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VEOLIA

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Motivation for further enhancements in NB-IoT to address Smart Water Metering

UTILITY USE CASES FOR IoT

WATER

Management of the global water cycle,

WASTE

Liquid and solid non-hazardous and hazardous waste management

ENERGY

Energy efficiency, efficient management

Smart Water Metering use case is the most challenging used case

Typical Requirements for Smart Water Meter:

- 15 years UE battery life (long term contract)
- 100 bytes payload twice a day
- Non-latency sensitive
- Deep Indoor coverage
- 164 dB MCL

Additional challenges associated to Smart Water Meter

Release 15 will introduce further enhancements including in particular power consumption that are extremely beneficial for the Smart Water Meter use case.

Smart Water Metering requires further improvements associated (still to preserve power consumption) in particular cases:

- Devices at the edge of a cell may not be able to reach the eNB in a single hop or they will need to increase drastically their battery consumption by emitting at full power.
- Well placed multi-hop relays could help those devices to limit their power consumption which is paramount for Smart Water Meter.
- Furthermore, in some large and highly developed cities, the density of meters could reach 100.000 sensors / Km².
- UE group scheduling will be highly beneficial for these situations in particular to limit control overhead and therefore limiting the UE power consumption.

It is important to include in Release 15 scope to reinforce NB-IoT position among LPWAN protocols to address Smart Water Meter Use case:

- Support of NB-IoT as multi-hop relay.
- UE group scheduling to reduce control overhead and UE power consumption.

Support of NB-IoT as multi-hop relay

Motivation:

- R15 NB-IoT scope already includes the support for NB-IoT small cell
  - Specify necessary support for NB-IoT to be used in microcell, picocell, and femtocell deployments [RAN4, RAN2, RAN1].
  - Appropriate eNB classes [RAN4]
  - Support for closed subscriber group (CSG) functionality can be considered. [RAN2]

- For meters at the edge of the cell/very deeply underground, multi-hop relays will drastically help those devices to limit their power consumption (to the same level than meters better situated).

By offering the possibility to support multi-hop relays, 3GPP will position NB-IoT as a very attractive technology for Smart meter in general and will allow operators to propose better managed solution than with current LPWA technologies.

Proposal 1: Support of NB-IoT as multi-hop relay [RAN2, RAN1]

- Introduce L3 relay node having RRC layer and lower, which acts as a small cell to the next hop and a UE to the previous hop, and has no support of S1 and X2 interfaces.
- Relay nodes and eNB shall be able to differentiate between a normal UE and a relay node.

UE group scheduling to reduce control overhead and UE power consumption

Motivation:

- One of the key enhancements of NB-IoT R14 is the support of Multicast with SC-PTM.
- Multicast may have impacts on the UE power consumption especially in high density scenario.
- In many cities, the density of smart water meters could be very high.
- UE group scheduling will be highly beneficial for these situations in particular to limit control overhead and therefore limiting the UE power consumption.

By offering UE group scheduling, 3GPP will position NB-IoT as a very attractive technology for Smart meter in general and will allow operators to propose better managed solution than with current LPWA technologies.

Proposal 2: UE group scheduling to reduce control overhead and UE power consumption. [RAN2, RAN1]

THANK YOU