduled resource allocation by NG-RAN;

- support for both dynamic and semi-static resource allocation when UE is allocated resources by the NG-RAN;

- support for HARQ;

- support for dynamic link adaptation by varying the transmit power, modulation and coding.

- support for UE SL discontinuous reception (SL-DRX) to enable UE power saving.

Association of transport channels to physical channels is described in TS 38.202 [20].

*Next Modified Subclause*

#### 16.9.2.2 MAC

The MAC sublayer provides the following services and functions over the PC5 interface in addition to the services and functions specified in clause 6.2.1:

- Radio resource selection;

- Packet filtering;

- Priority handling between uplink and sidelink transmissions for a given UE;

- Sidelink CSI reporting.

With LCP restrictions in MAC, only sidelink logical channels belonging to the same destination can be multiplexed into a MAC PDU for every unicast, groupcast and broadcast transmission which is associated to the destination. NG-RAN can also control whether a sidelink logical channel can utilise the resources allocated to a configured sidelink grant Type 1 (see clause 16.9.3.2). For transmissions to RX UE(s) using SL DRX operation, LCP restrictions ensure that a TX UE transmits data in the active time of the RX UE(s).

*Next Modified Subclause*

#### 16.9.3.2 Scheduled Resource Allocation

NG-RAN can dynamically allocate resources to the UE via the SL-RNTI on PDCCH(s) for NR sidelink communication.

In addition, NG-RAN can allocate sidelink resources to a UE with two types of configured sidelink grants:

- With type 1, RRC directly provides the configured sidelink grant only for NR sidelink communication;

- With type 2, RRC defines the periodicity of the configured sidelink grant while PDCCH can either signal and activate the configured sidelink grant, or deactivate it. The PDCCH is addressed to SL-CS-RNTI for NR sidelink communication.

Besides, NG-RAN can also semi-persistently allocate sidelink resources to the UE via the SL Semi-Persistent Scheduling V-RNTI on PDCCH(s) for V2X sidelink communication.

*Next Modified Subclause (new)*

### 16.9.5 SL DRX

#### 16.9.5.1 General

Sidelink supports timer-based SL DRX for unicast, groupcast, and broadcast. Similar parameters as defined in section 11 for Uu (on-duration, inactivity-timer, retransmission-timer, cycle) are defined for SL to determine the SL active time for SL DRX. During the SL active time for SL DRX, the UE performs SCI monitoring for data reception (i.e., PSCCH and 2nd stage SCI on PSSCH). The UE may skip monitoring of PSCCH and 2nd stage SCI on PSSCH for data reception during inactive time for SL DRX.

SL DRX configuration is specific to cast type (unicast, groupcast, broadcast). AS layer can determine the DRX parameters for SL DRX configuration with no additional inputs (other than QoS) from the upper layer, and can provide the PC5 DRX information to the upper layer. The SL active time of the RX UE includes the time in which any of its applicable on-duration timer(s), inactivity-timer(s) or retransmission timer(s) (for any of unicast, groupcast, or broadcast) are running.

*(Editor’s note: WA to be confirmed by RAN2): The active time also includes the time in which a UE is expecting CSI report following a CSI request.*

#### 16.9.5.2 Unicast

For unicast, SL DRX is configured per pair of source/destination L2 ID.

*(Editor’s note: For OOC, per direction DRX configuration is a baseline)*

The UE maintains a set of SL DRX timers per pair of source/destination and per direction, and starts/restarts the timers with the value configured for that pair of source/destination and direction. The DRX configuration between a pair of source/destination L2 IDs for a direction may be negotiated between the UEs in the AS layer. For DRX configuration of each direction, where one UE is the TX UE and the other is the RX UE, TX-centric approach is supported whereby:

 - RX UE sends assistance information to the TX UE using a PC5-RRC message

 - TX UE sends the SL DRX configuration to be used by the RX UE to the RX UE using RRCReconfigurationSidelink

When the TX UE is in-coverage and in RRC\_CONNECTED, the TX UE may report the received assistance information to its serving gNB and may obtain the SL DRX configuration to send to the RX UE in dedicated RRC signaling from the network. When the RX UE is in-coverage and in RRC\_CONNECTED, the RX UE can report the received SL DRX configuration to its serving gNB.

On-duration timer, inactivity-timer, HARQ RTT and retransmission timers are supported in unicast. SL HARQ RTT timer and SL retransmission timer are maintained per SL HARQ process at the RX UE. The TX UE maintains a timer corresponding to the SL inactivity timer in the RX UE for each pair of source/destination L2 ID, and uses the timer as part of the criterion for determining the allowable transmission time for the RX UE.

