**3GPP TSG-RAN WG2 Meeting #113bis electronic R2-210xxxx**

**Online, April 12 – April 20, 2021**

Agenda Item: 8.15.2

Source: ZTE

Title: [AT113bis-e][708][V2X/SL] DRX configuration for SL groupcast and broadcast

Document for: Discussion, Decision

# Introduction

This is for the following email discussion

* [AT113bis-e][708][V2X/SL] DRX configuration for SL groupcast/broadcast (ZTE)

 **Scope:** Discuss DRX configuration issues for SL groupcast/broadcast based on the companies’ contributions including whether it is allowed to configure different sl-drx-StartOffset for different groupcast/broadcast and whether DRX cycle length is associated with PQI. Discussion on inactivity timers and HARQ timers is not scope of this email discussion.

 **Intended outcome:** Discussion summary in R2-2104474.

**Deadline:** 4/19, 10:00am (UTC), R2-2104474 should be available before next Monday session on SL enhancement

# Discussion

## DRX cycle length for groupcast/broadcast

In last RAN2#113-meeting, RAN2 agreed that TX/RX UE can obtain DRX configuration from pre-configration for OOC UE and SIB for IC UE, *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* and *RAN2 will study/discuss how PQI and/or L2 destination ID is used to derive groupcast and broadcast DRX configuration*.

Considering corresponding pros and cons of per PQI or per L2 DST ID DRX cycle configuration has been discussed in previous RAN2 email discussion[1], before making the decision between per PQI or per L2 DST ID, we think it’s better to clarify the feasibility of these two solutions based on companies contribution.

To begin with, irrespective of which solution(i.e., PQI based or L2 DST ID based) is selected, the first issue we need to discuss is the general principle of DRX cycle configuration i,e. which factor should be taken into consideration of DRX cycle configuration for groupcast/broadcast. During the email discussion[2], many companies think the DRX configuration of groupcast/broadcast needs take QoS requirements into consideration. In consequence, it is suggested that RAN2 discuss whether DRX cycle is configured at least based on the QoS requirement.

**Question1-1: Irrespective of which solution(i.e., PQI based or L2 DST ID based) is selected, from high-level principle, do you agree that DRX cycle should take at least QoS requirement into consideration?**

**-Yes.**

**-No (Please clarify why QoS does not need to be taken into consideration and which factor shall be taken into consideration).**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Lenovo, MotM | Yes | DRX Cycle should achieve power savings but at the same time can’t sacrifice QoS. If the SL devices save power but can’t perform SL communication with required reliability – it would not be acceptable solution. |
| LG  | Yes | Agree with Lenovo. |
| OPPO | Yes | Agree with Lenovo, the reliability and latency requirement should be satisfied. |
| CATT | Yes |  |
| InterDigital | Yes |  |
| Samsung | Yes or no (see comments) | There would be several options how to configure DRX cycle length and timers (e.g. let’s take an example of on-duration timer here). For example, Option 1: Per PQI configuration* {DRX cycle length, on-duration timer, offset} per PQI

Option 2: Per DRX cycle length configuration* {on-duration timer, offset} per DRX cycle length

If we go option 1, yes QoS is considered, but if we go option2, traffic pattern is considered, e.g. whether traffic is periodic and if periodic, what should be periodicity of data arrival from the upper layer, then the UE will select the appropriate DRX cycle length and accordingly other information. We think at least for DRX cycle length, the periodicity of traffic is more important factor to be considered and it is not crystal clear if PQI value really can represent periodicity of periodic data.  |
| Huawei, HiSilicon | Yes | Share the view of Lenovo. |
| ZTE | Yes | Share the View with Lenovo. |
| Ericsson | No | It is sufficient to only consider service type. Service type represents a combination of QoS requirements for a specific service. QoS requirement could lead to many granularities (e.g., priority level+PDB+packet error rate etc). providing DRX configuration per QoS requirement would cause huge configuration complexity (e.g. a large number of DRX configurations provisioned), and which is unnecessary. Same as in Uu DRX, the DRX configuration is configured per service type.* Share the same views as Xiaomi, Qualcomm, and Convida
 |
| vivo | Yes | DRX cycle, indeed, reduces the opportunities for transmission or reception from Tx UE or Rx UE perspective. The configured DRX cycle should fit to the minimum QoS requirement. |
| Fujitsu | Yes |  |
| Nokia | comments | Although we understand Ericsson’s argumentation and point of view, SL DRX is configured and handled in AS layer, thus AS layer criteria are more suited (compared to V2X or APP layer criteria) to determine SL DRX cycle length. |
| Intel | Yes |  |
| Apple | Yes |  |
| Xiaomi | Comment | This doesn’t mean DRX has to be configured per PQI, since only PQI is not sufficient to decide DRX configuration. |
| ASUSTeK | Yes |  |
| Spreadtrum | Yes |  |
| Fraunhofer | Yes | Agree with Lenovo |
| Qualcomm | Yes/No, comment | Yes, some of QoS (e.g., PDB) but not the others (e.g., error rate) can be used for defining SL DRX Cycle length.No, traffic pattern should be taken into SL DRX Cycle length consideration, e.g., the periodicity of a periodic traffic such as BSM or CAM based groupcast or broadcast.In addition, UE’s power saving should also be taken into consideration.So, purely based on QoS is not a one-size-fits-all solution. |
| Convida | No | In our view we need to distinguish between how we group UEs that share a DRX configuration, and how we determine the parameters of that DRX configuration. For the grouping, we feel that the best grouping is via service type. For the determination of the DRX configuration, we feel that this should be based on the characteristics of the traffic (e.g periodicity), which is also more related to the service type rather than the QoS of the service. However, we understand that the DRX configuration must be chosen to meet these QoS requirements. |

#### Summary 1-1:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Yes | 16 |
| No | 4 |
| See comments | 2 |

Ericsson/Convida think it is better to consider service type. Samsung/Convida think the periodicity of traffic is more important factor to be considered. Nokia think AS layer criteria are more suited to determine DRX cycle, Xiaomi think PQI is not sufficient to decide DRX configuration. Considering that majority companies(16 out of 20 companies) think DRX cycle should take at least QoS requirement into consideration, we can agree that DRX cycle should take at least QoS requirement into consideration.

**Proposal 1-1:[16/20]For GC/BC, RAN2 understands that DRX cycle should take at least QoS requirement into consideration.**

If companies agree that DRX cycle should take at least QoS requirement into consideration, then we think RAN2 need to check whether above two solutions(i.e., PQI based or L2 DST ID based) can ensure the QoS requirement. As we know that PQI represents the QoS of service data, it is straightforward for RAN2 to understand that QoS can be ensured by adopting per PQI DRX cycle. Therefore the question is whether per L2 DST ID DRX cycle can ensure the QoS requirement.

