**3GPP TSG-RAN WG2 Meeting #116-bis-e Electronic R2-22xxxx**

**Online Meeting, Jan 17th – 25th, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.304** | **CR** |  | **rev** |  | **Current version:** | **16.7.0** |  |
|  |
| *For* [***HELP***](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:***  | Running CR of TS 38.304 for eSL |
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| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_SL\_enh-Core |  | ***Date:*** | 2022-1-11 |
|  |  |  |  |  |
| ***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)* |
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| ***Reason for change:*** | This CR introduces the support of Rel17 features for SL DRX. |
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| ***Summary of change:*** | Add description of SL-DRX in section 8.1. |
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| ***Consequences if not approved:*** | Rel17 features for sidelink are not supported in NR. |
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| ***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*

## 8.1 NR sidelink communication and V2X sidelink communication

The UE may transmit or receive NR sidelink communication if it fulfils the condition(s) defined in TS 38.331 [3], clause 5.8.2. When UE is in-coverage for sidelink operation as defined in clause 8.2, the UE may perform NR sidelink communication according to *SystemInformationBlockType12,* and when out-of-coverage for sidelink, the UE may perform NR sidelink communication according to *SL-V2X-PreconfigurationNR* or according to *SystemInformationBlockType12* of the cell on the frequency which provides inter-carrier NR sidelink configuration, as specified in TS 38.331 [3]. The UE shall not perform NR sidelink communication according to *SL-V2X-PreconfigurationNR* if the UE detects a cell providing NR sidelink configuration or inter-carrier NR sidelink configuration for the frequency UE is interested to perform NR sidelink communication on.

The UE may transmit or receive V2X sidelink communication if it fulfills the condition(s) defined in TS 36.331[6], clause 5.10.1d. When UE is in-coverage for sidelink operation as defined in clause 8.2, the UE may perform V2X sidelink communication according to *SystemInformationBlockType13/SystemInformationBlockType14* of the cell on an NR frequency.

The UE may use timer-based sidelink DRX for NR sidelink unicast, groupcast and broadcast as specified in TS 38.331[3] in order to reduce power consumption.

For NR sidelink broadcast and groupcast, when in-coverage for NR sidelink operation as defined in clause 8.2, both the TX UE and RX UE in RRC\_IDLE and RRC\_INACTIVE state may obtain SL DRX configuration for broadcast and groupcast from *SystemInformationBlockType12*. It is up to network implementation how to coordinate active time between different cells; when out-of-coverage for NR sidelink, both the TX UE and RX UE may obtain SL DRX configuration for broadcast and groupcast from *SL-V2X-PreconfigurationNR.*

For NR sidelink unicast, a TX UE in RRC IDLE, INACTIVE state or out-of-coverage determines the sidelink DRX configuration of the RX UE, when to send the sidelink DRX configuration to RX UE is up to TX UE implementation, i.e. TX UE can send the sidelink DRX configuration to RX UE without any restriction. For NR sidelink unicast, RX UE may include its desired SL DRX configuration in the assistance information which is transmitted to TX UE.

For NR sidelink unicast, when a TX UE in RRC IDLE, INACTIVE state or out-of-coverage has obtained the assistance information from RX UE, it may derive the values for SL DRX based on UE implementation; when a TX UE in RRC IDLE, INACTIVE state or out-of-coverage does not receive any assistance information from RX UE, TX UE considers that RX UE can accept for any DRX configuration (including no DRX configuration), and derives the value of the inactivity timer based on its implementation.

NOTE 1: SL paging and SL PO for SL DRX is not introduced in this release.

[Editor’s Note: how to derive other SL DRX parameters except for inactivity timer if not receiving any assistance information from RX UE is FFS.]

# Annex - Collection of RAN2 agreements on NR SL Enhancements

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.

RAN2#115-e agreements

Agreements on TX profiles:

1: For GC/BC, TX profile is introduced in Rel-17 for sidelink enhancement. FFS whether a TX profile identifies a Release, or one or more sidelink feature groups.

2: RAN2 understand a service type can be mapped to a TX profile, i.e. V2X and ProSe.

