3GPP TSG RAN Meeting #80
La Jolla, USA, 11th June – 14th June 2018

RP-180875

Proposal on the approval of Rel-16 work and study items

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Proposed areas of focus for Rel-16

FR1 enhancements (esp. FDD < 3 GHz)

- Spectrum enhancements (CA control & signaling enh, faster CA/BWP, multiple active BWPs)
- SRS in DL part of a paired spectrum
  CLI mitigation schemes
  Remote interference management
- Multi-TRP & MIMO
  NoMA
- MR-DC and EN-DC enhancements
  Mobility enhancements

Enhanced support for FR2

- Spectrum enhancements (NR-NR DC, incl. LTE/NR sharing in FR1)
- Multi-TRP & MIMO (beam management enhancements)
- Integrated access and backhaul
- MR-DC and EN-DC enhancements
  Mobility enhancements
  LTE connectivity options enhancements

Verticals

- V2X
- URLLC phase 2 (L1)
- Industrial IoT (L2/L3)
  NB-IoT to 5G CN
- Service oriented RAN support of network slicing

Missing LTE features

- Positioning
- SON/MDT
- NR in unlicensed spectrum

Miscellaneous: UE power savings, etc

Principles

- Rel-16 NR should well support the verticals
  - but not limited to verticals and expansion to unlicensed spectrum
- Rel-16 eMBB enhancements especially for low frequencies FDD bands are important
- Rel-16 should expand/enhance NR in a variety of areas with well-focused work items
- A WI is meaningful even if it is focused on its primary objective. Secondary objectives may be nice to have but should not block other meaningful areas of work to be approved.

Well-scope WIs are more crucial than limiting the total number of WIs

Scope of existing NR study items

- The scope of existing NR study items shall be reconsidered together with the approval of Rel-16 items, taking operator interests into consideration

- NR unlicensed SID approved in RP-172021, with “Consider unlicensed bands above 52.6GHz to the extent that waveform design principles remain unchanged with respect to below 52.6GHz bands” under the objective of “Physical channels inheriting the choices of duplex mode, waveform, carrier bandwidth, subcarrier spacing, frame structure, and physical layer design made as part of the NR study and avoiding unnecessary divergence with decisions made in the NR WI”
- Consider scope reduction of NR unlicensed SI by focusing on frequency bands up to 52.6GHz
  - The general design for NR in frequency bands above 52.6GHz has not been studied
  - It is desirable to have the same design for licensed and unlicensed spectrum in above 52.6GHz
  - Study of above 52.6GHz may not be a priority for Rel-16

Scope of existing NR study items

- NoMA SID approved in RP-171043, with “Synchronous and asynchronous operation” included under the objective of “Procedures related to the non-orthogonal multiple access”
- In RAN1#93 Busan meeting (May 2018), the following was agreed
  - Synchronous UL data transmission should be the starting point
  - Also considers the asynchronous transmission
- Consider scope reduction of NoMA SI by focusing on synchronous transmission in Rel-16
  - No clear use case in Rel-16 for asynchronous transmission
    - Asynchronous transmission is mainly targeted for LPWA use cases, where low cost devices do not maintain tight synchronization with network for power saving purpose. However, it was agreed in RAN#79 that NR shall not study or specify solutions for LPWA in Rel-16.
    - Asynchronous transmission assumes the support of data transmission in RRC INACTIVE, which is not supported in Rel-15 and not within the scope of NoMA SI
  - Asynchronous transmission is not a pre-requisite to support data transmission in RRC INACTIVE, e.g. by UE autonomously maintaining UL synchronization or with very infrequent signaling exchanges with network
  - Worse performance of asynchronous transmission compared to synchronous transmission, e.g. in terms of detection performance, additional guard band between UEs, additional receiver complexity for time-domain cancellation

Rel-16 LTE

A number of WI scoping email discussions took place up to RAN#80 on various topics:

- MIMO enhancement for FDD and TDD (SRS)
- Uplink enhancement for Wireless Surveillance Video Cameras
- Low latency enhancements (UP and CP)
- Broadcast (en-TV enhancements)
- NB-IoT enhancements
- eMTC enhancements
- Even further mobility enhancement
- LTE to new core enhancements
- Service oriented RAN support of network slicing
- High speed train enhancement (500 km/h)
- Advanced receivers for LTE V2X
- Low Complexity 4Rx

- While not all the above topics gathered a lot of interest, views were split between areas/regions where LTE market demand is still strong and areas/regions where investments will be mostly directed to NR.
- A reduction of LTE TU in RAN1 was approved at RAN#78. Further reduction of LTE TU is not encouraged based on the proposals submitted at RAN#80. Requirements from operators should be respected.

There is operator demand for eMBB LTE enhancements for FDD MIMO, TDD MIMO, uplink fixed wireless access and further work on LTE Services with Low Latency

Thank You

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