**Question1-2: If the answer of Question 1-1 is yes, do you think per L2 DST ID DRX cycle configuration can ensure the QoS requirement?**

**-Yes(Please clarify how to ensure the QoS)**

**-No(Please clarify why QoS can not be ensured)**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Lenovo, MotM | No | L2 destination Id is allocated in the V2X layer and this allocation has nothing to do with QoS i.e. there’s no mention of QoS being a factor in allocating a L2 SRC/ DST Id. RAN2 has decided that the DRX configuration is an Access Stratum functionality, it is not possible to associate a 24 bit number to any form of QoS from AS perspective. |
| LG | No | Same view with Lenovo. L2 destination Id is allocated in the V2X layer and this allocation has nothing to do with QoS. In addition, in the V2X layer, not only the source ID but also the GC/BC destination ID are changed periodically. DRX cycle configuration based on L2 ID causes frequent DRX cycle updates. |
| OPPO | No | There is no direct relationship between QoS and L2 ID. |
| CATT | No | Share the same view as Lenovo and LG. |
| InterDigital | No |  |
| Samsung | No |  |
| Huawei, HiSilicon | No, with comment | QoS flow is the finest granularity of the QoS requirements in NR SL as well. So the QoS profile/PQI is a more reliable parameter to reflect QoS requirements. |
| ZTE | No |  |
| Ericsson | Yes with comments | It is not efficient to directly couple DRX configuration to each individual QoS requirement, different combinations of QoS requirements would create a need to apply a different DRX configuration. Given the number of DRX configurations that a UE can support will be limited, we think it is more efficient to couple DRX configuration to service types, which has been widely applied in Uu DRX.🡪Share the same views as Xiaomi, Qualcomm, Fujitsu and Convida**This question should not be linked to whether answer to Q1-1 is Yes.****DRX configuration per L2 ID, which maps to service type, so, in a way that QoS requirements are ensured considering service type.** |
| vivo | No | Although the QoS(s) as the PQI(s) is mapped to a corresponding destination L2 ID for the upcoming services, yet it does not directly reflect QoS(s). |
| Fujitsu | Yes | Although QoS flow is the finest granularity of the QoS requirements, per L2 DST ID DRX cycle configuration can also ensure the QoS requirement taking the QoS requirements of the QoS flow(s) of the L2 DST ID into account, which is similar to the current Uu DRX configuration.  |
| Nokia | No |  |
| Intel | No | Agree with Lenovo that L2 DST ID does not seem to have anything to do with the QoS characteristics of the data traffic |
| Apple | No |  |
| Xiaomi | Yes | The question is indicative. Per destination configuration doesn’t mean the QoS is not considered. It’s up to gNB or TX UE’s implementation to consider all factors. There are mapping relation between destination and PQI, which could be used to ensure QoS fulfilment. |
| ASUSTeK | No |  |
| Spreadtrum | No | In Rel-16, V2X UE reports Destination ID and the corresponding QoS to the gNB via SidelinkUEInformation, which means the gNB is not aware of the relationship between the Destination ID and the QoS before. For UE in IDLE/INACTIVE mode, the gNB may provide DRX configuration via SIB without reporting from the UE. In such case, per L2 ID DRX configuration is not possible. |
| Fraunhofer | No |  |
| Qualcomm | Yes | QoS info is available at AS layer for UEs participating in a groupcast and broadcast, and UEs participating in a groupcast or broadcast can pick a proper SL DRX Cycle length based on the QoS info associated with the groupcast or broadcast. If QoS is not known for a groupcast or broadcast, then PQI based SL DRX cannot be formed for a groupcast or broadcast.So it’s really how to link QoS with a groupcast or broadcast. |
| Convida  | YesNote This question should not be linked to whether answer to Q1-1 is Yes  | As we noted in our response to Question1-1, we do not think that having a per service DRX configuration precludes basing the parameters of that DRX configuration on the QoS. Our view is that coupling directly DRX configuration to individual QoS requirement is an optimization with more complexity and specification work and it is not clear this finer level of granularity of DRX configuration leads to more power saving gains in comparison to a DRX configuration on service type basis also selected to meet QoS requirement. Even in the legacy Uu DRX design, DRX configuration are not provided to the UE at the granularity of individual QoS requirement level,  |

#### Summary 1-2:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Yes | 5 |
| No | 15 |

Majority companies think L2 destination id is allocated in the V2X layer and this allocation has nothing to do with QoS, per DST L2 ID DRX cycle configuration can not ensure the QoS requirement. Three(Fujitsu,Xiaomi,Qualcomm) companies think there are mapping relation between destination and PQI, per DST L2 ID DRX cycle consiguration can ensure the QOS requirement. Ericsson/Convida think it is not efficient to directly couple DRX configuration to each individual QoS requirement. There is a reasonable majority which prefer Per DST L2 ID cycle configuration can not ensure the QoS. And rapporteur think the conclusion of this question has no impacts on spec and majority companies select PQI based solution in question 1-5, therefore only an observation will be proposed for this issue.

**Observation 1-2:[15/20]For GC/BC, RAN2 understands that per DST L2 ID DRX cycle configuration can not ensure the QoS requirement.**

For per PQI DRX cycle configuration, companies holding the opposite views think:

1. RX UE does not know the PQI of upcoming service data. It’s only configured by upper layers with one or more destination layer-2 ID(s) for reception.

2. If DRX cycle is configured per PQI, UEs have to be awake in all PQI-based On-durations. It could significantly reduce the efficiency of power saving.

For the first issue, according to latest SA2’s output in 23.776[3] as shown in following:

|  |
| --- |
| 7.2 Conclusions for PC5 DRX operationsFor Key Issue #1 (Support of QoS aware NR PC5 power efficiency for pedestrian UEs), regarding NR PC5 DRX operations the following principles are taken as the conclusion:- The Access Stratum (AS) layer determines the PC5 DRX parameter values for V2X communication over PC5 reference point to enable pedestrian UE power saving.- The existing PC5 QoS parameters provided by the V2X layer can be used by the AS layer to determine the PC5 DRX parameter values.- For groupcast and broadcast, the AS layer of Rx UE needs PC5 QoS parameters to determine the PC5 DRX parameter values for V2X communication over PC5 reference point. Therefore, the V2X layer of Rx UE determines the interested V2X service types, and derives the corresponding PC5 QoS parameters based on either the mapping of V2X service types to PC5 QoS parameters, or the V2X Application Requirements for the V2X service type (e.g. priority requirement, reliability requirement, delay requirement, range requirement) provided by the application layer. 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.- The AS layer provides the applied PC5 DRX information to the V2X layer. |

It can be observed that not only TX UE knows about the QoS (PQI) of a new service requesting radio services but also a RX UE anticipates data of certain PQI(s) of interest. This allows both the TX UE and RX UE to use PQI as a common basis to initiate sidelink communication using a corresponding DRX configuration.However, considering 23.776 is a Technical Report(TR), the conclusion in TR may not be captured in the Technical Specification(TS), therefore RAN2 may still need to send the LS to clarify this issue.