3: A TX profile is indicated from upper layer to AS layer. FFS whether a TX profile needs to be provided with service type information or L2 id.

4: For GC/BC, a Rel-17 TX UE shall only assume SL DRX for the RX UEs when the associated TX profile corresponding to support of SL DRX. FFS whether a TX profile needs to be provided with service type information or L2 id.

5: For GC/BC only communication, a Rel-17 RX UE determines SL DRX is used if all service types/L2 ids of interest have an associated TX profile corresponding to support of SL DRX. A Rel-17 RX UE enables SL DRX operation for a service type/L2 id with the associated TX profile.

6: For UC, for SL transmissions after PC5-RRC connection is established, no backward compatibility issue of SL DRX is assumed, i.e. backward compatibility is handled based on PC5-RRC UE capability signalling.

7: Send an LS to SA2 to inform them of the RAN2 agreements related to TX profile.

Agreements on Uu DRX timer impacts:

1: When sl-PUCCH-Config is configured but the PUCCH is not transmitted due to UL/SL prioritization, the TX UE should start the SL-specific drx-HARQ-RTT-Timer in Uu for the corresponding SL HARQ process in the first slot/symbol after the end of the corresponding PUCCH resource. FFS on slot or symbol.

2: When sl-PUCCH-Config is not configured, the SL-specific drx-RetransmissionTimer should be supported.

3: SL-specific drx-RetransmissionTimer is started at the first symbol after the end of last PSSCH resource scheduled through one DCI (with the assumption RAN2 agrees not to support SL-specific drx-HARQ-RTT-Timer but to support SL-specific drx-RetransmissionTimer when sl-PUCCH-Config is not configured, when sl-PSFCH-Config is configured). FFS the SL-specific drx-RetransmissionTimer is started at the first slot after the end of last PSSCH resource scheduled through one DCI instead.

4: SL-specific drx-RetransmissionTimer is started at the first symbol after the end of last PSSCH resource scheduled through one DCI (with the assumption RAN2 agrees not to support SL-specific drx-HARQ-RTT-Timer but to support SL-specific drx-RetransmissionTimer when sl-PUCCH-Config is not configured, when sl-PSFCH-Config is not configured). FFS the SL-specific drx-RetransmissionTimer is started at the first slot after the end of last PSSCH resource scheduled through one DCI instead.

Agreements on SL DRX timer maintenance:

1: Inactivity timer is not (pre)configured per QoS profile for unicast in IDLE/INACTIVE or OOC case.

2: In groupcast, the RX UE maintains a separate inactivity timer for each L2 Destination ID.

3: SL inactivity timer can be supported for all scenarios of groupcast.

4: Stopping the inactivity timer to handle L1/L2 mismatch is not supported.

5: Specifying mechanisms to use HARQ feedback to handle Inactivity timer mismatch between TX and RX UE (for unicast and groupcast) is not considered in this release.

6: Restarting the inactivity timer at the TX UE is not needed upon transmission of an SCI indicating a retransmission.

7: Inactivity timer can be used for unicast whether HARQ feedback is enabled or disabled.

8: For groupcast, the TX UE restarts its timer corresponding to inactivity timer for the L2 destination ID (used for determining the allowable transmission time) upon reception of new data with the same destination ID.

9: HARQ RTT is supported for both HARQ enabled and HARQ disabled cases by allowing HARQ RTT timer to be set to different values. FFS on the specific values that can be used for HARQ disabled case.

10: Regardless of whether there is uncertainty or not, in the timing of a retransmission for a HARQ process the RX UE uses a retransmission timer.

11: For unicast and groupcast, retransmission timer value is configurable.

12: SL HARQ RTT timer and SL Retransmission timer are not used for broadcast transmissions.

13: When data is available for transmission to one or more RX UE in DRX, TX UE selects the resources taking into account the active time (current or future) of the RX UE(s) determined by the timers maintained at the TX UE. Details are FFS. FFS whether RAN1 or RAN2 implement this restriction. Send LS to RAN1.

14: For unicast, the TX UE selects the resources for the initial transmission associated with any active time (e.g. on duration timer or inactivity timer, or retransmission timer) at the RX UE. How to handle cases when a transmission may cause these timers to be running at the RX UE is FFS. FFS on groupcast. FFS on whether any spec impact.

