

3GPP RAN Rel-19 Workshop

RWS-230174

June 15th-16th, 2023, Taipei, Taiwan

Agenda Item: 5

Ambient IoT

Qualcomm Incorporated

Ambient IoT

Motivation

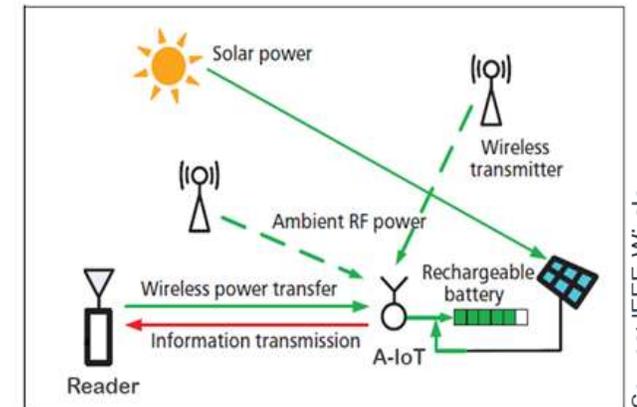
- Current LPWA IoT device does not fully cover use cases in logistics, retail, smart home, smart factory, smart farm, etc. due to battery replacement requirement, high device cost, high power consumption, etc.
- Ambient IoT (A-IoT) is new device type(s) targeting low cost/low complexity/low power consumption, which could potentially operate with harvested ambient energy only - which removes the requirement of battery replacement.
- Use cases: **inventory/logistics, positioning/tracking, sensor reporting**



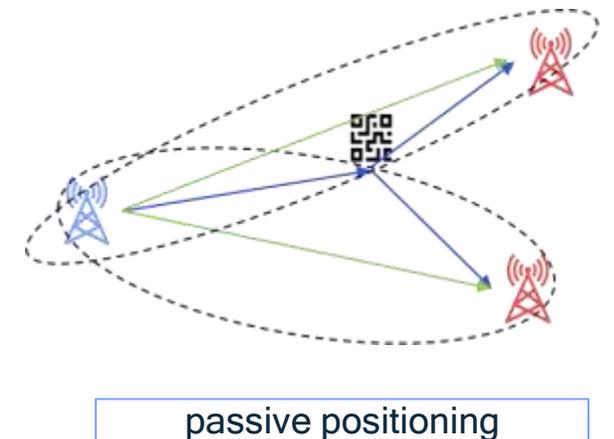
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SI Scope (1/2)

- RAN1 focuses on study on new air interface design - L1/L2 procedures/protocols to support A-IoT devices operation based on harvested energy.
 - Confirm **target use cases of interest** including inventory/logistics, positioning/tracking, sensor reporting considering RAN SI outcome [RAN1].
 - Confirm **topologies** of interest at least including UE/BS to A-IoT device to support target use cases [RAN1].
 - Confirm the **device type of interest** be semi-passive device to support target use cases [RAN1].
 - Define the **evaluation methodology** including use cases, traffic model, target deployment scenarios (including topologies, frequency, base station/device characteristics, etc.), and KPI for the identified use cases [RAN1]
 - Study **DL/UL communication techniques** between gNB/UE and A-IoT devices covering identified use cases and deployment scenarios [RAN1]
 - Study **backscattering, multiple access, coverage extension techniques** for A-IoT devices
 - Study the **feasibility** of stand-alone and **co-deployment** (considering co-source interference) considering NR TDD/FDD frame structure [RAN1]
 - Study **RF energy harvesting techniques** including waveform, signal, beamforming, and procedures [RAN1/4]
 - Study **positioning/ranging** techniques for Ambient IoT device at least including passive positioning [RAN1/4]



Source: IEEE Wireless Comm., April 2016



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SI Scope (2/2)

- RAN2 should focus on the protocol simplification/enhancements and connection control for A-IoT device in coordination with SA2.
 - Study upper layer procedures to support A-IoT device in NR system, e.g., reusing existing NR features [RAN2]
- Data/signaling/communication should consider the limitations due to energy harvesting of the A-IoT device [RAN1/2]

Thank you

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