**Observation 1-2a: According to the latest SA2 SI Phase’s output in 23.776, 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.**

**Question 1-2a: According to the latest SA2’s output in 23.776[3], do you agree that RAN2 need to send LS to SA2 to clarify whether the PC5 QoS parameters are available in the AS layer of Rx-UE for broadcast/groupcast.**

**-Yes(Please clarify why RAN2 need to send the LS)**

**-No**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| LG | No | There is no reason to send LS to SA2 because it has already been agreed in SA2 that RX UE can also know PC5 QoS parameters (e.g., PQI). |
| OPPO | No |  |
| CATT | No | The latest SA2’s output is clear to us. |
| InterDigital | No |  |
| Samsung | No |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| Huawei, HiSilicon | Maybe yes, with comments | Since this is just a TR conclusion, instead of a normative phase conclusion or a Spec description, it is perhaps safer to send an LS to ask for SA2’s confirmation. However, if the majority want to just reach consensus based on this TR configuration, we are also fine to follow the majority’s view.  |
| ZTE | Partially Yes | Share the same view with Huawei. |
| Ericsson | No with comments | It is not efficient to directly couple DRX configuration to each individual QoS requirement, different combinations of QoS requirements would create a need to apply a different DRX configuration. Given the number of DRX configurations that a UE can support will be limited, we think it is more efficient to couple DRX configuration to service types, which has been widely applied in Uu DRX.**Ericsson can agree with HW suggestion**. |
| vivo | No |  |
| Fujitsu | Yes with comments | We agree with Rapporteur that the conclusion in TR may not be captured in the TS, therefore RAN2 still need to send the LS to SA2 to clarify this issue if PQI based SL DRX configuration is pursued.  |
| Nokia | No |  |
| Intel | No |  |
| Apple | No |  |
| Xiaomi | Yes  | Agree with HW |
| ASUSTeK | No |  |
| Spreadtrum | No |  |
| Lenovo, MotM | No |  |
| Fraunhofer | No |  |
| Qualcomm | Yes | OK with HW’s suggestion. No strong preference. |
| Convida | Yes | Agree with Huawei and others |

#### Summary 1-2a:

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| --- | --- |
| Answer | Number of supporting companies |
| Yes | 6 |
| No | 14 |

Although 6 companies think it is perhaps safer to send an LS since the 23.776 is only a TP, not TS, but they can also follow majority views. Therefore, rapporteur think the LS is not needed.

**Proposal 1-2a:[14/20]For GC/BC, According to the latest SA2 SI phase’s output in 23.776, RAN2 does not need to send LS to SA2 to clarify whether the PC5 QoS parameters are available in the AS layer of Rx-UE.**

For the second issue, considering that after MAC PDU multiplexing, data with different PQIs will be multiplexed into same TB, therefore some companies think UE does not need to be awaken in all PQI-based on-duration, only one value of sl-drx-cycle is derived by UE at a given time for each destination ID of SL groupcast/broadcast reception according to per PQI DRX cycle configuration.

**Question1-3: If DRX cycle is configured per PQI and there are more than one PQIs associated with a specific L2 DST ID, how many values of sl-drx-cycle can be derived:**

**Option1: Only one value of sl-drx-cycle can be derived for a groupcast or broadcast service with the same destination id at a given time. (i.e. when UE have multiple PQIs for the same L2 DST ID, and DRX cycle is configured per PQI, UE needs to down-select one DRX cycle from available DRX cycle for a specific L2 DST ID)**

**Option2: Multiple values of sl-drx-cycle can be derived for a groupcast or broadcast service with the same destination id at a given time. (i.e. when UE have multiple PQIs for the same L2 DST ID, and DRX cycle is configured per PQI, UE may needs to start all DRX cycles associated with PQIs within a specific L2 DST ID)**

**Option3: Others (Please clarify the solution)**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comment |
| Lenovo, MotM | 2 | It is possible that more than one service “can” use the same L2 destination Id; therefore there may be as many DRX configurations for the same L2 DST Id! |
| LG | 2 | UE can have multiple PQIs for the same destination, thus UE can have multiple values of SL DRX cycle based on multiple PQIs. |
| OPPO | 2 | Option-1 is not preferred since* It introduces the complexity/effort to do this N-to-1 conversion
* This conversion is not that easy to do, since we have multiple dimensions for PC5 QoS, it is hard to decide which dimension to follow to down-select 1 from the N QoS
 |
| CATT | 1 | Similar with Uu DRX, there will be multiple sl-drx-cycles due to per PQI DRX cycle configuration, but there will be just only one cycle can be derived. The choosing and converting from multi-to-single can be left to implementation (algorithm, no spec impacts). Besides, there will be good to reduce the Implementation complexity for UE. |
| InterDigital | 1 | Assuming the DRX cycles can be combined (i.e. they are multiple of eachother), then a single DRX cycle (the minimum DRX cycle) can be derived from the configured DRX cycles and applied at the MAC layer for that specific L2 destination ID. |
| Samsung | 1 | DRX cycle length would be something like 10ms, 20ms, 40ms, 80ms, 160ms, blabla.. or 100ms, 200ms, 300ms, blabla.. And let’s assume data with PQI#1 is with 10ms periodicity, data with PQI#2 is with 20ms periodicity and data with PQI#3 is 40ms periodicity. Then the UE anyway needs to monitor PSCCH/PSSCH every 10ms. Why should the UE be configured with multiple DRX cycles? Do we have multiple DRX cycles (for a given time) for Uu?  |
| Huawei, HiSilicon | Option 2, if the question is asking whether multiple parameter values can be configured in RRC signalling;Option 1, if this question is asking how many parameter values is finally used in the MAC operation.  | Reading the question and companies’ views, we are not quite sure what the “derive” in the questions/options exactly means:* If this question is asking whether multiple sl-drx-cycle parameter values can be configured in RRC configuration in a per PQI/QoS way, then our answer is yes (Option 2), as it is one of the parameters included in the DRX configuration, and we support per PQI/QoS DRX configuration;
* if this question is asking whether the MAC entity can choose only one of the sl-drx-cycle value to use (i.e. to calculate DRX cycle), or can select multiple values to use in parallel, our view is that only one sl-drx-cycle should be used at a given time by the MAC (Option 1) to calculate the DRX cycle. This is from the perspective of simplifying UE implementation.

