[102-e][326] NR_UE_pow_sav_enh_Demod_NWM - Version 0.0.4
RAN4

3GPP TSG-RAN WG4 Meeting # 102-e R4-2207443

Electronic Meeting, February 21 – March 3, 2022

Agenda item: 10.14.4

Source: Moderator (MediaTek)

Title: Email discussion summary for [102-e][326] NR_UE_pow_sav_enh_Demod_NWM

Document for: Information

1 Introduction

The scope of this email thread is the following topics of Rel-17 power saving enhancement WI:

- Scope of UE demodulation requirements for power saving enhancement

Email discussion targets for the 1st round and 2nd round

- 1st round:
  - Discussion on whether to define demodulation requirements for power saving enhancement
- 2nd round: TBA

2 Topic #1: Whether to define demodulation requirements for power saving enhancement?

2.1 Companies' contributions summary

Table 1:

T-doc number	Company	Proposals / Observations

R4-2203759	Apple	**Proposal 1:** No demodulation requirement for DCI format 2-7 scrambled by PEI-RNTI. **Proposal 2:** No demodulation requirement for DCI based power saving adaptation during DRX active time.
R4-2204535	CMCC	**Proposal 1:** PEI monitoring performance should be specified. **Proposal 2:** A joint test case for PEI monitoring and PO monitoring can be defined for demodulation performance.
R4-2205099	Ericson	**Proposal:** Not define new UE demodulation requirements in Rel-17 UE power saving enhancements WI.
R4-2205770	Huawei,HiSilicon	Proposal 1: Do not consider paging early indication for power saving enhancement performance requirements definition. Proposal 2: Do not consider TRS occasion for idle/inactive-mode for power saving enhancement performance requirements definition. Proposal 3: Do not consider PDCCH monitoring reduction for C-DRX for power saving enhancement performance requirements definition.

R4-2205912	MediaTek inc.	Observation 1: When miss detection of DCI for PDCCH monitoring reduction happens, no demodulation performance impact to UE but cause more power consumption. Proposal 1: Do not define demodulation requirements for PDCCH monitoring reduction in connected-mode. Observation 2: When miss detection of PSCCH-based PEI happens, UE will miss the paging DCI in PO. gNB needs to do re-paging in the next DRX cycle which causes extra delay. Observation 3: For power saving enhancement, there are no newly designed physical signals/sequences. The physical signal design of PEI is based on PDCCH. Observation 4: The DCI payload size and AL for PDCCH-based PEI should be chosen properly to not impact the detection performance PDCCH for paging DCI. Observation 5: Considering the minimum DRX cycle for idle mode is 320ms, it will take quite a long time for the test, which is unacceptably considering the test cost. Observation 6: PEI is introduced in idle/in-active mode and there is no ACK/NACK for paging signal. Proposal 2: For the performance requirement of PEI, we think it cannot be tested as there are no ACK/NACK for the paging signal. Proposal 3: Do not define any demodulation requirements for UE power saving enhancement.

2.2 Open issues summary

Issue 1: Whether to define requirements for paging early indication in idle/inactive-mode?

- Proposals
    - Option 1 (CMCC): Yes. A joint test case for PEI monitoring and PO monitoring can be defined for demodulation performance.
    - Option 2 (Apple, Ericsson, Huawei, MediaTek): No.
- Recommended WF
    - Collect detailed companies views on whether to define requirements for paging early indication in idle/in-active mode.

Issue 2: Whether to define requirements for TRS occasion in idle/inactive-mode?

- Proposals
    - Option 1: Yes.
    - Option 2 (Apple, Ericsson, Huawei, MediaTek): No.
- Recommended WF
    - No demodulation requirements for TRS occasion in idle/inactive-mode.

Issue 3: Whether to define requirements for PDCCH monitoring reduction in connected-mode?

- Proposals
    - Option 1: Yes.
    - Option 2 (Apple, Ericsson, Huawei, MediaTek): No.
- Recommended WF
    - No demodulation requirements for PDCCH monitoring reduction in connected-mode.

2.3 Companies views' collection for 1st round

2.3.1 Open issues

2.3.1.1 Issue 1: Whether to define requirements for paging early indication in idle/inactive-mode?

Feedback Form 1:

1 – HiSilicon Technologies Co. Ltd Option 2 considering no new algorithms introduced. Also it is not feasible to test since there is no HARQ mechanism for paging PDSCH.
2 – MediaTek Inc. Based on the observations below, we support Option 2. Do not define requirements for paging early indi-

cation in idle/inactive-mode.

