3GPP TSG RAN Meeting #97e
Electronic Meeting, September 12-16, 2022

RP-222457

Document for: Discussion and Decision
Agenda Item: 9.1
Source: Huawei, HiSilicon

Considerations on Rel-18 RAN SI on x-IoT

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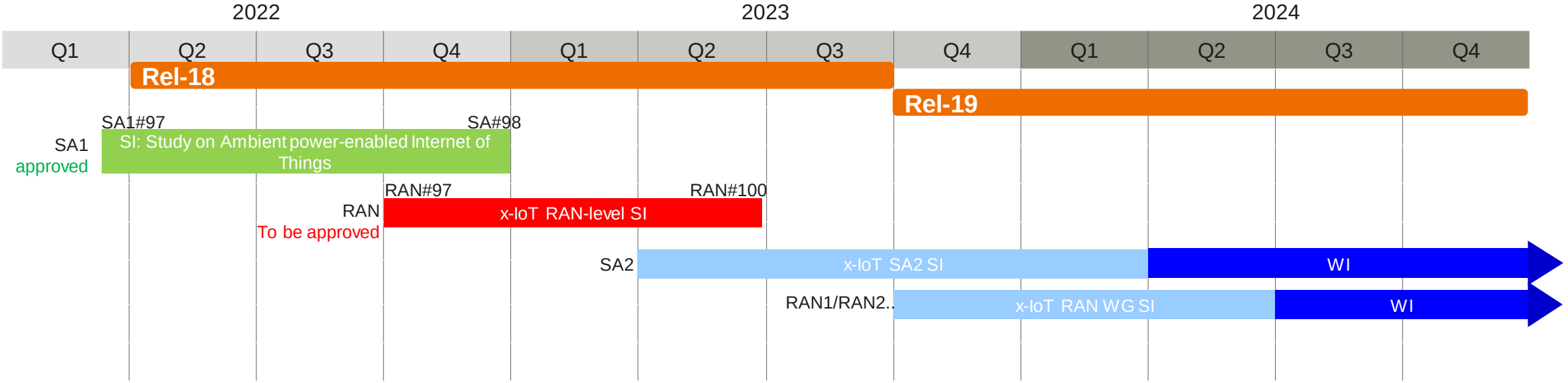
Necessity of a Rel-18 RAN SI on x-IoT

- Target to complete a first set of normative work within Rel-19 (e.g. by 2025H2) to not miss the market opportunity
- A new end-to-end system design potentially with many different design options
- A Rel-18 RAN SI is needed to
  - Bring companies onto same understanding with respect to deployments, use cases, design targets, etc.
  - Compare the different deployments options for each use case
  - Assess, on a first order, the feasibility and identify assumptions on required functionality to be supported
  - Shape a follow-up RAN WG SI with focused scope for timely stage 3 completion within Rel-19



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Considerations

- This study shall target for an IoT segment well below the existing 3GPP IoT technologies, e.g. NB-IoT, eMTC, RedCap, etc. The study shall not aim to replace existing 3GPP LPWA technologies.

- In terms of energy storage, the study will consider the following:
  - Pure batteryless devices with no energy storage capability at all, and completely dependent on the availability of the ambient source of energy it is harvesting
  - Devices with energy storage capability (e.g. up to that available from ambient sources via energy harvesting) that do not need to be replaced or recharged manually, and which can manage short periods of ambient energy unavailability.

- The study shall aim to provide better coverage compared to existing non-3GPP technologies for the relevant use cases.