Regarding how to determine the only one sl-drx-cycle value used by MAC from the multiple DRX configurations signalled by RRC, we proposed two possible ways in R2-2103174. But due to the limited time, we can leave it as FFS to future meetings.  |
| ZTE | Option1 | If DRX cycle is configured per PQI, UEs does not need to be awake in all PQI-based On-durations. |
| Ericsson | Option 1 with comments | This question has confirmed our understanding that it is not efficient to directly couple DRX configuration to each individual QoS requirement, instead, it is more efficient to couple DRX to service type.Anyway, Option 1 is better than option 2, if PQI based solution is adopted at the end. Since option 1 would more like Uu DRX, i.e., only one DRX cycle is active at a time. One key issue here is that how to ensure TX UE and RX UE to apply the same DRX configuration if there are multiple DRX configurations available. Fro this sense, L2 ID based option would be better, and shall be adopted as the baseline to avoid such complexity. |
| vivo | 2 | A destination L2 ID may contain multiple PQIs, which is interesting to a UE, say N, but it does not mean the UE needs N DRX cycles for power saving operation. The UE can form several PQI groups, and select the proper number based on its necessity, which is equal to or smaller than N.  |
| Fujitsu | 1 | Agree with CATT.  |
| Nokia | Option 1 | Similar understanding as CATT. While a UE may have multiple PQFIs for the same destination, the UE can apply only a single SL DRX configuration for that particular destination. The question rather is if the UE should apply the SL DRX configuration that fulfils the most stringent PQFI requirements (i.e. shortest SL DRX length) ? |
| Intel | 1 | In our understanding, even if the UE is configured with different DRX cycle/configuration for PQI, ultimately a single DRX cycle can be derived for a given destination |
| Apple | Option 2 | The RRC configuration shall support multiple DRX confguraitons, each per PQI w/o considering the L2 Destination ID. The configuration is destination-agnostic. If the UE has traffic with multiple PQIs, the UE need follow the most busiest DRX cycle to ensure wake up to receive all traffic of different PQIs.  |
| Xiaomi | 1 | The SCI destinies to destination not PQI. MAC entity is not aware of PQI. It’s unclear how to maintain multiple DRX timers per PQI in MAC. Furthermore, it’s agreed to enhance LCP to consider active time of destination. It’s unclear how to decide destination’s active time in option 2, since PQI is not visible to MAC entity. |
| ASUSTeK | 1 |  |
| Spreadtrum | Option 1 | DRX are configured per QoS. If multiple QoS are associated with a single Destination, only one of the DRX cycle is used. |
| Fraunhofer | Option 1 | Similar view as Nokia |
| Qualcomm | 1 | If multiple SL DRXs are configured per multiple PQI values, an Rx UE doesn’t know the PQI value associated to a packet to be received and therefore the Rx UE has to monitor all the SL DRX On durations, wasting a lot power! For trade-off between QoS and power saving, a SL DRX can be configured per the most stringent QoS requirement, so that an Rx UE only monitors one SL DRX On duration instead of multiple On durations. |
| Convida | Option1 | This question confirms our understanding that coupling DRX configuration to individual QoS requirement is inefficient and is an optimization with more complexity that is not justified. The RX UE should have a single DRX cycle if there are more than one PQIs associated with a specific L2 DST ID. PQI based DRX configuration is an optimization that can be postponed to future releases if companies feel strongly about it, but as a starting point, RAN2 should specify first a basic and less complex mechanism that is in alignment with the proven legacy Uu DRX design approach. |

#### Summary 1-3:

Huawei confirms their answer is option1 in the email.

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| --- | --- |
| Answer | Number of supporting companies |
| Option1 | 15 |
| Option2 | 5 |

For this issue, rapporteur think we can follow majority views that only one value of sl-drx-cycle can be derived for a groupcast or broadcast service with the same destination id at a given time. However, some companies think how to derive the value from multiple cycle configuration can be left to UE implementation, rapporteur think this is out of scope of this email discussion, RAN2 can further discuss it.

**Proposal 1-3:[15/20]For GC/BC, if DRX cycle is configured per PQI/QoS, and if UE has multiple PQIs for same DST L2 ID, UE needs to down-select one DRX cycle from available DRX cycles for a specific L2 DST ID, FFS on how to down-select the DRX cycle or leave it to UE implementation.**

For per L2 DST ID DRX cycle configuration, companies holding the opposite views think, there is literally huge number (2^24) of L2 destination IDs, which may cause huge signaling overhead especially in SIB.

**Question1-4: If DRX cycle is configured per L2 DST ID, how to control the signaling overhead of SIB?**

**Option1: L2 DST IDs can be further divided into several L2 DST ID groups, group\_1 use DRX\_Configuration\_1; group\_2 use DRX\_Configuration\_2 and so on**

**Option2: others (Please clarify the solution)**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comment |
| Lenovo, MotM | 1 | Since we are not a proponent, we assume any reasonable solution will go this way. |
| LG | See the comment | We don’t agree on the DRX cycle based on the L2 Destination ID. In the V2X layer, not only the source ID but also the GC/BC destination ID are changed periodically. DRX cycle configuration based on L2 ID causes frequent DRX cycle updates. |
| OPPO | NONE | We think the per-DST ID way is not feasible. |
| CATT | 1 | We share the same view as Lenovo. |
| InterDigital | 2 | A set of DRX configurations (with index) can be defined, and the index applicable to each source ID can then be broadcast |
| Samsung | 2 | For DRX cycle, it would be quite difficult to configure it per L2 id.  |
| Huawei, HiSilicon | See comments | We just wonder whether there is a way to separate DST ID values into different value spaces, and if so, how. Note that the DST ID value allocation seems out of 3GPP scope; in this case, how can 3GPP decide a proper way of partition? |
| Ericsson | Option 2 (per L2 ID) | we don’t think large L2 ID space is an issue for SL DRX configuration. In typical cases, there will be only a limited set of L2 ID values applied due to the fact that there are limited number of applications/services employed for SL broadcast and SL groupcast. |
| vivo | 1 | This is one of better solutions for reducing the overhead. Nevertheless, we are supportive of QoS based DRX configuration. DRX parameters such as DRX cycle and on duration can only be determined by PQI. As pointed out previously, if there are multiple PQIs potentially existing in a destination L2 ID, we can rely on group-manner, and select the shortest DRX cycle for DRX deployment. |
| Fujitsu | 2 | The typical sidelink DRX configuration of the L2 destination IDs for the interested/supported sidelink services can be included to save the signalling overhead |
| Nokia | none | see Q1-1 and Q1-2 |
| Apple | None | There is no feasible way because L2 ID allocation is out of 3GPP. |
| Xiaomi | 1 |  |
| ASUSTeK | See comment | We tend to not consider dividing L2 DST IDs into different L2 DST ID groups. |
| Spreadtrum | None |  |
| Fraunhofer | None | We do not think DRX cycle per L2 DST ID is feasible. |
| Qualcomm | 1 or 2 | There are not going to be 2^24 broadcasts or groupcasts in a small area for direct communications on sidelink. The ID addressable space is not the same as total number of broadcasts or groupcasts operated in a proximity.Either “grouping” (Op1) or a mapping table indexing (Op2) will help to reduce the bits of a destination ID. |
| Convida | Option2 | We don’t think that a DRX configuration needs to be defined for each potential L2 destination ID value. We agree with Ericsson that there will likely only be a limited number of applications/services employed for SL broadcast and SL groupcast – and so the set of L2 destination ID values will also be limited. Even if this is not the case, Option1 is also an alternative to manage the signaling overhead. |

#### Summary 1-4:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Option1 | 5 |
| Option2 | 6 |
| See comments | 3 |
| None | 5 |

According to Proposal1-5, majority companies support PQI based solution and companies do not propose specific solution on this issue, rapporteur think we can ignore this issue.

