3GPP TSG RAN Meeting #79
Chennai, India, March 19 - 22, 2018
Agenda item: 10.1
Source: Ericsson

RP-180351

ERICSSON

THOUGHTS ON IOT RELAYING

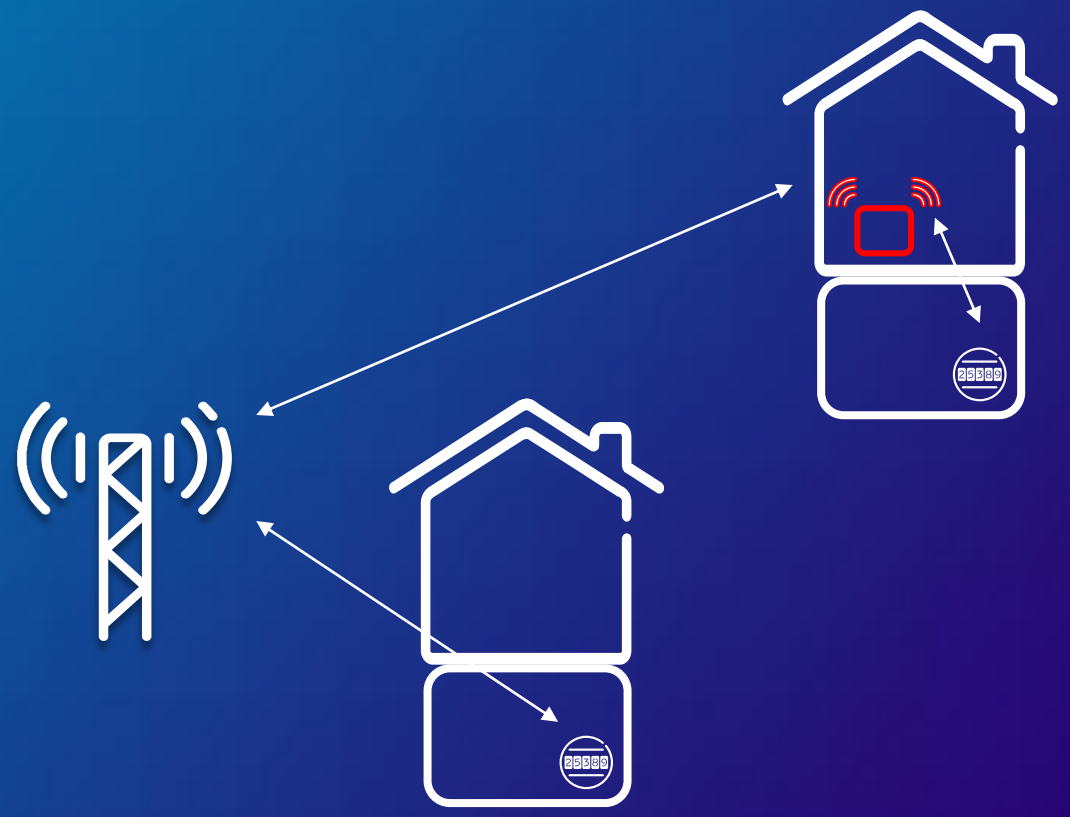
BACKGROUND

- The original proposal on “wearables relaying” has, after the completion of the SI, transformed into a WI proposal on “IOT relaying”
  - An example use case of “wearables relaying” is a smart watch connecting to the network via a smart phone
  - An example use case of “IOT relaying” is a smart meter connecting to the network via a gateway/other smart meter
    - Targeting NB-IOT/eMTC
- This document discusses whether the solution for “wearables relaying” <u>using the sidelink</u> is also the most preferential for “IOT relaying”
  - The alternative is to do <u>Uu-based relaying</u>

WHICH SPECTRUM TO USE FOR ACCESS LINK?

- Licensed spectrum <u>needs operator approval</u>, independent of DL or UL
  - Sidelink-based relaying is operating on UL
  - Uu-based relaying is operating on DL & UL
- Unlicensed spectrum does not need operator approval
  - NR-U, MFA, Bluetooth, WiFi, etc.
- Inband relaying requires <u>coordination and partitioning of resources</u>
  - TDM between donor and access link
    - Separated sidelink resource pools for access link → unusable by Uu on donor link
    - Separation through MBMS subframes on access link in case of Uu-based relaying
- Outband relaying does not requires coordination
  - Donor (Uu) and access link (sidelink, Uu) independent

WHAT TYPE OF RELAY NODE?



- Dedicated relay nodes
  - Requires extra deployment effort but ensures to be in “planned/good” spots
  - Keeps cost impact away from UEs
- Non-dedicated relay
  - No extra deployment cost <u>but unplanned/random location</u>
  - <u>UE complexity impact</u>, see next slide
  - Need power supply
  - 3. party control, see below
- Operator controlled relays
  - Benefit all operator customers
- 3.party control
  - <u>Primarily benefit 3. party devices</u>
- Relay node cost
  - Primarily determined by Tx power and number of supported subordinate nodes
  - Low-power Uu-based relay node can also be based on a UE plattform

UE IMPACT

- Sidelink based relaying negatively impacts UE complexity
  - All smart meters required to implement sidelink (in addition to Uu)
    - Rx chain for UL band required*
    - LTE sidelink is based on LTE/eMTC UL but NOT on NB-IOT UL
      - → New sidelink design needed!
  - Legacy UEs do not benefit
- For non-dedicated relays, in addition
  - Relaying functionality and processing capacity for other subordinates required in all smart meters
- Unidirectional relaying
  - *Can limit UE complexity impact
  - But coverage extension limited to UL only

3GPP SIDELINK TRACK RECORD

- Rel-12/13
  - PS sidelink → struggling
  - Commercial D2D → failed
- Rel-14
  - LTE-based V2V → struggling
- Rel-15
  - Wearables D2D → lost interest
- Rel-16
  - New NR-based sidelink for V2V
  - eMTC / NB-IOT sidelink???

Uu BASED RELAYING
SPECIFICATION IMPACT

- Needed enhancements as compared to Rel-10 relaying
  - Enhance relay architecture with CIOT enhancements (RAN2/RAN3)
    - UP based: Suspend/resume
    - CP based: DoNAS

PROPOSAL

- Do not specify a sidelink-based relaying solution for NB-IOT/LTE-M
  - As it 1) requires access to licensed spectrum anyway, 2) requires donor-access-link-coordination anyway, 3) increases UE cost, 4) cannot serve legacy UEs, 5) requires huge standardization effort

- Instead, consider to enhance Uu-based relaying for NB-IOT/LTE-M
  - As it 1) does not increase UE cost, 2) serves legacy UEs, 3) requires little standardization effort

ERICSSON