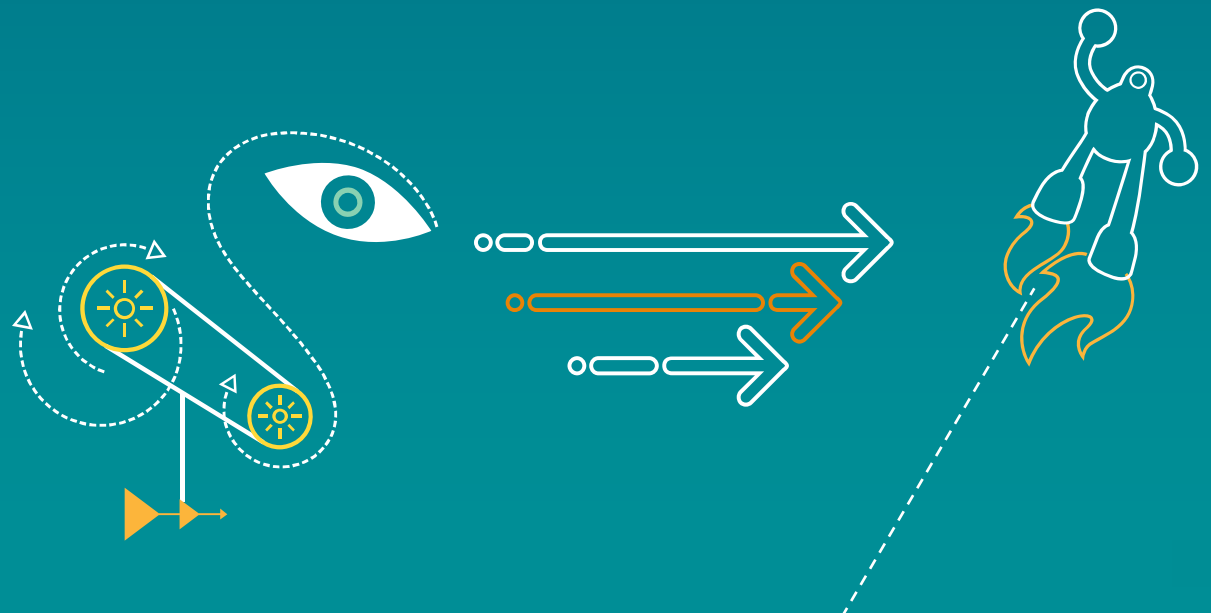
3GPP RAN #74
December 2016, Vienna

NR R14 Prioritization



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Background (1/2)

RAN1 Chairman/DCM proposal

- Scope of study item is unchanged and hence the SID is not modified.
- For the items listed below and those in RP-161914, no dedicated meeting time in the WGs will be allocated until March 2017, but they will be studied after March 2017. As a consequence, detailed design decisions related to these items are postponed until after March 2017.
- However, although no dedicated meeting time is allocated, when making design decisions the working groups must ensure forward compatibility. This means that the basic NR design shall ensure that features to support following list of items and the list in RP-161914 can be added later and can be operated in an efficient manner.
- As previously agreed at RAN#72 in RP-161269, the WGs are expected to report to TSG RAN #75 on what mechanisms are available to ensure forward compatibility for the listed items below and those in RP-161914.
- WG chairs are left to provide guidance to their group where within the meeting agenda forward compatibility aspects should be discussed.

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Background (2/2)

RAN1 Chairman/DCM proposal - List of items:

- [URLLC]
  - [E.g., scheduling/HARQ mechanisms to achieve very low latency (UL grant-free transmission, etc)]
  - [Note: URLLC U-plane latency/reliability reqs can be achieved by using larger subcarrier spacing for shortening slot length]
- [Mini-slot-based mechanisms]
- 2-step RACH procedure
- Flexible duplex of paired spectrum
- Network coordination for interference management and network assisted advanced receiver
- Type II (enhanced) CSI feedback,
  - Explicit feedback and/or codebook-based feedback with higher spatial resolution
- [UL based mobility]
- Multi-connectivity by more than two distinct schedulers (DC between LTE and NR, in NR, is not included)
- Frequency above 52.6 GHz
  - except for activity of characteristics of terrestrial IMT systems for frequency sharing / interference analysis
- RRC_INACTIVE and related mobility procedures, including UL/DL data transfer from/to UE in RRC_INACTIVE

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Do we need further prioritization?

Yes!!

