**3GPP TSG RAN WG1 Meeting #107-e R1-21xxxxx**

**e-Meeting, Nov 11th – Nov 19th, 2021**

**Agenda Item: 6**

**Source: Moderator (Nordic Semiconductor ASA)**

**Title: Moderator summary on 107-e-LTE-6CRs-02**

**Document for: Discussion and Decision**

# Introduction

This documents provides the summary of discussions on the corresponding email discussion, regarding the proposed CR in [1].

[107-e-LTE-6CRs-02] Email discussion/approval on Fallback DCI for eMTC – Karol (Nordic)

* Discussion and decision on CR by 11/17, final check by 11/19

# Discussion

In [1], a correction to the DCI Format 6-0A is proposed due to the following reason:

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| --- | --- |
| ***Reason for change:*** | Clarify that all UE-specific RRC-configured UL DCI format fields are only present in USS. |
|  |  |
| ***Summary of change:*** | Add the clarification “and the DCI is mapped onto the UE-specific search space given by the C-RNTI as defined in [3]” to Resource block assignment DCI field in 6-0A. |
|  |  |
| ***Consequences if not approved:*** | Size of CSS fallback DCI changes with RRC configuration. |

The proposed change is as following:

##### 5.3.3.1.10 Format 6-0A

DCI format 6-0A is used for the scheduling of PUSCH in one UL cell, and for the indication of ACK feedback.

The following information is transmitted by means of the DCI format 6-0A:

- Flag format 6-0A/format 6-1A differentiation – 1 bit, where value 0 indicates format 6-0A and value 1 indicates format 6-1A

- Frequency hopping flag – 1 bit, where value 0 indicates frequency hopping is not enabled and value 1 indicates frequency hopping is enabled as defined in clause 5.3.4 of [2]

- Number of resource units – 2 bits, where value '00' indicates the format 6-0A DCI uses PRB resource allocation, otherwise the DCI format 6-0A uses sub-PRB resource allocation as defined in clause 8.1.6 of [3]. This field is present when *ce-PUSCH-SubPRB-Config* is configured by higher layers and the DCI is mapped onto the UE-specific search space given by C-RNTI as defined in [3]

- Resource block assignment –

- If the format 6-0A DCI uses sub-PRB resource allocation and the DCI is mapped onto the UE-specific

search space given by C-RNTI as defined in [3]:

- +6 bits for PUSCH as defined in [3]

-  MSB bits provide the narrowband index as defined in clause 5.2.4 of [2]

- 6 bits provide the resource allocation within the indicated narrowband using UL resource allocation type 5 as defined in clause 8.1.6 of [3]

- Else if the DCI is mapped onto the UE-specific search space given by C-RNTI as defined in [3] and flexible starting PRB for PUSCH resource allocation is enabled by higher layers with  equal to , $\left⌈log\_{2}(6N\_{RB}^{UL})\right⌉$ bits for FDD PUSCH and $\left⌈log\_{2}(5N\_{RB}^{UL})\right⌉$ bits for TDD PUSCH provide the resource allocation using UL resource allocation type 0 as defined in clause 8.1.1 of [3]

- Otherwise,+5 bits for PUSCH as defined in [3]:

- If the 5 LSB bits indicate a value not larger than 20

-  MSB bits provide the narrowband index as defined in clause 5.2.4 of [2]

- 5 bits provide the resource allocation using UL resource allocation type 0 within the indicated narrowband

- Otherwise,

- +5 bits provide the resource allocation using UL resource allocation type 4 as defined in clause 8.1.5 of[ 3]

<remaining parts of clause have been omitted >

According to moderator calculations, the number of bits needed for resource block assignment in DCI Format 6-0A are as shown in the Table 1 below:

**Table 1:** Number of bits of ”Resource block assigment ” -field in DCI Format 6-0A

|  |  |  |
| --- | --- | --- |
| System bandwidth | N of bits of RA w/o flex PRB | N of bits of RA w flex PRB for FDD |
| 1.4 MHz | 5 | 6 |
| 3 MHz | 6 | 7 |
| 5 MHz | 7 | 8 |
| 10 MHz | 8 | 9 |
| 15 MHz | 9 | 9 |
| 20 MHz | 9 | 10 |

**Q1**: Is it clear in current specification that when *ce-PUSCH-SubPRB-Config* is not configured by higher layers then the DCI format 6-0A in CSS follows Resource block assignment

Otherwise,+5 bits for PUSCH as defined in [3]:

- If the 5 LSB bits indicate a value not larger than 20

-  MSB bits provide the narrowband index as defined in clause 5.2.4 of [2]

- 5 bits provide the resource allocation using UL resource allocation type 0 within the indicated narrowband

- Otherwise,

- +5 bits provide the resource allocation using UL resource allocation type 4 as defined in clause 8.1.5 of[ 3]

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| Companies | Comments |
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**Q2:** Is it a common understanding, that according to current specification, when flexible starting PRB for PUSCH resource allocation is enabled by higher layers the DCI format 6-0A in CSS will change its size and/or its interpretation (as in Table 1)?

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| Companies | Comments |
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**Q3:** Do you agree that size and/or interpretation of DCI format 6-0A in CSS should not depend on UE-specific RRC configuration? If yes, also please indicate whether below change is acceptable?

Else if the DCI is mapped onto the UE-specific search space given by C-RNTI as defined in [3] and flexible starting PRB for PUSCH resource allocation is enabled by higher layers with  equal to , $\left⌈log\_{2}(6N\_{RB}^{UL})\right⌉$ bits for FDD PUSCH and $\left⌈log\_{2}(5N\_{RB}^{UL})\right⌉$ bits for TDD PUSCH provide the resource allocation using UL resource allocation type 0 as defined in clause 8.1.1 of [3]

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| Companies | Comments |
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# Summary

TBA

# References

1. R1-2112378 Fallback DCI for eMTC, Nordic Semiconductor ASA