*(Editor’s note: WA to be confirmed by RAN2): SL HARQ RTT timer can be derived from the retransmission resource timing when the SCI indicates a retransmission resource*

SL DRX MAC CE is introduced for SL DRX operation in unicast.

#### 16.9.5.3 Groupcast/Broadcast

For groupcast/broadcast, SL DRX is configured commonly among multiple UEs based on QoS profile and L2 ID. Multiple SL DRX configurations (beyond just being cast type specific) are supported.

SL DRX cycle is configured per QoS profile. The starting offset of the SL DRX cycle is determined based on the destination L2 ID, and does not take QoS into account. In-coverage TX and RX UEs in RRC\_IDLE/RRC\_INACTIVE obtain their SL DRX configuration from SIB. In this case, the network coordinates the active time between different cells. UEs (TX or RX) in RRC\_CONNECTED can obtain the SL DRX configuration from SIB. For the out of converage case, the SL DRX configuration is obtained from pre-configuration. The inactivity timer may take into consideration the QoS.

On-duration timer, inactivity-timer, HARQ RTT and retransmission timers are supported for groupcast. On-duration timer is supported for broadcast. SL HARQ RTT timer and SL retransmission timer are maintained per SL HARQ process at the RX UE. The TX UE maintains a timer corresponding to the SL inactivity timer in the RX UE for each pair of sourc/destination L2 ID, and uses the timer as part of the criterion for determining the allowable time for to the RX UE.

#### 16.9.5.4 Alignment between Uu DRX and SL DRX

Alignment of Uu DRX and SL DRX for a UE in RRC\_CONNECTED is supported for unicast, groupcast, and broadcast. Alignment of Uu DRX and SL DRX at the same UE is supported. In addition, for mode 1 scheduling, the alignment of Uu DRX of the TX UE and SL DRX of the RX UE is considered.

Alignment may comprise of either full overlap or partial overlap in time between Uu DRX and SL DRX. For SL RX UEs in RRC\_CONNECTED, alignment is achieved by the gNB.

*Next Modified Subclause*

# 11 UE Power Saving

The PDCCH monitoring activity of the UE in RRC connected mode is governed by DRX, BA, and DCP.

When DRX is configured, the UE does not have to continuously monitor PDCCH. A SL UE can be configured with DRX, in which case, SL grants are provided to the UE during its active time. DRX is characterized by the following:

- **on-duration**: duration that the UE waits for, after waking up, to receive PDCCHs. If the UE successfully decodes a PDCCH, the UE stays awake and starts the inactivity timer;

- **inactivity-timer**: duration that the UE waits to successfully decode a PDCCH, from the last successful decoding of a PDCCH, failing which it can go back to sleep. The UE shall restart the inactivity timer following a single successful decoding of a PDCCH for a first transmission only (i.e. not for retransmissions);

- **retransmission-timer**: duration until a retransmission can be expected;

- **cycle**: specifies the periodic repetition of the on-duration followed by a possible period of inactivity (see figure 11-1 below);

**- active-time**: total duration that the UE monitors PDCCH. This includes the "on-duration" of the DRX cycle, the time UE is performing continuous reception while the inactivity timer has not expired, and the time when the UE is performing continuous reception while waiting for a retransmission opportunity.

# Annex - Collection of RAN2 agreements on NR SL Enhancements

Cyan highlight – agreement captured in stage-2 specifications

Green highlight – stage-3 level agreement, not captured in stage-2 specifications

No highlight – agreement with no direct impact on specifications

RAN2#113-e agreements

Agreements on SA2’s questions:

1: For Q1, RAN2 reply AS layer can determine DRX parameters and no additional input from V2X layer other than the currently available QoS is needed.

2: RAN2 confirms that for unicast, the PC5 DRX may be negotiated between the UEs in AS layer. We can also include this RAN2 confirmation into the response LS.

3: For Q2, RAN2 further reply that for SL unicast, other than DRX parameter negotiation/sharing reason, AS layer can provide the PC5 DRX related information to the V2X layer, and RAN2 is working on the detailed DRX parameter that applies to each cast type. RAN2 would keep SA2 being update on the RAN2 progress.

4: For Q3, RAN2 reply that RAN2 does not think it is beneficial for broadcast and groupcast to share the PC5 DRX related information amongst UEs in the vicinity in V2X layer.

5: For Q4, RAN2 reply that RAN2 is working on this aspects following the WID bullet of “Specify mechanism aiming to align sidelink DRX wake-up time with Uu DRX wake-up time in an in-coverage UE”, RAN2 would keep SA2 updated on related working progress.