15: For unicast, the TX UE can select the resources for the retransmission associated with any active time (e.g. on duration timer or inactivity timer, or retransmission timer) at the RX UE. How to handle cases when a transmission may cause these timers to be running at the RX UE is FFS. FFS on groupcast. FFS on whether any spec impact.

16: For broadcast, the TX UE can select the resources for the initial transmission associated with any active time supported by broadcast (i.e. on duration timer) at the RX UE.

17: For broadcast, the TX UE can select the resources for the retransmission associated with any active time supported by broadcast (i.e. on duration timer) at the RX UE.

Agreements on SL DRX configuration for UC:

1: For determining SL DRX configuration by TX UE, SL DRX capable RX UE is not mandatory to provide the SL DRX assistance information to TX UE. FFS on the interpretation if assistance information is not provided.

2: For SL unicast, RX UE may include its desired SL DRX configuration in the assistance information which is transmitted to TX UE.

3: For SL unicast, RX UE may send the SL DRX assistance information to TX UE when the previously transmitted SL DRX assistance information has changed.

4: For unicast, a two-step process (i.e., RX UE accepts or rejects TX UE’s suggestion) is adopted as a baseline, i.e., FFS on the following TX/RX UE behaviours when reject happens.

 • Step 1: TX UE sends RRCReconfigurationSidelink containing a SL DRX configuration to be applied by RX UE to RX UE

 • Step 2: RX UE replies with a PC5-RRC signalling indicating acceptance or rejection for the SL DRX configuration. FFS on whether the new rejection cause for SL DRX needs to be defined. FFS on whether RRCReconfigurationFailureSidelink or RRCReconfigurationCompleteSidelink is used in Step 2.

5: For unicast in IDLE/INACTIVE or OOC, in case there is no SL DRX assistance information received from RX UE, TX UE derives the value of the inactivity timer based on its implementation. FFS on the interpretation if assistance information is not provided.

6: For unicast in IDLE/INACTIVE or OOC, if TX UE has obtained assistance information from RX UE, TX UE derives the value of the inactivity timer based on its implementation.

Agreements on SL DRX configuration for GC/BC:

1: For SL BC and GC, for in-coverage case, RRC\_CONNECTED TX-UE/RX-UE can obtain DRX configuration from 1) SIB which is delivered via dedicated RRC signalling as in legacy, and from 2) from dedicated RRC signalling during handover, i.e., in an RRCReconfiguration message including reconfigurationWithSyn. Otherwise, RRC\_CONNECTED TX-UE/RX-UE does not expect DRX configuration from dedicated RRC signalling.

2: For BC/GC, the on-duration timer length and inactivity timer length (only for GC) are configured per QoS profile.

3: For GC, do not pursue per-QoS or per-L2-ID configuration for RTT timer length and retransmission timer length.

4: For BC/GC, default DRX configuration(s) can be used for QoS profile(s) which cannot be mapped into DRX configuration configured for the dedicated QoS profile(s).

5: For BC/GC, do not pursue DRX command MAC CE in Rel-17.

Agreements on other remaining issues:

1: For SL unicast, UE stops on-duration timer and inactivity timer for the unicast link where SL DRX MAC CE is received from peer UE.

2: When TX UE sends SL DRX MAC CE is up to UE implementation.

3: For unicast, SL BC DRX configuration is applied for DCR message [20/22]. FFS on whether default SL BC DRX configuration or which SL BC DRX configuration for DCR message should be used.

4: Working assumption: DRX configuration for V2X group management signaling is out of RAN2 scope.

5: For unicast, if serving gNB of a RRC\_CONECTED TX UE determines the DRX configuration of RX UE, TX UE should send the unicast DRX configuration to the RX UE upon receiving the corresponding DRX configuration from the serving gNB.

6: For unicast, when to send the DRX configuration to RX UE is up to TX UE implementation for the case that TX UE determines the DRX configuration of the RX UE, i.e. TX UE can send the DRX configuration to RX UE without any restriction.

