**3GPP TSG RAN WG1 #110 R1-2207706**

**Toulouse, France, August 22nd – 26th, 2022**

**Agenda item:** 8.16.5

**Source:** Moderator (NTT DOCOMO, INC.)

**Title:** Summary on UE features for UE power saving enhancements

**Document for:** Discussion and Decision

# **Introduction**

This document summarizes contributions submitted to AI 8.16.5 regarding UE features for UE power saving enhancements and captures company views based on the announcement in the following email thread.

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| --- |
| [110-R17-UE\_features\_1] To be used for sharing updates on online/offline schedule, details on what is to be discussed in online/offline sessions, tdoc number of the moderator summary for online session, etc – Hiroki (DOCOMO)* eIIoT & URLLC, RedCap, UE power saving, coverage enhancement, NB-IoT & eMTC, sidelink, MBS, 5G terrestrial broadcast, UL TX switching, SDT
 |

Based on the latest RAN1 UE features list in [1] and contributions in AI 8.16.5 discussing UE features for UE power saving enhancements, the issues to be discussed are tagged and colour coded with High priority or Low priority based on potential RAN2 spec impact (including description update in TS38.306).

# **Discussion**

## **2.1 29-3b/c/d: 2/3 search space sets group switching and 2 search space sets group switching with PDCCH skipping**

In [1], FG 29-3b/c/d are captured as below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29. NR\_UE\_pow\_sav\_enh | 29-3b | 2 search space sets group switching | Support of 1-bit indication of SSSG switching between 2 SSSGs by scheduling DCI, and timer based SSSG switching, if *PDCCHSkippingDurationList* is not configured |  | Y |  |  | Per band | N/A | N/A | N/A | UE supports search space set group switching capability-1 [according to Table 10.4-1 of 38.213] | Optional with capability signaling |
| 29. NR\_UE\_pow\_sav\_enh | 29-3c | 3 search space sets group switching | Support of 2-bit indication of SSSG switching among 3 SSSGs by scheduling DCI and timer based SSSG switching, if *PDCCHSkippingDurationList* is not configured | 29-3b | Y |  |  | Per band | N/A | N/A | N/A | UE supports search space set group switching capability-1 [according to Table 10.4-1 of 38.213] | Optional with capability signaling |
| 29. NR\_UE\_pow\_sav\_enh | 29-3d | 2 search space sets group switching with PDCCH skipping | Support of 2-bit indication of SSSG switching between 2 SSSGs, PDCCH skipping by scheduling DCI, and timer based SSSG switching | 29-3a, 29-3b | Y |  |  | Per band | N/A | N/A | N/A | UE supports search space set group switching capability-1 [according to Table 10.4-1 of 38.213] | Optional with capability signaling |

Following views are provided in contributions for the RAN1#110 meeting.

|  |  |  |
| --- | --- | --- |
| [2] | Huawei, HiSilicon | After RAN1#109, only remaining issues of UE capability for UE power saving are the square brackets left in the notes of 29-3b, 29-3c and 29-3d. In our view, the square brackets can be simply removed in this meeting to complete the UE feature discussion for Rel-17 UE power saving. ***Proposal 4-1: Remove the square brackets in the note of the FG 29-3b, 29-3c and 29-3d.*** |
| [3] | NTT DOCOMO, INC. | One remaining issue for FG29-3b/c/d is whether capability-1 should follow the value in Table 10.4-1 of 38.213 or other value such as P=25/25/25/50 symbols for µ=0/1/2/3 as proposed by one company at the RAN1#109-e.Regarding application delay for SSSGS, the following WA was made.

|  |
| --- |
| . Working Assumption* Upon detecting a scheduling DCI format 1-1/1-2/0-1/0-2 indicating SSSG switching (i.e., Beh 2/2A/2B),
	+ the UE applies SSSG switching on an active BWP of the serving cell at a first slot that is at least *Pswitch* symbols after the last symbol of the PDCCH reception
		- FFS: a minimum applicable scheduling offset is configured in the BWP
	+ Note: *Pswitch* is defined in Table 10.4-1 in TS38.213
 |

Although the above WA said “at least *Pswitch*” which may mean that the application delay can be greater than *Pswitch* defined in Table 10.4-1 in TS38.213, we think we don’t need different value. However, we are open to discuss it if it is confirmed that the different value is needed in the main session. **Proposal 5: Remove the bracket in Note for FG 29-3b/c/d.** |
| [4] | Nokia, Nokia Shanghai Bell | * **29-3b - 2 search space sets group switching**
	+ Remove the yellow highlighted text
* **29-3c - 3 search space sets group switching**
	+ Remove the yellow highlighted text
* **29-3d - 2 search space sets group switching with PDCCH skipping**
	+ Remove the yellow highlighted text
 |

Based on above, following proposal should be discussed at the RAN1#110 meeting.

### **High priority proposal 2-1:**

* **Apply ~~either one of~~ the following ~~alternatives~~ for FG29-3b/c/d**
	+ **~~Alt.1:~~ Remove the bracket in Note for FG 29-3b/c/d, i.e., “according to Table 10.4-1 of 38.213” is kept [2, 3]**
	+ **~~Alt.2: Remove the yellow highlighted text in Note for FG29-3b/c/d, i.e., “according to Table 10.4-1 of 38.213” is removed [4]~~**

|  |  |
| --- | --- |
| Company | Comment |
| ZTE, Sanechips | Support Alt-1, otherwise, the application delay for 29-3x is unclear. |
| Nokia, NSB | Alt-2 |
| Nordic | We believe that 38.213 is clear or what is capability for these features, no need to refer to Table here.Alt-2 should be sufficient.  |
| Moderator (NTT DOCOMO) | There are slightly larger number of companies supporting Alt.1, and the argument for Alt.2 is just “unnecessary” i.e., there may be no concern/different view on the content of Alt.1 Note.In that sense, we can check if following updated proposal is agreeable.* **Apply ~~either one of~~ the following ~~alternatives~~ for FG29-3b/c/d**
	+ **~~Alt.1:~~ Remove the bracket in Note for FG 29-3b/c/d, i.e., “according to Table 10.4-1 of 38.213” is kept [2, 3]**
	+ **~~Alt.2: Remove the yellow highlighted text in Note for FG29-3b/c/d, i.e., “according to Table 10.4-1 of 38.213” is removed [4]~~**
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# **Conclusions**

TBD

# **References**

[1] R1-2205608 Updated RAN1 UE features list for Rel-17 NR after RAN1 #109-e including remaining RAN1 issues Moderators (AT&T, NTT DOCOMO, INC.)

[2] R1-2205787 On UE features for other Rel-17 work items Huawei, HiSilicon

[3] R1-2207392 Discussion on remaining issues in RAN1 UE features list for Rel-17 NR NTT DOCOMO, INC.

[4] R1-2207584 On UE features for miscellaneous topics Nokia, Nokia Shanghai Bell