Agreements on high-level principles for SL DRX

1: For SL unicast (after SL unicast link is established), SL DRX configuration can be configured per a pair of source/destination. FFS whether SL DRX operates per direction or for both directions.

2: For SL groupcast/broadcast, SL DRX configuration can be configured in common. FFS on granularity of SL DRX configuration.

3: Short DRX cycle is not introduced for SL unicast, groupcast and broadcast in Rel-17.

4: For data reception, RAN2 defines the behaviour for monitoring the SCI reception (i.e., PSCCH and 2nd SCI on PSSCH) during the SL active time for SL DRX. For data reception, the UE may skip monitoring of PSCCH and 2nd SCI on PSSCH during inactive time for SL DRX. Sensing aspect is not considered in this agreement.

5a: At least, On-duration timer and Inactivity timer are supported in SL unicast.

5b: HARQ RTT is supported in SL unicast. FFS for the detailed condition when it is supported. FFS whether HARQ RTT is explicitly configured or can be based on SCI. FFS on the need of HARQ retransmission timer.

6a: At least, on-duration timer is supported for SL groupcast. FFS for the need and detailed condition when inactivity timer is supported.

6b: HARQ RTT is supported in SL groupcast. FFS for the detailed condition when it is supported. FFS whether HARQ RTT is explicitly configured or can be based on SCI. FFS on the need of HARQ retransmission timer.

7: At least, on-duration timer is supported for SL broadcast.

8: SL DRX Command MAC CE is introduced for SL DRX operation in unicast. FFS on the need of groupcast. FFS on the detailed UE behaviour (including relation to inactivity timer).

9: In mode 1, when in RRC\_CONNECTED, if DRX is configured, the MAC entity monitors the PDCCH for the MAC entity's SL-RNTI, SLCS-RNTI and SL Semi-Persistent Scheduling V-RNTI in Uu DRX Active Time. MAC entity does not need to monitor the PDCCH for the MAC entity's SL-RNTI, SLCS-RNTI and SL Semi-Persistent Scheduling V-RNTI in Uu DRX in-active Time.

Agreements on SL DRX configurations

1: For broadcast/groupcast, for out-of-coverage case, TX-UE/RX-UE obtain DRX configuration from pre-configuration.

2: For broadcast/groupcast, for in-coverage case, RRC\_IDLE/INACTIVE TX-UE/RX-UE obtain DRX configuration from SIB. It is up to network implementation how to coordinate active time between different cells.

3: For broadcast/groupcast, for in-coverage case, for RRC\_CONNECTED TX-UE/RX-UE can obtain DRX configuration from SIB. FFS on whether dedicated-RRC is also used.

4: For unicast, for OOC scenario, the UE who sends out the DRX configuration decides on the DRX configuration. FFS on whether pre-configuration and/or the assistance information from the peer UE is also taken into account when determining the DRX configuration.

5: For unicast, for OOC scenario, adopt per-direction DRX configuration is as baseline. FFS on whether it is TX-centric or Rx-centric, i.e. TX UE or RX UE decides it.

Agreements on granularity of SL DRX operation for groupcast/broadcast

1: RAN2 kindly agree that for groupcast and broadcast communication further granularity to multiple sets of DRX configurations (beyond just cast type) is required i.e. more than two DRX Cycle configurations should be supported in specification.

2: RAN2 will study/discuss how PQI and/or L2 destination ID is used to derive groupcast and broadcast DRX configuration.

Agreements on SL DRX on groupcast/broadcast

1: Timer-based SL DRX is also applied to SL groupcast/broadcast.

RAN2#113bis-e agreements

Agreements on details of timer

1: The following parameters are supported as part of the SL DRX configuration for all cast types: sl-drx-StartOffset, sl-drx-Cycle, sl-drx-onDurationTimer, and sl-drx-SlotOffset.

2: The RX UE determines the symbol/slot/subframe associated with the start of the DRX cycle using the configured sl-drx-Cycle, sl-drx-StartOffset. FFS on details.

3: The RX UE starts the sl-drx-onDurationTimer after sl-drx-slotOffset from the beginning of the subframe.

4: The RX UE’s active time includes the time in which sl-drx-on-DurationTimer is running.

5: For unicast, the TX UE behaviors should be specified to keep aligned with the RX UE regarding the DRX Active time. FFS the specific Spec impacts needed at the TX side.

6: For unicast, the RX UE maintains a separate SL inactivity timer for each pair of src/dest L2 ID.