7: For GC, it’s up to UE implementation to determine when the DRX configuration for SL GC communication is applied, i.e. no spec impact.

8: For BC, it’s up to UE implementation to determine when the DRX configuration for SL BC communication is applied, i.e. no spec impact.

RAN2#116-e agreements

Agreement on SL DRX design:

1: Previous RAN2 WA “SL DRX should take PSCCH monitoring also for sensing (in addition to data reception) into account if SL DRX is used” is dropped.

Agreements on stage 3 open issues for RRC running CR:

1: To remove implementations in clause 5.8.9.1.3[5] and clause 5.8.9.1.9[5].

2: Remove the current 5.8.X and EN in 5.2.2.4.13. The behaviour description is revised as “2>if sl-DRX-Config-GC-BC is included in SIB12-IE: 3> store the NR sidelink DRX configuration and perform sidelink DRX operation”.

3: Use one specific configuration which is not associated with QoS or L2 ID, for HARQ RTT timer and Retransmission timer of groupcast.

4: Remove the current implementation in clause 5.7.4.3 regarding UE behaviour triggered by E-UTRA RRC message [5].

5: Remove the current implementation and EN in Clause 5.3.5.9 Other configuration.

6: Remove the current implementation in clause 5.7.4.1/2/3[5].

7: RAN2 to decide related UE behaviour including using either UAI or SUI, for reporting DRX configuration or sidelink assistance information to its serving gNB.

8: Change “SL-QoS-Profile-r17” to “SL-QoS-Profile-r16” and “maxNrofSL-QFIs-r17” to maxNrofSL-QFIs-r16” (clause 6.3.5[5]). Remove “Editor’s note 4: FFS how to implement SL-QoS-Profile-r17.”

9: Put IE “sl-DRX-Config” under a new IE of SL-PHY-MAC-RLC-Config-v17xy, further put this new IE of SL-PHY-MAC-RLC-Config-v17xy under SL-ConfigDedicatedNR; add one EN “FFS extension marker for SL-PHY-MAC-RLC-Config-v17xy is needed or not”.

10: To place default DRX Configuration for GC/BC outside the “SL-DRX-GC-BC-PerQoS-List-r17. Remove the current Boolean indicator “sl-DefaultDRX-GC-BC-r17” from the current version.

Agreements on stage 3 open issues for MAC running CR:

1: Priority value of sidelink DRX Command MAC CE is a fixed value (i.e., “1”).

Agreements on SL-DRX for ProSe:

1: RAN2 confirm R17 SL-DRX design can support non-relay-related ProSe communication directly without additional specific solution discussion / specification effort.

2: RAN2 confirm the R17 SL-DRX design can support non-relay-related ProSe discovery by reusing SL default-DRX configuration used for communication without further additional specific solution discussion / specification effort.

Agreements on SL-DRX for ProSe:

1: RAN2 confirms Rel-17 SL-DRX design can be reused for relay-related ProSe communication in layer-3 relay without additional specific solution discussion/specification effort.

2: Keep RAN2 previous agreement (prioritize the non-relay case without consideration of relay specific optimization in Rel-17) but we’re not going to make any conclusion if L2 relay-related ProSe communication is supported or not in Rel-17 now.

3: RAN2 confirms Rel-17 SL-DRX design can be reused for L3 relay-related ProSe discovery without additional specific solution discussion/specification effort (by applying SL default-DRX configuration). No conclusion if L2 relay-related ProSe discovery is supported or not in Rel-17 now. RAN2 does not specify any restriction now.

4: Will include the agreement above in addition to all other related agreements made last week and from this offline discussion into the response LS to SA2.

Agreements on HARQ RTT:

1: RAN2 confirms the working assumption: “SL HARQ RTT timer can be derived from the retransmission resource timing when the SCI indicates a retransmission resource”

Agreements on HARQ RTT:

1: One-to-one mapping is needed between Tx and Rx resource pools for derivation of SCI-based RTT timer. We do not need to specify it.

2: In case RAN2 pursue the SCI based RTT timer, UE only use the immediately next retransmission resource indicated in SCI to derive a single RTT value.

