

3GPP TSG RAN Meeting #102
Edinburgh, December 11-15, 2023
Agenda item: 9.1.1.4 Ambient IoT

RP-232870

Views on Ambient IoT

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Background

- ◆ RAN chair provided the guidance on work plan for ambient IoT in Rel-19.
 - It has about 3.5 TU targeting 12-months for SI completion.
 - Check in Dec'24 for conversion to WI or if necessary, continuation of SI.
- ◆ Still have some details needed to be discussed. In this contribution, we give our views on:
 - Prioritized device type
 - Prioritized deployment scenario and topologies
 - Scope of the objectives

Prioritized device type and scenario (1/2)

- ◆ To complete study within 12 months, it's better to focus on some device type and scenario in Rel-19 first to get a reasonable work load.
 - Device type and scenario should be specific to ambient IoT, and not cover existing 3GPP technology.
 - Device type and scenario should be forward compatible, so that they can easily be enhanced in later releases.
- ◆ For independent signal generated by device type C, there are still some sub-types, e.g.
 - Subtype C-1: independent signal is compatible with backscatter transmission, e.g. OOK signal.
 - Subtype C-2: independent signal is narrower bandwidth signal, e.g. like single sub-carrier NB-IoT uplink signal
 - Subtype C-3: independent signal is wider bandwidth signal, e.g. like 12 sub-carriers NB-IoT uplink signal or NR RedCap uplink signal
- ◆ Since device type C has higher capability, it's easier for a type C device to connect with network using radio interface which is designed first for device type A and B. On the other hand, it's a challenge for a type A and B device to connect with network using radio interface which is designed first for device type C.

Prioritized device type and scenario (2/2)

- ◆ Standalone deployment of ambient IoT is required. And it's better to decouple ambient IoT radio access technology and core network, i.e. ambient IoT radio access technology could be applied in future 6G core network.
- ◆ We could have basic feature to complete SI first and then enhance in the further, thus it has:
 - Basic coverage first and coverage enhancement second, if necessary
 - Direct communication first and relay communication second, if necessary
- ◆ **Proposal 1:** Prioritized device type, if any, should be forward compatible to the access of later device type.
- ◆ **Proposal 2:** If prioritization is needed to complete SI within 12 months,
 - For device type: type A and type B
 - For scenario and topology: Deployment scenario 1 with Topology 1 and Deployment scenario 4 with Topology 3

Objectives of the 12-months SI for Ambient IoT in Rel-19

- ◆ RAN1 to study the fundamental physical layer signal structure for the new 3GPP IoT technology, covering:
 - Evaluation methodology for ambient IoT.
 - Physical channels and signals, waveform and bandwidth.
 - Channel coding, modulation and physical channel mapping.
 - Physical layer procedures.
 - Coexistence with legacy 3GPP technology, e.g. NR and/or NB-IoT.
- ◆ RAN2 to study the radio interface protocol architecture and procedures:
 - Necessities and functionalities of MAC, RLC, PDCP, and RRC protocols.
 - Necessities and functionalities of RRM procedures, e.g. measurement and mobility.
 - Connection management and security control in radio interface.
 - Device capabilities.
- ◆ RAN3 to study overall architecture and network interface to support ambient IoT.

Summary

It is proposed to have a reasonable work plan to complete SI within 12 months and also consider future enhancement by:

- ◆ **Proposal 1:** Prioritized device type, if any, should be forward compatible to the access of later device type.
- ◆ **Proposal 2:** If prioritization is needed to complete SI within 12 months,
 - For device type: type A and type B
 - For scenario and topology: Deployment scenario 1 with Topology 1 and Deployment scenario 4 with Topology 3
- ◆ **Proposal 3:** Study on ambient IoT with the following objectives (details as in the previous slide):
 - RAN1 to study the fundamental physical layer signal structure
 - RAN2 to study the radio interface protocol architecture and procedures
 - RAN3 to study overall architecture and network interface

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