**Observation 1-4:Majority companies support per PQI DRX cycle configuration, how to control signaling overhead issue when DRX cycle is configured per L2 DST ID is ignored.**

Based on the discussion above, we think it is sufficient to make the final decision between per PQI and per L2 DST ID DRX cycle configuration. Except the issues listed above, companies can also discuss other issues in question1-5.

**Question1-5: What is your expectation on DRX cycle configuration :**

**Option1: Per PQI**

**Option2: Per L2 DST ID.**

**Option3: Others (Please clarify the solution)**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comment |
| Lenovo, MotM | 1 | Only per PQI can provide a reasonable common basis to start any sidelink communication that fulfils QoS and provides power saving. |
| LG | 1 | See the comment with Q1-3/Q1-4. |
| OPPO | Option 1 | Except for the above issues, one argument raised for supporting per L2 ID granularity is the load balancing. However, it is not valid as well since it is infeasible to predict the load for each L2 ID. |
| CATT | 1 |  |
| InterDigital | 1 |  |
| Samsung | 3 | See our comments in Question 1-1 (option 2) |
| Huawei, HiSilicon | 1, at least |  |
| ZTE | 1 |  |
| Ericsson | Option 2, But, we can compromise with option 3 if there is majority (option 3 suggested by Qualcomm, Vivo) | As we commented for other questions, we think it is more efficient to map DRX configuration to service type, It is expected that the same mapping rule, i.e., services types mapped to different Destination L2 IDs, will be applied for SL communications in Rel-17. For a specific application, the corresponding destination Layer-2 ID is stored at the AS layer of Receiving UE(s) for the groupcast mode communication reception.the mapping information between services and Destination L2 ID is already provisioned to the UE. Upon a reception of service data via SL groupcast or broadcast, the UE is already able to identify the associated service type straight away. It is unnecessary for the UE to ask upper layer to provide the PQI associated with received service data.In addition, a TX UE may have multiple flows which are associated with multiple separate PQI values, however, when the TX UE builds a MAC PDU, which including SDUs from multiple flows, **which DRX configuration shall the TX UE to choose**?In case a RX UE receives a MAC PDU containing data belonging to multiple flows/PQIs, **which DRX configuration shall the RX UE to apply**?In addition, PQIs may be often configured/update due to arrival/left of service flows, which increases configurational complexity, while L2 ID based option would be less frequently updated.Due to the configuration complexity and the issues raised in the above, we think it is not feasible to apply DRX configuration per PQI.  |
| vivo | 1 or 3, see our comments | First of all, we need to make a clarification that what types of DRX parameters are included in DRX cycle configuration.Alt-1: DRX cycle configuration contains the parameters of DRX cycle and on duration, but excluding the start offset.Alt-2: DRX cycle configuration contains the parameters of DRX cycle, on duration, and start offset.For Alt-1, we prefer to have Option 1.For Alt-2, we prefer to have Option 3; namely, a combined solution between PQI and destination L2 ID is preferable. If a UE purely selects DRX cycle with all the configured DRX parameters, the different UEs requiring the same PQI even in different groups need to perform the same DRX cycle, which may incur a problem of resource collision and degrade the PRR performance, especially when the configured On Duration is shorter. Therefore, we believe, a part of DRX parameters could be associated with PQI, and a part of DRX parameters could be associated with destination L2 ID. |
| Fujitsu | 2 | We prefer to have SL DRX configuration per L2 DST ID, since the RX UE uses the L2 DST ID for the SL reception in all the cast types. SL DRX configuration based on L2 DST ID may have lower specification impact, which is like the Uu DRX.  |
| Nokia | Option 1  | see Q1-2 |
| Intel | 1 | Based on our comments above, we prefer per PQI DRX configuration in order to better meet the QoS requirements |
| Apple | 1 |  |
| Xiaomi | 2 | The DRX timer maintenance is done per destination for both TX and RX. If there are multiple PQIs associated with one destination, how to derive the DRX timer to certain destination in option 1? This problem exists in both TX UE and RX UE, since it’s already agreed to consider RX UE’s active time when TX UE performs sidelink transmission. There may be misalignment between TX UE and RX UE for the same destination, if the mapping between PQI and destination is not the same. |
| ASUSTeK | 1 |  |
| Spreadtrum | Option 1 |  |
| Fraunhofer | Option 1 |  |
| Qualcomm | 2 or 3 | **Op1:** It’s easy to make one-to-one mapping with PQI, but the cost of supporting PQI based SL DRX operations may be high.1. A UE has to wake up to monitor multiple SL DRXs if a groupcast or broadcast support multiple PQI values. This consumes much more power.
2. Multiple groupcasts or broadcasts may share one SL DRX with the same PQI value. This may cause uneven traffic with increased resource collisions and complicate timer operations, especially HARQ timers are operated per a source ID and destination ID.

Current sidelink process is per source ID and destination ID. PQI based SL DRX operation may cause more work, **Op2**: UEs associated with a groupcast or broadcast (a destination ID) know the QoS and thus can pick the SL DRX Cycle length properly. Op2 based avoids complicating SL DRX operations.1. UEs are aligned per destination ID based SL DRX configuration.
2. UEs wake up and monitor ONE SL DRX on duration, thus saving power.
3. More aligned with sidelink process, especially for HARQ timers.

**Op3:** there are pros and cons with PQI based and Destination ID based SL DRX configuration, Combining PQI and Destination ID can be an alternative solution with more pros and fewer cons. |
| Convida | Option2 | In addition to the reasons provided by others, we also feel that the per L2 DST ID configuration is also applicable to the initial PC5-S signaling to establish a unicast connection (Direct Communication Request). It is unclear how the PQI approach would be used for this signaling. |

#### Summary 1-5:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Option1 | 14 |
| Option2 | 5 |
| Option3 | 4 |

Rapporteur suggests follow majority view.