7: For unicast, the SL inactivity timer value may take into consideration the QoS. Whether any specification impacts are needed is FFS.

8: For unicast, RX UE starts/restarts the inactivity timer with the value configured for that pair of src/dest L2 ID.

9: For unicast, the RX UE (re)starts the inactivity timer upon reception of a new SL data transmission from the RX UE perspective for that pair of src/dest L2 ID.

10: For unicast, the RX UE (re)starts the inactivity timer based on information in SCI (SCI1+SCI2). FFS if the MAC layer can stop the inactivity timer.

11: For unicast, the RX UE (re)starts the inactivity timer in the first slot after SCI (SCI1+SCI2) reception.

12: For unicast, the TX UE maintains a timer corresponding to the SL Inactivity timer in the RX UE for each pair of src/dest L2 ID, and uses the timer as part of criterion for determining the allowable transmission time for the RX UE.

13: For unicast, the TX UE (re)starts its timer corresponding to the SL inactivity timer at the RX UE at the slot following an SCI transmission indicating a new data transmission. FFS the specific spec impacts needed at the TX side.

14: SL Inactivity timer is supported for groupcast. FFS on the scenarios where it is supported.

15: SL Inactivity timer is not supported for broadcast transmissions.

16: The RX UE is active on sidelink (monitors SCI1+SCI2) as long as at least one of the SL inactivity timers associated with unicast or groupcast (if supported) is running.

17: As a baseline, agreements 7-13 inclusive are applied to SL inactivity timer for groupcast, with the difference that “src/dest L2 ID pair” is replaced with “groupcast L2 destination ID or src/dest L2 id pair” (dependent on the conclusion of proposal 17). Any specific handling which may be needed for synchronization of inactivity timers for the groupcast case is FFS.

18: SL HARQ RTT timer and SL HARQ retransmission timer are maintained per SL HARQ process at the RX UE.

19: Working assumption: SL HARQ RTT timer can be derived from the retransmission resource timing when the SCI indicates a retransmission resource. FFS whether explicitly configured SL HARQ RTT timer may be still required. If big problem is identified next meeting, we can revisit it.

20: The value(s) of the SL HARQ RTT Timer, when explicitly configured and not determined via SCI (if agreed to do so), is determined by UE or NW implementation.

21: For unicast, sidelink retransmission timer can be supported for at least some cases of HARQ disabled transmissions. FFS whether HARQ RTT is supported or not.

22: For transmissions with HARQ feedback, the RX UE starts the SL HARQ RTT timer in the symbol/slot following the end of PSFCH transmission.

23: If the RX UE does not transmit PSFCH for a HARQ enabled transmission (e.g. due to UL/SL prioritization) the RX UE still starts the HARQ RTT timer in the symbol/slot following the end of PSFCH resource.

24: For cases where there is some uncertainty in the timing of a retransmission for a HARQ process (e.g. due to no retransmission resource indicated in the SCI, or possible reselection by the TX UE) the RX UE uses a configured retransmission timer.

25: Retransmission timer can be started upon expiry of the HARQ RTT timer.

26: The value(s) of the SL retransmission timer can be determined by UE or NW implementation.

27: The SL active time of the RX UE includes the time in which any of its applicable sl-drx-OnDuration(s), sl-DRXInactivityTimer(s), or sl-drx-RetransmissionTimer(s) are running.

28: Working assumption: The slots when the UE is expected CSI report following a CSI request is considered as SL active time.

29: RAN2 assumes LCP enhancements for ensuring a TX UE transmits data in the active time of an RX UE are needed. FFS on the resource (re)selection enhancements (e.g. limiting the resources to the active time for peer UE).

Agreements on alignment between Uu DRX and SL DRX

1: Alignment of Uu DRX and SL DRX for unicast is supported. FFS on how alignment is achieved.

2: Alignment of Uu DRX and SL DRX for groupcast and broadcast is supported. FFS on whether new mechanisms are needed.

3: Alignment of Uu DRX and SL DRX for UE in RRC CONNECTED shall be a baseline.

4: The alignment of Uu DRX and SL DRX of the same UE shall be considered.

RAN2#114-e agreements

Agreements on TX-UE centric or RX-UE centric DRX configuration determination

1: In SL unicast, for DRX configuration of each direction where one UE as Tx-UE and the other UE as Rx-UE, support signalling exchange including both 1) Signaling-1: signalling from RX-UE to TX-UE, and 2) Signaling-2: signalling from TX-UE to RX-UE.

2: For SL unicast, TX-UE centric DRX configuration based on the assistance information from RX-UE is agreed as baseline.