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Considerations

- Relationship with ongoing SA1 study item
  - The RAN SI shall start with the agreed use cases/services from SA1 “Study on Ambient power-enabled Internet of Things”
  - The RAN SI shall not intend to repeat the discussion of SA1

- The focus of the RAN SI
  - RAN-centric aspects of x-IoT deployments, in particular the RAN topologies, spectrum
  - Consolidate the SA1 output into a set of RAN design targets for RAN WGs to work on in Rel-19
  - Compare the different deployment options and identify assumptions on required functionality to be supported

- Aspects relating to SA, e.g. with or without CN, public vs. private networks
  - Propose not to prioritize the aspects that need heavy SA involvement

- The levels of technical details for RAN SI
  - Should find ways to keep the level of technical discussion proper for RAN plenary

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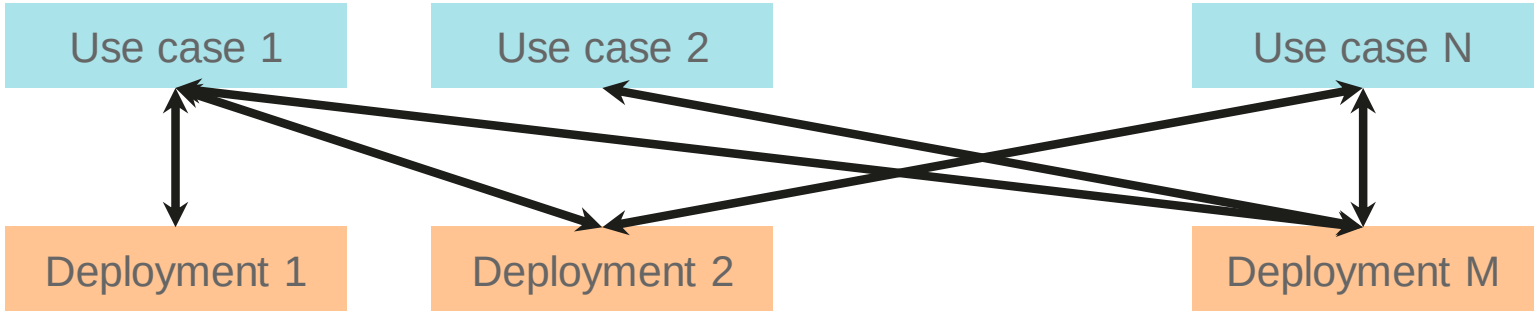
On the deployments and use cases

- The RAN SI shall start with the agreed use cases/services from SA1 “Study on Ambient power-enabled Internet of Things”
- The RAN SI shall not intend to repeat the discussion of SA1
- The RAN SI shall focus on the RAN-centric aspects of the deployments, e.g.
  - Indoor or outdoor
  - Base station characteristics (e.g. macro or micro)
  - Connectivity topologies, including which node(s) can be activator and/or reader, e.g. gNB, UE, relay, etc
  - Spectrum aspects (e.g. TDD or FDD, licensed or unlicensed)
  - Co-existence in frequency bands with UEs of existing 3GPP technologies
  - Mobile Originated and Mobile Terminated traffics
- The RAN SI shall not prioritize the discussion on deployment aspects that should be coordinated with SA, e.g.
  - Public or private network
  - With or without CN connection



On the design targets

- The RAN SI shall start with the agreed requirements from SA1 “Study on Ambient power-enabled Internet of Things”
- The RAN SI shall not intend to repeat the discussion of SA1
- The RAN SI shall formulate a set of RAN design targets to guide the follow-up WG level SI/WI, at least including
  - Power consumption
  - Complexity
  - Coverage
  - Data rate
  - Positioning accuracy
- Additional design targets relevant to RAN may be further identified in future WG level SI/WI, in particular those that require coordination with SA2
- It is not precluded that some design targets may be common to all use cases, and some other design targets may be specific to a subset of use case(s)

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Compare and assess {use case, deployment, design targets} combos

- Compare the different deployments options for each use case
- Assess, on a first order, the feasibility and identify assumptions on required functionality to be supported
  - Not intended to require WG level of detailed analysis
  - RAN to make proper assumptions and make first order assessment
- It is not precluded that analysis for a certain deployment may be applicable to more than one use case

	Use case 1	Use case 2		Use case N
Deployment 1	Pros & cons? Design targets met? Required conditions?	N/A		N/A
Deployment 2	Pros & cons? Design targets met? Required conditions?	N/A		Pros & cons? Design targets met? Required conditions?
Deployment M	Pros & cons? Design targets met? Required conditions?	Pros & cons? Design targets met? Required conditions?		Pros & cons? Design targets met? Required conditions?

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Thank you.