Agreements on SL DRX for mode 1:

1: For the issue that a mode-1 SL grant being provided by network to Tx-UE yet it is not in SL active time of any destination that has data to be sent, for initial transmission, drop the grant. FFS if any spec change.

2: For the issue that a mode-1 SL grant being provided by network to Tx-UE yet it is not in SL active time of any destination that has data to be sent, for retransmission, drop the grant.

Agreements on identified FFSs:

1: The onduration timer should be included in the RX UE’s desired SL DRX configuration.

2: The DRX start offset should be included in the RX UE’s desired SL DRX configuration.

3: The DRX cycle should be included in the RX UE’s desired SL DRX configuration.

4: When TX UE doesn’t receive any assistance information from RX UE, TX UE considers that RX UE is ok with any DRX configuration (including no DRX configuration).

5: For GC, when performing the down-selection of the inactivity timer, select the inactivity timer whose inactivity timer length is the largest one (among multiple ones for the corresponding L2 id) as the selected inactivity timer.

6: Common default SL DRX configuration should be used for BC/GC.

7: The default SL DRX configuration for BC/GC can be used for the DCR message. FFS for UC (at least for the initial message).

8: RAN2 confirms that DRX configuration for V2X group management signaling is out of RAN2 scope. No additional new mechanism is needed.

9: A Tx profile identifies one or more sidelink feature groups.

10: When sl-PUCCH-Config is configured but the PUCCH is not transmitted e.g. due to UL/SL prioritization, the starting timing of SL-specific drx-HARQ-RTT-Timer is referring to symbol.

11: RAN2 agree to revise the agreement made in RAN2#114-e as below:

 “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 symbol after the end of the corresponding transmission carrying the SL HARQ feedback via the PUCCH.”

12: In case of SL-specific drx-HARQ-RTT-Timer is not supported but to support SL-specific drx-RetransmissionTimer, the starting timing of SL-specific drx-RetransmissionTimer is referring to symbol.

13: It is up to Rx UE’s implementation to determine its desired SL DRX configuration.

14: The SL DRX assistance information request from Tx UE to Rx UE is not supported in the current release.

15: Working assumption: Option2 (Need of down-selection for DRX cycle and on-duration) for GC/BC when multiple QoS profiles are associated with the same DST L2 ID.

Agreements on DRX timer length and start time:

1: For UC/GC/BC, the units of Uu DRX timers are taken as baseline for the following SL-DRX parameters:

 - sl-drx-LongCycle and sl-drx-StartOffset in millisecond.

 - sl-drx-onDurationTimer in multiples of 1/32 ms (subMilliSeconds) or in ms (milliSecond).

 - sl-drx-SlotOffset in multiples of 1/32 ms.

 - sl-drx-InactivityTimer in multiple integers of 1 ms.

2: For unicast/groucast/broadcast, for sl-drx-HARQ-RTT-Timer, the granularity of starting time is at slot-level and the length is also configured in number of slots.

3: For unicast/groucast/broadcast, for sl-drx-RetransmissionTimer, the granularity of starting time is at slot-level and the length is also configured in number of slots.

4: The SL DRX timers should be calculated in the unit of physical slot. FFS whether the case may happen that no SL slots are available in UE’s active time and whether/how to solve it.

5: Similar to Uu, the start of SL-DRX cycle is calculated by the following formula:

 [(DFN × 10) + subframe number] modulo (sl-drx-Cycle) = sl-drx-StartOffset

6: For unicast, for CONNECTED TX UE, RAN2 confirms that sl-drx-StartOffset and sl-drx-SlotOffset are configured to RX UE by TX UE based on gNB configuration.

7: For unicast, for IDLE/INACTIVE/OOC TX UE, RAN2 confirms that sl-drx-StartOffset and sl-drx-SlotOffset are configured to RX UE by TX UE implementation.

8: For groucast and broadcast, an equation is introduced to derive sl-drx-startoffset based on DST L2 ID.

9: RAN2 to select one of the following options to determine the sl-drx-startoffset:

 Option-1:

 - n=DST L2 ID MOD N, where N is the total number of sl-drx-startoffset values, and n is an index in the N sl-drx-startoffset values.