- Progress of current items
  - 2 meetings left before SI conclusion
  - Remaining open items:
    - LDPC coding design
    - Polar coding design
    - DL control
    - UL control
      - Regular burst
      - Short burst
    - RS
      - DMRS, SRS, CSI-RS, “CRS”, “MRS”, “PTRS”
    - Initial access: SYNC, RACH
    - PHY procedures
      - Power control, CSI, TA, measurements
    - Carrier aggregation
- Prioritization is needed!
- Criteria for prioritization
  - Expected importance of the feature for earlier commercialization
  - Forward compatibility

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Items Considered for Prioritization (1/4)

	Early market interest?	Forward Compatibility	Conclusion
Flex-duplex FDD	No	No issue	OK to deprioritize
Rx Intf mitigation (NAICS)	No	RS placement for better inter-cell interference mitigation	OK to deprioritize (with forward compatibility provisions)
Type II CSI-feedback	No	No issue	OK to deprioritize
Multi-connectivity NR-NR	No	No issue	OK to deprioritize
Freq > 52.6 GHz	No	No issue	OK to deprioritize
RRC_inactive data	No	No issue	OK to deprioritize (with forward compatibility provisions)

- Note on RRC_INACTIVE data:
  - Fast control signaling exchange in RRC_inactive mode should be supported for mobility purpose

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Items for Prioritization (2/4)

	Early market interest?	Forward Compatibility	Conclusion
[URLLC]	No identified need	eMBB dynamic puncturing handling	OK to deprioritize (with forward compatibility provisions)
[URLLC grant-free]		No issue	OK to deprioritize
[URLLC HARQ]		No issue	OK to deprioritize
[URLLC inactive data]		No issue	OK to deprioritize
[Mini-slot]	120 KHz mmW	Mini-slot/slot multiplexing rule	OK to narrow down scope to above 6GHz data. If URLLC is not deprioritized then mini-slot cannot be deprioritized

- Multiplexing of mini-slot within eMBB data needs to be specified to ensure fwd compatibility
- Definition of candidate mini-slot duration [1, 2, 4, 7]
  - Definition of generic mini-slot multiplexing and aggregation rules
  - Definition of generic slot / mini-slot puncturing rules
  - Identify eMBB bursty interference mitigation techniques: indication of puncturing, or outer-code
- Eventually, 3GPP could limit specification of mini-slot shared channels to above 6GHz eMBB data

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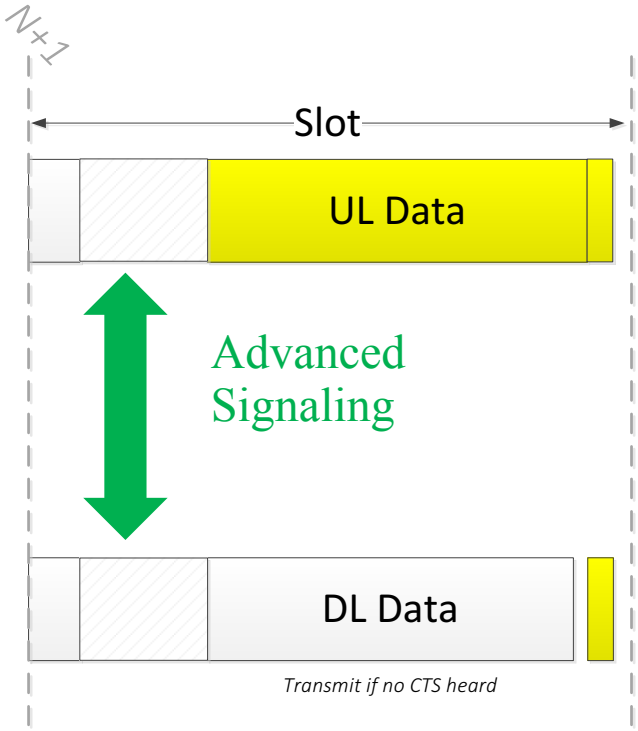
Items for Prioritization (3/4)

	Early market interest?	Forward Compatibility	Conclusion
Tx Interference Coordination	Yes for dynamic TDD	Legacy UEs blocking advanced UEs	OK to narrow down scope to dynamic TDD (i.e. some enabling features should be defined)

- Enabling features that should be defined in Rel-15
  - Gap for introduction of advanced signaling
  - Transmission of signaling for interference measurements (SRS, CTS)
- Issues if such signaling is NOT defined in Rel-15
  - If no gap is defined, BS would have self-Tx/Rx blocking issue
  - If no advanced signaling is defined, legacy UE in one cell will prevent advanced UEs in other cells to be scheduled due to the lack of interference measurements



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Items for Prioritization (4/4)

	Early market interest?	Forward Compatibility	Conclusion
2-step RACH	Yes for NR access latency	No issue	OK to narrow-down scope to UE-ID transmission in 2-step RACH
[UL-based mobility]	Desirable for HST, UDN deployment	Zone-based signals, SYNC/MIB/PDCCH	OK to deprioritize (with forward compatibility provisions and assuming PRACH with UE-ID)

- 2-step RACH enables low latency NR eMBB state transition
  - 4-step RACH leads to higher latency coupled with TDD UL/DL ratio, longer UE wakeup time
  - ➔ We propose that 3GPP prioritizes 2-step RACH payload with UE-ID only

- UL-based mobility is highly desirable for high speed train and ultra-dense network
  - ➔ Enable SFN transmission of SYNC/MIB within a zone
  - ➔ Leverage 2-step RACH for UL measurements
  - We are ok to deprioritize as long as forward compatibility is maintained (eg continue work on 2-step RACH)

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