1. There is no HARQ mechanism for paging PDSCH. No way to decide whether paging PDSCH is successfully decoded from UE side during the test.
2. There is no new algorithms introduced to decode PEI.
3. gNB can use less DCI payload length and higher AL level to increase the robustness of PEI.

3 – Ericsson Japan K.K.

Support option 2.

As commented by Huawei/HiSilicon and MediaTek above, UE does not send HARQ-ACK in IDLE/INACTIVE. This means TE (BS simulator) cannot verify UE decode PDCCH/PDSCH or not. This is the reason RAN4 has not defined demodulation requirements not only for NR but also for LTE.

4 – China Mobile Com. Corporation

We are fine to go with Option 2.

Based on our understanding, although no ack/nack for paging PDSCH, the requirements can still be defined as PBCH did. However, considering of less importance of this feature and additional working is needed, Option 2 is ok for us.

5 – Apple Hungary Kft.

Option 2

6 – Qualcomm Technologies Int

Support Option 2, as other companies commented the proposed requirement cannot be tested

2.3.1.2 Issue 2: Whether to define requirements for TRS occasion in idle/inactive-mode?

Feedback Form 2:

1 – HiSilicon Technologies Co. Ltd

Option 2. Similar view as Issue 1.

2 – MediaTek Inc.

Support the Recommended WF.

3 – Ericsson Japan K.K.

Support the recommended WF.

4 – China Mobile Com. Corporation

Support the recommended WF.

5 – Apple Hungary Kft. Support recommended WF
6 – Qualcomm Technologies Int Support the recommended WF

2.3.1.3 Issue 3: Whether to define requirements for PDCCH monitoring reduction in connected-mode?

Feedback Form 3:

1 – HiSilicon Technologies Co. Ltd Option2. There is no new algorithms introduced, the UE can decode PDCCH containing the new DCI field similar as legacy PDCCH.
2 – MediaTek Inc. Support the Recommended WF.
3 – Ericsson Japan K.K. Support the recommended WF.
4 – China Mobile Com. Corporation Support the recommended WF.
5 – Apple Hungary Kft. Support the recommended WF
6 – Qualcomm Technologies Int Support the recommended WF

2.4 Summary for 1st round

2.4.1 Open issues

Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.

Table 2:

	Status summary

Issue 1: Whether to define requirements for paging early indication in idle/inactive-mode?	*Tentative agreements: Do not need to define requirements for paging early indication in idle/inactive-mode* *Recommendations for 2nd round: Do not need to discuss this issue.*
Issue 2: Whether to define requirements for TRS occasion in idle/inactive-mode?	Tentative agreements: Do not need to define requirements for TRS occasion in idle/inactive-mode. Recommendations for 2nd round: Do not need to discuss this issue.
Issue 3: Whether to define requirements for PDCCH monitoring reduction in connected-mode?	Tentative agreements: Do not need to define requirements for PDCCH monitoring reduction in connected-mode. Recommendations for 2nd round: Do not need to discuss this issue.

2.5 Discussion on 2nd round (if applicable)

3 Recommendations for Tdocs

3.1 1st round

New tdocs

Table 3:

Title	**Source**	**Comments**
Way Forward on demodulation requirements for power saving enhancement	MediaTek	Capture the agreements

Existing tdocs

Table 4:

Tdoc number	Title	Source	Recommendation	Comments
R4-2203759	UE power saving enhancement: de-mod performance requirements	Apple	Noted	
R4-2204535	Discussion on de-modulation for UE power saving en-hancement	CMCC	Noted	
R4-2205099	UE demodulation requirements for UE power saving enhancement	Ericsson	Noted	
R4-2205770	Discussion on for power saving en-hancement demod	Huawei,HiSilicon	Noted	
R4-2205912	Views on demodu-lation requirements for power saving enhancements	MediaTek inc.	Noted	

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   i) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   ii) Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

3.2 2nd round

Table 5:

Tdoc number	Title	Source	Recommendation	Comments
R4-2207225	Way Forward on demodulation requirements for power saving enhancement	MediaTek	Agreeable	

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   i) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   ii) Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

4 Annex

Please add your contact information in the feedback form below as follows:

- Company, Name, Email address

Feedback Form 4:

1 – Ericsson Japan K.K. Ericsson, Kazuyoshi Uesaka, kazuyoshi.uesaka@ericsson.com
2 – Qualcomm Technologies Int Qualcomm, Pierpaolo Vallese, pvallese@qti.qualcomm.com

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)