

**Agenda Item: 9.3.2.3**

**Source: Samsung**

**Title: On Potential Paging Enhancements for Rel-17 UE Power Savings**

**Document for: Discussion**

# Status of RAN1 Discussion

- ◇ RAN1 have considered the following two paging enhancements schemes for UE power savings in idle/inactive mode
  - ◆ #1: Early paging indication (PEI), and
  - ◆ #2: UE subgrouping for paging
- ◇ RAN1 reached the following conclusion in RAN1#105-e aiming to down-select a channel/signal for PEI in RAN1#106-e

## **Conclusion:**

To down-select one solution for PEI physical-layer channel/signal in RAN1 #106-e, using below as a starting point:

- PDCCH-based PEI
- SSS-based PEI
- TRS/CSI-RS-based PEI

Note: Additional details for each of the above 3 solutions are encouraged for more informed down-selection

Note: further refinement of the above list is possible, e.g., by merging/further splitting, depending on significance of the commonality and/or differences

- ◇ In RAN1#106-e, RAN1 could not make a consensus and the following was captured in RAN1 chairman's notes

## Proposed Working Assumption

- PDCCH-based PEI

Supported by 20 companies, but can not be accepted by 3 companies, i.e., Intel, CATT, Sony.

# Comparison of PEI Candidates

## ◇ Performance comparison based on RAN1 evaluation [R1-2106898]

Metric	SSS-based PEI	PDCCH-based PEI
Power saving gain	Larger power saving gain due to <ul style="list-style-type: none"> <li>• Reduced synchronization/AGC overhead</li> <li>• Lower power consumption on detection</li> </ul>	Depending on different assumptions <ul style="list-style-type: none"> <li>• Same detection power consumption as SSS-based PEI</li> <li>• Relaxed AGC/synchronization processing based on serving cell measurement only.</li> </ul>
Resource overhead	Lower overhead, i.e., less number of REs to achieve target reliability	-
Coexistence with legacy UEs	Finer granularity for multiplexing with legacy PDSCH, i.e., RE level, RB level	Better coexistence with legacy PDCCH
Other		Flexibility to carry large number of information

## ◇ Concerns on specification efforts

SSS-based PEI	PDCCH-based PEI
<ul style="list-style-type: none"> <li>• New sequence design mapping to multiple UE subgroups</li> </ul>	<ul style="list-style-type: none"> <li>• Design of a new DCI format to support multiple functionalities including additional second functionalities (e.g., TRS availability, SI update or ETWS)</li> <li>• Design of a new CSS set with monitoring occasions mapped to <math>N &gt; 1</math> POs and so on</li> </ul>

# Observations and Proposals

- ◇ Observation 1: There have been different evaluation results from different companies depending on the assumptions of UE implementation and simulation parameters.
- ◇ Observation 2: There are concerns on specification efforts for each of PDCCH-based PEI and SSS-based PEI.
- ◇ Proposal: No PEI is supported in Rel-17

**THANK YOU**