 Option-5:

 - sl-drx-StartOffset (ms) = DST L2 ID MOD sl-drx-LongCycle (ms)

 - FFS: sl-drx-SlotOffset

10: For groucast and broadcast, sl-drx-SlotOffset is also set based on DST L2 ID (i.e., similar to sl-drx-StartOffset).

Agreements on need of additional new considerations:

1: A new MAC CE to indicate DRX operation suspend/resume is not supported in Rel-17 (related to R2-2109722).

2: SL DRX configuration for SL groupcast including multiple settings for the SL DRX ON duration is not supported in Rel-17 (related to R2-2109812).

3: Inactivity timer maintenance rules for groupcast transmissions with MCR is not supported in Rel-17 (related to R2-2109937).

4a: In Rel-17, RX UE filtering based on SL-DRX shall not be specified and enforced. RX UE is allowed to receive and process incoming traffic which does not exactly match SL DRX configurations (related to R2-2110062).

4b: RAN2 to confirm that no specification change is needed for supporting 4a.

5: For GC, number of group members does not need to be considered in the determination of SL DRX on-duration and inactivity timers in the scenario where the UE knows it in Rel-17 (related to R2-2110938).

6a: An SL UE capability, representing the amount of time a UE needs to process SL grant and prepare data transmission, is not needed to be indicated by the UE to its serving gNB (related to R2-2111119).

6b: RAN2 to confirm that no specification change is needed for indicating SL traffic characteristics and associated QoS requirement to the SL TX UE’s gNB for determining SL DRX On duration.

Agreements on SL DRX for SL CSI reception:

1: Confirm the WA: The slots when the UE is expected CSI report following a CSI request is considered as SL active time.

2: Active time for SL-CSI reception is defined with description. Active time includes the time between SL-CSI request is sent and SL-CSI report reception or period of sl-LatencyBound-CSI-Report.

3: Ambiguous time is not introduced on sidelink for SL-CSI report.

Agreements on candidate resource selection and HARQ RTT:

1: TX UE shall select initial transmission resource only in the RX UE’s active time where SL DRX timers are running now or will be running in future (at least on-duration timer). Further details of active time can be considered later. FFS on spec impact.

2: If RAN 2 agrees that TX UE shall select initial transmission resource only in the RX UE’s active time, it is applied for all cast types.

3: For each SL grant, the grant is used if it is in active time of at least one destination; otherwise the grant is skipped.

4: Regardless whether HARQ feedback is enabled or disabled, the HARQ RTT timer can be derived based on the resource assignment information for retransmission of the same TB in the SCI if the resource assignment information for retransmission of the same TB is present.

5: When HARQ feedback is disabled, either zero value or non-zero value can be configured for the HARQ RTT timer if the resource assignment information is not present. FFS on details of configuration.

6: Always set the value of the retransmission timer to be a configured value regardless how the UE sets the HARQ RTT timer.

7: MAC indicates the active time information to PHY.

8: It is up to RAN1 to select an option.

9: We will send LS to inform RAN1 of the related agreements from this offline discussion [706]

RAN2#116bis-e agreements

Agreement on SL DRX configuration:

1: For unicast and TX UE in RRC CONNECTED and Mode 1 RA, the serving gNB of TX UE determines the SL DRX configurations for RX UE.

2: For unicast and TX UE in RRC CONNECTD, it is up to TX UE’s gNB implementation to determine alignment between Uu DRX of TX UE and SL DRX of RX UE, i.e., no spec change is foreseen.

3: For unicast and RX UE in RRC CONNECTED, RX UE uses an existing Uu RRC signalling to report a received SL DRX configuration to the gNB. Which RRC signalling to use will rely on outcome of the email discussion 715.

4: For unicast and RX UE in RRC CONNECTED, it is up to RX UE to indicate either acceptance or rejection to TX UE for a received SL DRX configuration.

5: For groupcast or broadcast, it is up to the gNB implementation to provide proper Uu DRX configuration to TX UE or RX UE, i.e., no spec change is foreseen.

6: For unicast and TX UE in RRC CONNECTED and Mode 2 RA, TX UE determines SL DRX for RX UE.