2a: In SL unicast, for DRX configuration of each direction where one UE as Tx-UE and the other as Rx-UE, signaling-1 (Rx->Tx) is carried via a new PC5-RRC message, from Rx-UE to Tx-UE.

2b: In SL unicast, for DRX configuration of the direction where one UE as Tx-UE and the other as Rx-UE, signaling-2 (Tx->Rx) is carried via RRCReconfigurationSidelink, to deliver DRX configuration from Tx-UE to Rx-UE.

3: In SL unicast, for DRX configuration of each direction where one UE as Tx-UE and the other UE as Rx-UE, when Tx-UE is in-coverage and in RRC\_CONNECTED state, Tx-UE may report the information received in signaling-1 (Rx->Tx) to the serving network.

4: In SL unicast, for DRX configuration of each direction where one UE as Tx-UE and the other as Rx-UE, when Tx-UE is in-coverage and in RRC\_CONNECTED state, Tx-UE may obtain DRX configuration from dedicated RRC to generate signalling-2 (Tx->Rx).

5: In SL unicast, for DRX configuration of each direction where one UE as Tx-UE and the other as Rx-UE, when Rx-UE is in-coverage and in RRC\_CONNECTED state, Rx-UE report the DRX configuration received in signalling-2 (Tx->Rx) to the serving network.

Agreements on Uu DRX Impact to Support SL

1: SL-specific drx-onDurationTimer is not introduced in Uu.

2: SL-specific drx-InactivityTimer is not introduced in Uu.

3: For Tx UE configured with sidelink resource allocation mode 1, it should start or restart the Uu drx-InactivityTimer if the UE receives a PDCCH indicating a new SL transmission.

4: SL-specific drx-HARQ-RTT-Timer and SL-specific drx-RetransmissionTimer should be introduced in Uu, which are maintained based on sidelink process.

5: When sl-PUCCH-Config is configured, SL-specific drx-HARQ-RTT-Timer and SL-specific drx-RetransmissionTimer should be maintained for UE configured with sidelink resource allocation mode 1.

6: Adopt the following definitions of SL-specific drx-HARQ-RTT-Timer and drx-RetransmissionTimer (the detailed name of the timers can be further discussed):

 - drx-RetransmissionTimerSL (per Sidelink process): the maximum duration until a grant for SL retransmission is received;

 - drx-HARQ-RTT-TimerSL (per Sidelink process): the minimum duration before a SL retransmission grant is expected by the MAC entity.

7: When sl-PUCCH-Config is configured (and the PUCCH is transmitted), the UE should start the SL-specific drx-HARQ-RTT-Timer in Uu for the corresponding SL HARQ process in the first slot after the end of the corresponding transmission carrying the SL HARQ feedback via the PUCCH.

Agreements on DRX for SL GC and BC

1: WA: RAN2 assumes that the V2X layer of Rx UE passes the PC5 QoS parameters together with the corresponding destination layer-2 ID(s) for reception to the AS layer, as per TR 23.776 conclusion, and will further discuss SL DRX design based on this working assumption. RAN2 does not need to send LS to SA2 to clarify this issue.

2: For GC/BC, DRX cycle should take at least QoS requirement into consideration.

3: For GC/BC, DRX cycle(s) is configured per QoS profile. FFS on the need of down-select one DRX cycle from available DRX cycles for a specific L2 DST ID if UE has multiple QoS profiles for same DST L2 ID.

4: For GC/BC, DRX cycle is configured per QoS profile.

5a: For GC/BC, RAN2 understands that sl-drx-startoffset does not take QoS requirement into consideration.

5b: For GC/BC, For GC/BC, sl-drx-startoffset is set based on DST L2 ID.

Agreements on alignment between Uu DRX and SL DRX

1: Alignment of Uu DRX and SL DRX for UE may comprise the full overlapping between Uu DRX and SL DRX in time.

2: Alignment of Uu DRX and SL DRX for UE may comprise the partial overlapping between Uu DRX and SL DRX in time.

3: For at least SL RX-UEs in RRC CONNECTED, the alignment of Uu DRX and SL DRX is up to gNB. FFS for SL TX-UE.

4: RAN2 to down-scope alignment of Uu DRX and SL DRX for UEs in RRC IDLE and RRC INACTIVE from Rel-17.

5: In case of Mode 1 scheduling, the alignment of Uu DRX of Tx UE and SL DRX of Rx UE shall be considered. FFS on how alignment is achieved.

Agreements on geolocation based SL DRX

1: Geolocation based SL DRX is not supported in Rel-17.

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