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Views on introduction of NB-IoT in AAS specification

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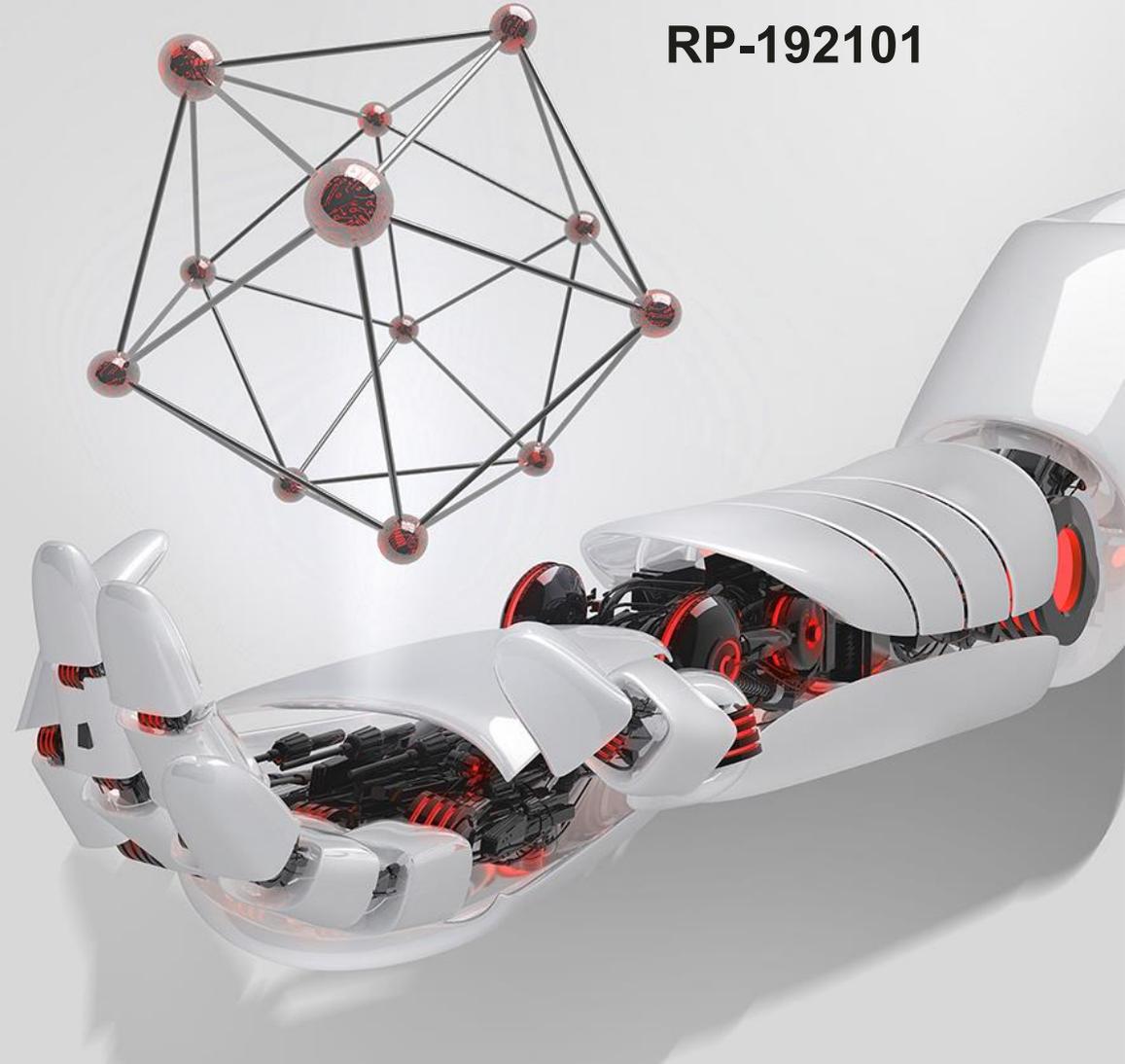
Background

- [1] was submitted for information during RAN4#92 meeting. It proposes to introduce NB-IoT into AAS specification to enable the usage of AAS BS for bands around and above 2 GHz. In this paper we provide our views on the new WI proposal.

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Discussion on the request

- NB-IoT feature was introduced in Rel-13, towards low complexity and low throughput radio access technology to address the requirements of cellular internet of things.

- AAS as the platform for advanced array technologies (e.g. MIMO)was also introduced in Rel-13.

- Both features were enhanced in Rel-14 and Rel-15 WIs. During Rel-13 ~ Rel-15 phase, there was no desire to include NB-IoT into AAS specifications, with the following reasons

  - NB-IoT is designed for narrow bandwidth with low throughput for low frequency band but not for multi-stream and high data-rate service scenarios, i.e. NB-IoT only supports one or two antenna ports

  - AAS is suitable for high frequency band for MBB service

- **Observation 1: AAS is not suitable to support NB-IoT compared to non-AAS**

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Discussion on the impact on AAS BS

- To support NB-IoT, the power consumption may be increased significantly.

  - The physical layer common channel overhead of the NB-IoT is much higher than that of the LTE, and the possibility of OFF power symbol is much lower compare to LTE, e.g. compared LTE+NB case to LTE only case there can be 35% gap in theory (no load) and ~20% in low load scenario.

  - The power consumption is essential for AAS BS which has much more transceiver units and higher power consumption than non-AAS.

  Observation 2: To support NB-IoT for AAS BS, the probability of OFF power symbol will be much lower and affects the energy saving effect.

- To support NB-IoT, the implementation complexity will be increased.

  - Power boosting need more implementation margin to fulfil the unwanted emission mask

  - Additional antenna calibration is needed for NB-IoT.

- **Observation 3: To support NB-IoT, the implementation complexity will be increased.**

Proposals

- Considering no concrete gain, significant impact to power saving and increased implementation complexity, we propose,

- Proposal：NB-IoT is not introduce into AAS specification.

Reference

[1] R4-1908060, On NB-IoT requirement coverage, Ericsson

Thank you.

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