7: For groupcast or broadcast, the existing information content in the existing RRC signaling (e.g., SidelinkUEInformationNR) is reused by TX UE if in RRC CONNECTED to report assistance information to the gNB in order to achieve alignment of Uu DRX of TX UE and SL DRX of RX UE. FFS on additional information.

8: For groupcast or broadcast, RX UE in RRC CONNECTED can report L2 id and QoS profile associated with its interested services that SL DRX is applied to the gNB in order to achieve alignment of Uu DRX of RX UE and SL DRX of RX UE.

Agreement on RRC open issues:

1: UE uses SUI to report sidelink DRX configuration or sidelink assistance information to its serving gNB.

2: UE reports sidelink assistance information to its serving gNB, upon receiving sidelink DRX assistance information from the peer UE.

3: For IDLE/INACTIVE/OOC UE, It is up to TX UE implementation to set sl-DRX-ConfigUC-PC5.

4: Remove the EN in clause 5.8.9.X.3 of running CR and update the description as “For sidelink unicast, when a UE in IDLE/INACTIVE or OOC has obtained this assistance information from its peer UE, it may derive the values for SL DRX based on UE implementation.”

5: Use an extension marker for SL-PHY-MAC-RLC-Config-v17xy.

6: UE reports sidelink DRX configuration to its serving gNB, upon accepting sidelink DRX configuration information from the peer UE.

Agreement on MAC open issues:

1: The priority order of Sidelink DRX Command MAC CE is between Sidelink CSI Reporting MAC CE and data from any STCH.

2: When an Rx UE receives SL DRX command MAC CE from a TX UE, the Rx UE can stop the running onduration timer and inactivity timer associated with a unicast link.

3: For the same pair of L2 SRC/DST ID, the SL DRX command MAC CE can be transmitted alone or with data in the MAC PDU.

4: When a MAC PDU carrying only the SL DRX Command MAC CE is transmitted, it is transmitted as a HARQ Feedback disabled MAC PDU.

5: RAN2 does not define a separate SR configuration for SL DRX Command MAC CE.

6: drx-HARQ-RTT-TimerSL is supported in case PSFCH is configured in resource pool and sl-PUCCH-Config is not configured. NW can set value as zero or any other value.

7: UE uses configured sl-drx-HARQ-RTT-Timer value when the resource assignment information for the next re-transmission does not exist in the SCI regardless of whether HARQ feedback is enabled or disabled.

8: Working assumption: when mode 1 SL grant is not in SL active time of any destination that has data to be sent, for initial transmission and the mode 1 grant is dropped, UE sends ACK to gNB.

9: Working assumption: slots associated with the announced periodic transmissions by the TX UE are considered as SL active time of the RX UE.

10: Working assumption (down-selection for DRX cycle and on-duration for GC/BC when multiple QoS profiles are associated with the same DST L2 id) is confirmed as an agreement.

11: TX/RX UE determines the DRX cycle applied for groupcast/broadcast transmissions associated with a specific L2 destination ID as the minimum DRX cycle configured for any of the QoS profiles associated with that L2 destination ID.

12: Working assumption: TX/RX UE determines the on-duration timer applied for groupcast/broadcast transmissions associated with a specific L2 destination ID as the maximum on duration timer configured for any of the QoS profiles associated with that L2 destination ID.

13: Reconfirmed no optimization at MAC PDU decoding failure (e.g. if the received L2 id is not RX UE’s actual interested L2 id).

14: Tx UE should select a destination associated with an Rx UE that is in SL active time for the SL transmission occasion in SL LCP.

15: drx-RetransmissionTimerSL is started after expiring drx-HARQ-RTT-TimerSL when the PUCCH (NACK) transmission is dropped.

16: Following RAN2 agreement is also applied to GC NACK only.

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

17: For unicast, sl-drx-RetransmissionTimer is started after expiring sl-drx-HARQ-RTT-Timer when the PSFCH (NACK) transmission is dropped. FFS for ACK transmission dropping.

18: Working assumption: for GC, sl-drx-StartOffset (ms) = DST L2 ID MOD sl-drx-Cycle (ms)

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