**3GPP TSG RAN WG1 Meeting #101-e R1-200XXXX**

**eMeeting, May 25-June 5, 2020**

**Agenda Item: 7.2.4.7**

**Source: Moderator (FUTUREWEI)**

**Title: Email summary of [101-e-NR-5G\_V2X\_NRSL-NRUuSchedulingLTESL-01]**

**Document for: Discussion and decision**

# Introduction

At RAN1#101-e, it was agreed to have the following email discussion:

*[101-e-NR-5G\_V2X\_NRSL-NRUuSchedulingLTESL-01] Email discussion/approval by 5/29 on how to capture (e.g., whether in a TP or conclusion in the Chairman’s notes) that SL index is present in DCI 3\_1 only for cases with TDD configurations 0-6 and to discuss if any clarification is needed for SPS index and activation/release in DCI format 3\_1 – Phillippe (Futurewei)*

The views for each company are listed and summarized in this document.

# Issues to discuss

**Q1: What is each company’s preference on how to capture (e.g., whether in a TP or conclusion in the Chairman’s notes) that SL index is present in DCI 3\_1 only for cases with TDD configurations 0-6?**

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| Company | View |
| Futurewei | Our preference is to have the following statement captured in the Chairman’s notes: “SL index is present in DCI 3\_1 only for cases with TDD configurations 0-6” |
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**Q2: Is a clarification needed for SPS index and activation/release in DCI format 3\_1?**

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| Company | View |
| Futurewei | In our view, no clarification is needed: the description of the fields is clear, and there is no ambiguity (RNTI used in DCI 5A is not relevant here) |
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**Q3: if ‘yes’ to Q2, what is the preferred way to address the clarification (TP, conclusion in Chairman’s notes, other)?**

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| Company | View |
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# Description of issues

## SL index of DCI field

This issue is brought up in [1] and [4]. SL index is listed in DCI format 3\_1:

- SL index – 2 bits as defined in 5.3.3.1.9A of [11, TS 36.212]

TS 36.212 in turn specifies the following for “SL index”:

- SL index – 2 bits as defined in clause 14.2.1 of [3] (this field is present only for cases with TDD operation with uplink-downlink configuration 0-6).

This brings the question of whether SL index is always present or only for case with TDD configurations 0-6.

Note that previous agreements make it clear that SL index is not always present. For instance:

* *For NR Uu scheduling LTE sidelink, the subframe of the first sidelink transmission is the first SL subframe of the corresponding resource pool that starts not earlier than* *, where TDCI is the start timing of the slot carrying DCI format 3\_1, NTA and Tc are defined in TS 38.211, X is the value indicated by Timing offset field in DCI format 3\_1, m is the value indicated by SL index in DCI format 3\_1 if SL index is present, otherwise m=0.*

Therefore, the discussion needs to focus on how to clarify when SL\_index is present.

## Issue 3: SL SPS configuration index

This issue is listed in [2]. DCI format 3\_1 refers to DCI format 5A for the fields *SL SPS configuration index* and *activation/release*. In [2], it is stated that “ clause 5.3.3.1.9A of DCI format 5A in which the SPS configuration index and activation/release indication exist only when an LTE V2X SPS RNTI (i.e., SL-SPS-V-RNTI) is used to scramble to the DCI. Consequently, these fields will be absent in DCI format 3\_1 as there is no such RNTI specified in NR.”

# Decisions at previous meetings

## RAN1#96

*Agreements:*

* *Scheduling by gNB using RRC for LTE sidelink scheduled mode is supported from RAN1 perspective under the premise that there is sufficient time for coordination between the NR and LTE modules. No DCI to activate/release*
  + *RRC message delivers the SPS grant configuration and releases the SPS configuration.*
  + *Support of this scheduling mode is subject to UE capability (may or may not have capability for both LTE & NR)*
  + *Note: some specification LTE change is needed to support the reception of a grant through RRC*
    - *RRC message contains mode 3 grant content and timing*
    - *Up to the Editor to capture it as mode 3 or new LTE sidelink mode*
  + *No intention to have additional NR & LTE specification change (other than those described above) for this function in Rel-16*
* *RAN1 studied the feasibility of SPS scheduling by gNB for LTE sidelink with DCI activation/release, but there is no consensus to support it*

## RAN1#96bis

*Agreements:*

*Regarding RRC-based versus DCI-based activation/release of LTE sidelink SPS, RAN1 agrees to make the choice on the basis of at least:*

* *Spec impact*
* *Flexibility*
* *Performance, including latency*
* *Implementation complexity*
* *Timing of the activation/deactivation*

## RAN2#105bis

*Agreements:*

* *For scheduling LTE SL UEs, the gNB uses RRC messages to deliver the SPS grant configuration.*
* *Separate system information block should be designed to support LTE resource pool configuration via NR Uu. It will be defined as a container (OCTET STRING) and actual information follows what defined in LTE RRC.*
* *gNB should be able to configure the LTE V2X mode 4 sidelink resource pool via dedicated signalling. In addition, gNB should be able to configure mode3 SL resources via dedicated signaling. It will be defined as a container (OCTET STRING) and actual information follows what defined in LTE RRC.*