**Proposal 1-5:[14/20] For GC/BC, DRX cycle is configured per PQI/QoS.**

## sl-drx-StartOffset for groupcast/broadcast

According to some companies’ contributions, the DRX configuration including sl-drx-StartOffset are configured per-PQI/QoS. However, based on some other contribution, for PQI/QoS based sidelink DRX configuration, multiple groups or services may share the same sidelink DRX on duration which may cause uneven traffic on sidelink. Moreover, if all the UE wake up at the same time, those mode2 TX UEs participating different broadcast/groupcast services will perform sidelink transmission simultaneously. It may cause congestion and increase the probability of resource collision. In order to avoid congestion and decrease the the probability of resource collision, it is better to configure different sl-drx-StartOffset for different groupcast/broadcast services, then they will not wake up at the same time. Therefore, in other companies’ contributions, sl-drx-StartOffset are configured per L2 destination ID. In this section, we will discuss the configuration for sl-drx-StartOffset.

**Question2-1: Do you agree that the sl-drx-StartOffset value may take into consideration the PQI/QoS?**

**-Yes**

**-No**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Lenovo, MotM | Yes | PQI/ QoS based DRX configuration can distribute the load on the physical resources evenly across time. Number of PQIs available (Table 5.4.4-1 of TS 23.287) balance nicely between too many possible DRX configuration (leading to implementation complexity) and too little DRX configuration (leading to high congestion and HD issue around the active time). |
| LG | Yes | See the comment with Q1-3/Q1-4. |
| OPPO | Yes | Agree with Lenovo |
| CATT | Yes |  |
| InterDigital | No | We don’t see a link between the offset of the DRX configuration and the QoS. The offset can be used to distribute the load across the configuration, and should not be related to QoS as such. |
| Samsung | No | Offset’s purpose is to distribute the UEs’ DRX starting time in time-domain. For distribution, we think it has nothing to do with QoS. In Uu, it can be distributed per UE or per (group) of UE by assigning different offset to the UE(s). With the same principle, we think L2 destination id should be considered to distribute UEs’ DRX starting time in time-domain.  |
| Huawei, HiSilicon | Yes | It is a DRX parameter, so should be decided based on PQI/QoS. |
| ZTE | No | We do not see the relationship between startoffset and QoS. This parameter only controls when UE start the on-duration timer. We think when UE start the on-duration timer does not influence QoS. And the start offset should be used to implement load balance. |
| Ericsson | No with comments | This is up to UE/Network implementation, it doesn’t affect the spec. in principle, each DRX configuration may be configured with different **sl-drx-StartOffset value.** In addition, share the same views as other companies, there is no linkage between QoS and offset |
| vivo | No | *sl-drx-StartOffset* is a key parameter to mitigate the traffic congestion but not relating to QoS for any services, especially when the configured On Duration is shorter as we mentioned in Q1-5. RAN2 should consider a leveraged solution in order to harvest the power saving gain without sacrificing PRR performance. |
| Fujitsu | No | Agree with InterDigital.  |
| Nokia | Yes | The question says “take into consideration”. That does not necessarily mean “how to take into consideration” and/or whether this has any spec impact. |
| Intel | Yes | We assume this is one of the DRX configuration parameters that can be configured based on the PQI specific configuration |
| Apple | No | Not sure how drx-offset is linked to QoS.  |
| Xiaomi | No |  |
| ASUSTeK | No | We think sl-drx-StartOffset is just related to time to start a SL DRX on-duration.  |
| Spreadtrum | No | Offset is not related with QoS, but used to distribute the active time among different group of UEs for traffic congestion mitigation. |
| Fraunhofer | No | Similar view as Interdigital. The offset can be used to distribute the load across the configuration, and should not be related to QoS as such. |
| Qualcomm | No | There is no relationship between Offset and QoS. SL DRX can be distributed with destination ID, so that UEs participating in a groupcast or broadcast are grouped per the associated destination ID and wake up at the same time for the same SL DRX On duration. |
| Convida  | No | We don’t see the direct linkage between sl-drx-StartOffset value and PQI/QoS. This should be left to implementation, this offset is rather for distribution of DRX cycles of the UE population in time. |

#### Summary 2-1:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Yes | 7 |
| No | 13 |

For this issue, slight majority companies think startoffset does not take QoS requirement into consideration, however according to proposal2-2, this question does not influence the conclusion of startoffset configuration, therefore only an observation is proposed.

**Proposal 2-1:[13/20] For GC/BC, RAN2 understands that sl-drx-startoffset does not take QoS requirement into consideration.**

**Question2-2: How to configure sl-drx-StartOffset for different groupcast/broadcast?**

**Option 1: configure the same value of sl-drx-StartOffset for all groupcast/broadcast service**

**Option 2: configure different values of sl-drx-StartOffset per PQI/QoS**

**Option 3a: configure different values of sl-drx-StartOffset per L2 destination ID**

**Option 3b: configure different values of sl-drx-StartOffset per L2 destination ID group**

**Option 3c: derive value of sl-drx-StartOffset from L2 destination ID**

**Option 4: Others (Please clarify the solution)**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comment |
| Lenovo, MotM | 2 | For reasons mentioned above |
| LG | 2 |  |
| OPPO | Option 2 |  |
| CATT | 2 |  |
| InterDigital | 3a or 3b | We think L2 destination ID or group is a better way to distribute the offset of the DRX configuration. |
| Samsung | 3a or 3b | Offset’s purpose is to distribute the UEs’ DRX starting time in time-domain. For distribution, we think it has nothing to do with QoS. In Uu, it can be distributed per UE or per (group) of UE by assigning different offset to the UE(s). With the same principle, we think L2 destination id should be considered to distribute UEs’ DRX starting time in time-domain. |
| Huawei, HiSilicon | At least 2, with comments | It is possible to configure the same value for different PQI/QoS, which is up to UE/NW implementation. So it is not completely accurate to say “different value” per PQI/QoS, but this may be taken care by the Rapp when the summary is drafted. |
| ZTE | 3b | We first share the same view with InterDigital and Samsung. However, considering there is literally huge number (2^24) of L2 destination IDs, which may cause huge signaling overhead especially in SIB, option3b is a better solution than option3a. |
| Ericsson | 3a | See comments for Question2-1.  |
| vivo | 3b, fine to 3a | See the comments in Q1-5 and Q2-1 |
| Fujitsu | 3a | See comments for Question2-1 |
| Nokia | 3a or 3b | Since Q2-2 is referring to groupcast/broadcast we do not really get the difference between 3a and 3b. “group of L2 dest ID” vs. “L2 group ID” vs. “L2 dest ID group” |
| Intel | 2 | Agree with Huawei |
| Apple | 3a or 3b or 1 | For the same destination, the offset shall be the same to save UE wake up time, but for different diestinations, it is up to gNB implementation to decide whether to configure same or different offset. Option 1 is a subset of Option 3 from this perspective. |
| Xiaomi | 3a or 3b |  |
| ASUSTeK | 3c | For supporting multiple groups or services not to share the same SL DRX on duration, we think the value of sl-drx-StartOffset can be derived from L2 DST ID so that RAN2 will not need to consider how to specify a SL DRX configuration for different values of sl-drx-StartOffset. |
| Spreadtrum | 3a |  |
| Fraunhofer | 3a or 3b | The offset here in our understanding implies DRX configuration distribution. Hence, it is better to have it either group Destination ID based or destination ID based in case of broadcast. |
| Qualcomm | 3a or 3b | For option 2: how to generate different offsets with a PQI value? Clearly different offsets cannot be based on ONE PQI value. |
| Convida | Option 3a | We prefer to base the sl-drx-StartOffset on the L2 destination ID to distribute the load across the DRX configurations |

#### Summary 2-2:

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Option 1 | 1 |
| Option 2 | 6 |
| Option 3a | 12 |
| Option 3b | 9 |
| Option 3c | 1 |
| Option 3a+3b+3c | 14 |
| Option 4 | 0 |

Slight majority companies think the startoffset is configured per DST L2 ID, however, regarding to per DST L2 ID or per DST L2 ID group, no consensus is achieved. Rapporteur think we can further discuss the details.

