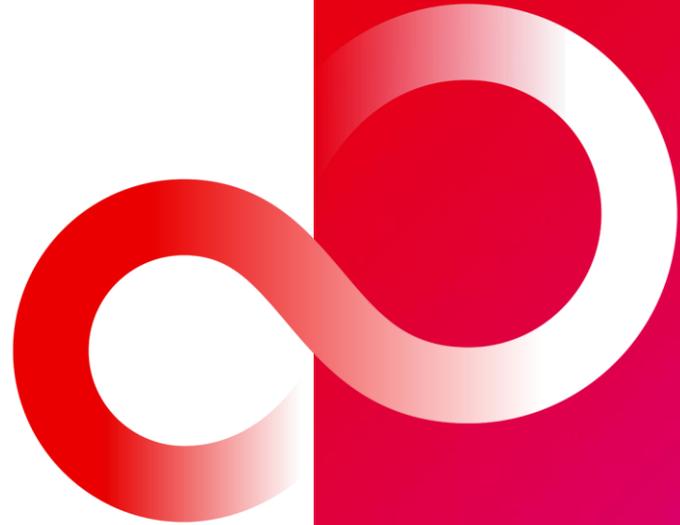


Views on Rel-19 Ambient IoT

Agenda Item:	9.1.1.4
Source:	Fujitsu
Document for:	Discussion



RAN chair's proposal in RP-232745

Ambient IoT SI

References: [RWS-230488](#), [RP-231540](#), [RP-232614](#)

Potential objectives:

- Consider all Devices A, B and C in the SI?
- Down-selection among:
 - Deployment scenario 1 with Topology 1
 - Deployment scenario 2 with Topology 1
 - Deployment scenario 2 with Topology 2
 - Deployment scenario 4 with Topology 1
 - Deployment scenario 4 with Topology 3
- FR1 licensed spectrum, focusing on FDD only
 - Downselection Spectrum in-band to NR, in guard-band to LTE/NR, and in standalone band(s)

Slide 21

- Evaluations and remaining feasibility assessments
 - Device architecture and characteristics
 - Evaluation methodology and assumptions
 - Design target evaluations
 - Coexistence evaluations
- Physical layer study on:
 - Waveform and multiple access
 - Frame structure and numerology
 - Modulation and channel coding
 - Physical layer signals/channels
 - Physical layer procedures including initial access and mobility, scheduling, (H)ARQ, power control, etc
- Higher layers study on:
 - Compact protocol stack and lightweight signaling procedure, including mobility aspects
 - Control plane functionalities, including CN connectivity
 - User plane functionalities
 - Security aspects (*Note: This does not necessarily mean security has RAN impact)
- RAN3 aspects for study:
 - Enabling necessary CN-RAN signalling
 - RAN architecture aspects, if any
- RAN4 aspects for study:
 - Feasibility study of BS/UE/device architectures
 - Link budget study
 - Coexistence analysis
 - RRM

- A lot of issues on the objectives need to be resolved in RAN#102
- In this document, we share our views on the most important aspect of Amb-IoT, i.e. **device type, deployment scenario, spectrum and operation mode.**

● Procedure issue

- A checkpoint is proposed by RAN Chair, and we still have a possibility to finalize a normative phase in Rel-19
- However, according to the current TU allocation, it is still quite challenging to do so

● Market issue

- Market fragmentation should be avoided → this is the lesson we learnt from Cat.1/eMTC/NB-IoT
- Even though companies' views on the device type, i.e. A+B vs. C, are split, it wouldn't be a good idea to specify/study both

Proposal 1. RAN should choose one device type for Rel-19 study item

● Device type and topology

- There might be potential business opportunities for all device types, i.e. A, B and C
- However, the 3GPP technologies should make the full use of existing network.
- Even though device A and B have a potential cost benefit from device perspective, they require additional installation of new gNBs and/or readers to achieve a sufficient coverage
 - It is questioned why 3GPP needs to specify such a technology. Existing non-3GPP technologies + 3GPP network as a backhaul will work
- We believe the reason why 3GPP should work on Amb-IoT is reusing the existing coverage to achieve a nation-wide service area without any gNB installation cost
 - This leads to our opinion that device type C plus topology 1 should be the focus of 3GPP work. Topology 2 is also useful for supplemental coverage on top of topology 1

Observation 1. The reason why 3GPP should work on Amb-IoT is to make the full use of existing nation-wide coverage

Proposal 2. Focus on device type C in the Rel-19 Amb-IoT SI

Proposal 3. Focus on topology 1 and 2 to enjoy the existing coverage

● Spectrum

- FDD (i.e. lower frequency band) would be preferable because of its propagation property.
- TDD can be supported in the later release depending on the operators' demand
- We don't see any strong necessity to support unlicensed spectrum because the project related to unlicensed spectrum has never been so successful.
 - It is clear that licensed spectrum is much more important to MNOs

● Operation mode

- In NB-IoT, 3 operation modes were specified, and the choice depends on operators' spectrum situation
- However, operation flexibility will lead to gNB implementation complexity. If 3 modes are supported, at least L1 and L2 design should be common.

Proposal 4. Focus on FR1 licensed spectrum with FDD in Rel-19

Proposal 5. The number of supported operation modes should be minimized, and the L1/L2 design should be common for all modes

- **Proposal 1.** RAN should choose one device type for Rel-19 study item
- **Observation 1.** The reason why 3GPP should work on Amb-IoT is to make the full use of existing nation-wide coverage
- **Proposal 2.** Focus on device type C in the Rel-19 Amb-IoT SI
- **Proposal 3.** Focus on topology 1 and 2 to enjoy the existing coverage
- **Proposal 4.** Focus on FR1 licensed spectrum with FDD in Rel-19
- **Proposal 5.** The number of supported operation modes should be minimized, and the L1/L2 design should be common for all modes

Thank you