## RAN1#97

*Agreements:*

* *DCI-based activation/deactivation is supported* 
  + *Support of LTE PC5 scheduling by NR Uu (mode 3-like ) is based on UE capability*
  + *NR DCI provides the fields of DCI 5A in LTE-V that are related to SPS scheduling*
  + *The size of DCI for activation/deactivation is one of the DCI size(s) that will be defined for NR Uu scheduling NR V2V*
    - *FFS whether the DCI format is the same as one of the DCI formats that will be defined for NR Uu scheduling NR V2V*
  + *Activation/deactivation applies to the first LTE subframe after Z+X ms after receiving the DCI*
    - *Z is the same timing offset in current LTE V2X specs*
    - *X>0. FFS value(s) of X, and if one or multiple values of X are possible*

## RAN1#98

*Agreements:*

* *A new RNTI is introduced to scramble the NR DCI used for scheduling LTE PC5.*
* *X is dynamically indicated using a field in the DCI*
  + *FFS whether the DCI field provides an index to a table or the value of X*
  + *The minimum value of X is subject to UE capability*
    - *UE reports a single value subject to UE capability*

## RAN1#98b

*Agreements:*

* *The NR DCI field to indicate X provides an index to a table of values*
  + *The table of values is configurable, and has 8 values*
  + *The size of the DCI field is fixed at 3 bits*

## RAN1#99

*Agreements****:***

* *Use a separate PDCCH monitoring configuration (as configured in Rel-15) for NR DCI scheduling LTE SL*
  + *The per-CC and across-CC blind decoding budget and the maximum number of non-overlapped CCEs for channel estimation are not increased.*
  + *The per-CC and across-CC maximum number of search spaces is not increased.*
  + *The per-CC and across-CC maximum number of CORESETs is not increased*
    - *When in the same slot, there is both PDCCH monitoring for Uu SL and PDCCH monitoring for SL for the same CC, the search space(s) for LTE SL is configured to be the same or a subset of those for Uu for the same CC or vice versa*

*Agreements:*

* *The minimum value of X signalled in the UE capability is one of the values (excluding spare values) that can be signalled in DCI 3\_1*

*Agreements:*

*The supported values of X signaled in the DCI are:*

* *0.75ms, 1ms, [1.25ms], [1.5ms], 2ms, 4ms, 5ms, 8ms, 10ms, 20 ms*
  + *Additional value(s) can be discussed during the Feb. meeting*
* *Spare values are reserved for future deployments*

## RAN1#100

*Agreements*

* *For NR Uu scheduling LTE sidelink, the subframe of the first sidelink transmission is the first SL subframe of the corresponding resource pool that starts not earlier than , where TDCI is the start timing of the slot carrying DCI format 3\_1, NTA and Tc are defined in TS 38.211, X is the value indicated by Timing offset field in DCI format 3\_1, m is the value indicated by SL index in DCI format 3\_1 if SL index is present, otherwise m=0.*

*Agreements*

* *If UE is configured to monitor DCI 3\_0, the sizes of DCI 3\_1 and DCI 3\_0 are aligned by zero padding.*
* *If UE is not configured to monitor DCI 3\_0, the mechanism for size alignment between DCI 3\_0 and Uu DCI is reused for size alignment between DCI 3\_1 and Uu DCI*

*Agreements:*

* *The set of possible values for X is: 0ms, 0.25ms, 0.5ms, 0.625ms, 0.75ms, 1ms, 1.25ms, 1.5ms,1.75ms, 2ms, 2.5ms, 3ms, 4ms, 5ms, 6ms, 8ms, 10ms, 20 ms*

# References

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *No.* | *Tdoc* | *Type* | *Source* | *Title* | *Status* |
| 1 | R1-2003315 | discussion | Nokia, Nokia Shanghai Bell | Remaining details of Support of NR Uu controlling LTE sidelink | present |
| 2 | R1-2003385 | discussion | vivo | Remaining issues on support of NR Uu controlling LTE sidelink | present |
| 3 | R1-2003500 | discussion | Huawei, HiSilicon | Remaining details of NR Uu control for LTE sidelink | present |
| 4 | R1-2003554 | discussion | ZTE, sanechips | Remaining issues on NR Uu control LTE sidelink | present |
| 5 | R1-2003568 | discussion | LGE | Discussion on NR Uu controlling LTE sidelink | present |
| 6 | R1-2003808 | decision | Futurewei | Remaining details of cross-RAT scheduling | present |
| 7 | R1-2004078 | discussion | OPPO | Open loop power control for NR Uu controlling LTE sidelink | present |
| 8 | R1-2004388 | discussion | NTT DoCoMo | Remaining issues on NR Uu controlling LTE SL | present |
| 9 | R1-2004550 | decision | Ericsson | NR UU controlling LTE sidelink transmissions | present |