**Proposal 2-2:[13/20]For GC/BC, sl-drx-startoffset is configured based on DST L2 ID, FFS on per DST L2 ID[12/20] or per DST L2 ID group[9/20].**

**Question2-3：If option 2 is selected for Q2-2, considering that a groupcast or broadcast service may associate to multiple PQI values, we shall further discuss whether multiple different values of sl-drx-StartOffset can be applied for a groupcast or broadcast service with the same destination id.**

**Option1: Only one value of sl-drx-StartOffset can be applied for a groupcast or broadcast service with the same destination id. (i.e. when UE have multiple PQIs for the same L2 DST ID, and start offset is configured per PQI, UE needs to down-select one start offset from available DRX cycle for a specific L2 DST ID)**

**Option2: Multiple values of sl-drx-StartOffset can be applied for a groupcast or broadcast service with the same destination id. (i.e. when UE have multiple PQIs for the same L2 DST ID, and start offset is configured per PQI, for a specific L2 DST ID, UE may needs to start on-duration timer after sl-drx-SlotOffset associate with PQIs within the L2 DST ID from the beginning of the subframe)**

**Option3: Others (Please clarify the solution)**

|  |  |  |
| --- | --- | --- |
| Company | Option | Comment |
| Lenovo, MotM | 2 |  |
| LG | 2 |  |
| OPPO | Option 2 |  |
| CATT | 1 |  |
| InterDigital |  | This issue would not occur if we don’t configured the start offset based on PQI. This way, the UE would have a single start offset if it is interested in a single L2 ID. |
| Huawei, HiSilicon | Option 2, if the question is asking whether multiple parameter values can be configured in RRC signalling;Option 1, if this question is asking how many parameter values is finally used in the MAC operation. | Same comments as to Q1-1. |
| Ericsson | comments | This question has confirmed our understanding that it is not efficient to directly couple DRX configuration to each individual QoS requirement, instead, it is more efficient to couple DRX to service type.Fully agree with Qualcomm and Convida |
| vivo | 1 | As pointed out in A2-1, *sl-drx-StartOffset* is a key parameter to mitigate the traffic congestion. Having single start offset per destination L2 ID is enough, that can be beneficial for UEs to align their DRX cycles by means of configuring the cycle length between different PQIs by N-fold. This can further reduce the power consumption. |
| Fujitsu | 1 |  |
| Intel | 2 | Same comment as above |
| Apple |  | Same view as InterDigital |
| Xiaomi |  | This question is not valid if offset is per destination. |
| ASUSTeK | 1 |  |
| Qualcomm |  | PQI based scheme complicates SL DRX operations and increases power consumption, |
| Convida | comment | This question confirms our understanding that coupling DRX configuration to individual QoS requirement is inefficient and is an optimization with more complexity that is not justified. The RX UE should have a single DRX cycle if there are more than one PQIs associated with a specific L2 DST ID. PQI based DRX configuration is an optimization that can be postponed to future releases if companies feel strongly about it, but as a starting point, RAN2 should specify first a basic and less complex mechanism that is in alignment with the proven legacy Uu DRX design approach. |

#### Summary 2-1:

Huawei confirms their answer is option1 in the email.

|  |  |
| --- | --- |
| Answer | Number of supporting companies |
| Option1 | 5 |
| Option2 | 4 |
| See comments | 6 |

For this issue, no consensus is achieved, ,however according to proposal 2-2, rapporteur think this issue can be ignored.

**Observation 2-3:Majority companies support sl-drx-startoffset should be configured based on DST L2 ID, therefore for a groupcast or broadcast service with the same destination id, the issue of whether multiple different values of sl-drx-StartOffset can be applied is ignored by RAN2.**

## ~~Other~~

If the option of configuring SL DRX cycle per PQI/QoS and/or sl-drx-StartOffset per PQI/QoS is adopted, AS layer of the Rx-UE shall obtain the QoS parameters for the reception of NR SL broadcast/groupcast.

According to TS 24.587[1], UE’s usage of V2X communication is controlled by V2X communication parameters. The V2X communication parameters consist of the configuration parameters for V2X communication over PC5 is listed as below:

|  |
| --- |
| 5.2.3 Configuration parameters for V2X communication over PC5The configuration parameters for V2X communication over PC5 consist of:i) configuration parameters for a V2X communication over PC5 in NR-PC5, consisting of:1) optionally, a list of V2X service identifier to V2X NR frequency mapping rules. Each mapping rule contains one or more V2X service identifiers and the V2X NR frequencies with associated geographical areas;2) a list of V2X service identifier to destination layer-2 ID for broadcast mapping rules. Each mapping rule contains one or more V2X service identifiers and the destination layer-2 ID for broadcast;3) optionally, a default destination layer-2 ID for broadcast;4) a list of V2X service identifier to destination layer-2 ID for groupcast mapping rules. Each mapping rule contains one or more V2X service identifiers and the destination layer-2 ID for groupcast;5) a list of V2X service identifier to default destination layer-2 ID for unicast initial signaling mapping rules. Each mapping rule contains one or more V2X service identifiers and the default destination layer-2 ID for initial signalling to establish unicast connection;6) a list of V2X service identifier to PC5 QoS parameters mapping rules. The PC5 QoS parameters are specified in clause 5.4.2 of 3GPP TS 23.287 [3];7) an AS configuration, including a list of SLRB mapping rules applicable when the UE is not served by E-UTRA and is not served by NR. Each SLRB mapping rule contains a PC5 QoS profile and an SLRB. The PC5 QoS profile contains the following parameters:i) the PC5 QoS profile contains a PQI;ii) if the PQI of the PC5 QoS profile identifies a GBR QoS, the PC5 QoS profile contains a PC5 flow bit rates consisting of a guaranteed flow bit rate (GFBR) and a maximum flow bit rate (MFBR);iii) if the PQI of the PC5 QoS profile identifies a non-GBR QoS, the PC5 QoS profile contains the PC5 link aggregated bit rate consisting of a per link aggregate maximum bit rate (PC5 LINK-AMBR);NOTE: PC5 link aggregated bit rate is only used for unicast mode communications over PC5.iv) the PC5 QoS profile contains a range, which is only used for groupcast mode communications over PC5; andv) the PC5 QoS profile can contain the priority level, the averaging window, and the maximum data burst volume. If one or more of the priority level, the averaging window or the maximum data burst volume are not contained in the PC5 QoS profile, their default values apply; |

**Observation 1: Based on the TS 24.587 [1], the possible PC5 QoS parameters can be derived according to the L2 destination ID for groupcast/broadcast in NAS layer.**

However,whether the AS layer of the Rx UE can obtain the possible PC5 QoS parameters for each L2 destination ID is unclear, so maybe we can ask SA2 to clarify whether QoS parameters are provided to the AS layer of the Rx-UE side for broadcast/groupcast. And if QoS parameters are not available in the AS layer of the Rx-UE side for broadcast/groupcast, whether the NAS lay can provide them to the AS layer.

**~~Question3-1: If SL DRX cycle and/or sl-drx-StartOffset is configured per PQI/QoS, do you agree to send a LS to SA2 to clarify whether the possible PC5 QoS parameters are available in the AS layer of Rx-UE for broadcast/groupcast in current specification?~~**

**~~-Yes~~**

**~~-No~~**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Lenovo, MotM | No (not required anymore) | As mentioned in [14], SA2 meeting#143 had already agreed a CR [in S2-2101436] that specifies QoS Provisioning for a Prose ***receiver*** device. Based on their approved CR, not only a transmitter SL UE knows about the QoS (PQI) of a new service requesting radio services but also a receiver SL UE anticipates data of certain PQI(s) of interest. This allows both the transmitter and receiver SL devices to use PQI as a common basis to initiate sidelink communication using a corresponding DRX configuration. |
| LG | No (not required anymore) | In the February SA meeting, it has already been agreed that RX UE can also know PC5 QoS parameters (e.g., PQI). For your information, the contribution agreed at the SA2 meeting in February is S2-2101436. The proposed text was reflected in TR 23.776. |
| X | X | X |

**~~Question3-2: If SL DRX cycle and/or sl-drx-StartOffset is configured per PQI/QoS, and if the possible PC5 QoS parameters are not available in the AS layer of the Rx-UE side for broadcast/groupcast, do you agree to send the LS to SA2 to request NAS layer providing QoS parameters to the AS layer of Rx-UE ?~~**

**~~-Yes~~**

**~~-No~~**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Lenovo, MotM | No (not required anymore) | As previously indicated. |
| LG | No (not required anymore) | See the comment with Q3-1. |
| X | X | X |

# Conclusion

These are the following proposals out of this email discussion:

LS to SA2:

 **Observation 1-2a: According to the latest SA2 SI Phase’s output in 23.776, 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.**

 **Proposal 1-2a:[14/20]For GC/BC, According to the latest SA2 SI phase’s output in 23.776, RAN2 does not need to send LS to SA2 to clarify whether the PC5 QoS parameters are available in the AS layer of Rx-UE.**

 DRX cycle configuration:

 **Proposal 1-1:[16/20]For GC/BC, RAN2 understands that DRX cycle should take at least QoS requirement into consideration.**

 **Observation 1-2:[15/20]For GC/BC, RAN2 understands that per DST L2 ID DRX cycle configuration can not ensure the QoS requirement.**

 **Proposal 1-3:[15/20]For GC/BC, if DRX cycle is configured per PQI/QoS, and if UE has multiple PQIs for same DST L2 ID, UE needs to down-select one DRX cycle from available DRX cycles for a specific L2 DST ID, FFS on how to down-select the DRX cycle or leave it to UE implementation.**

 **Proposal 1-5:[14/20] For GC/BC, DRX cycle is configured per PQI/QoS.**

 DRX startoffset cofiguration:

  **Proposal 2-1:[13/20] For GC/BC, RAN2 understands that sl-drx-startoffset does not take QoS requirement into consideration.**

 **Proposal 2-2:[13/20]For GC/BC, sl-drx-startoffset is configured based on DST L2 ID, FFS on per DST L2 ID[12/20] or per DST L2 ID group[9/20].**

# Reference

1. R2-2102184 Summary of [AT113-e][708]
2. R2-2101727 Summary of email discussion [702][SLe] High-level principles for SL DRX (LG)
3. 23.776 Study on architecture enhancements for 3GPP support of advanced Vehicle-to-Everything (V2X) services
4. R2-2102981 Discussion on SL DRX configuration for groupcast/broadcast ZTE
5. R2-2102689 Further Study on DRX for Sidelink Groupcast/Broadcast CATT discussion Rel-17 NR\_SL\_enh-Core
6. R2-2102817 SL DRX for Groupcast and Broadcast vivo discussion
7. R2-2102886 Discussion on DRX configuration OPPO discussion Rel-17 NR\_SL\_enh-Core
8. R2-2102888 Left issues on DRX mechanisms and granularity OPPO discussion Rel-17 NR\_SL\_enh-Core
9. R2-2103003 General aspects of SL DRX Ericsson,Qualcomm Incorporated discussion Rel-17 NR\_SL\_enh-Core
10. R2-2103068 On general SL DRX design Intel Corporation discussion Rel-17 NR\_SL\_enh-Core
11. R2-2103174 Consideration on sidelink DRX for broadcast and groupcast Huawei, HiSilicon discussion
12. R2-2103288 Alignment of sidelink DRX active time Fujitsu discussion Rel-17 NR\_SL\_enh-Core
13. R2-2103462 Discussion on SL DRX active time for groupcast and broadcast ASUSTeK discussion Rel-17 NR\_SL\_enh-Core
14. R2-2103615 Discussion on Sidelink DRX Sony Europe B.V. discussion Rel-17 NR\_SL\_enh-Core
15. R2-2103741 DRX Configuration for Broadcast and Groupcast SL communication Lenovo, Motorola Mobility discussion Rel-17 NR\_SL\_enh-Core
16. R2-2103779 Discussion on SL DRX configuration for Groupcast & Broadcast Qualcomm Finland RFFE Oy discussion Rel-17
17. R2-2104285 Discussion on SL DRX configuration for Groupcast & Broadcast Qualcomm Finland RFFE Oy, Ericsson discussion Rel-17
18. R2-2103852 Discussion on remaining issues on SL DRX Apple discussion Rel-17 NR\_SL\_enh-Core
19. R2-2103891 SL DRX operation for groupcast/broadcast Samsung discussion
20. R2-2103952 SL DRX Granularity Considerations Convida Wireless discussion Rel-17
21. R2-2104256 Consideration on sidelink DRX determination LG Electronics Inc. discussion Rel-17 NR\_SL\_enh-Core