Views on 3GPP Rel-17

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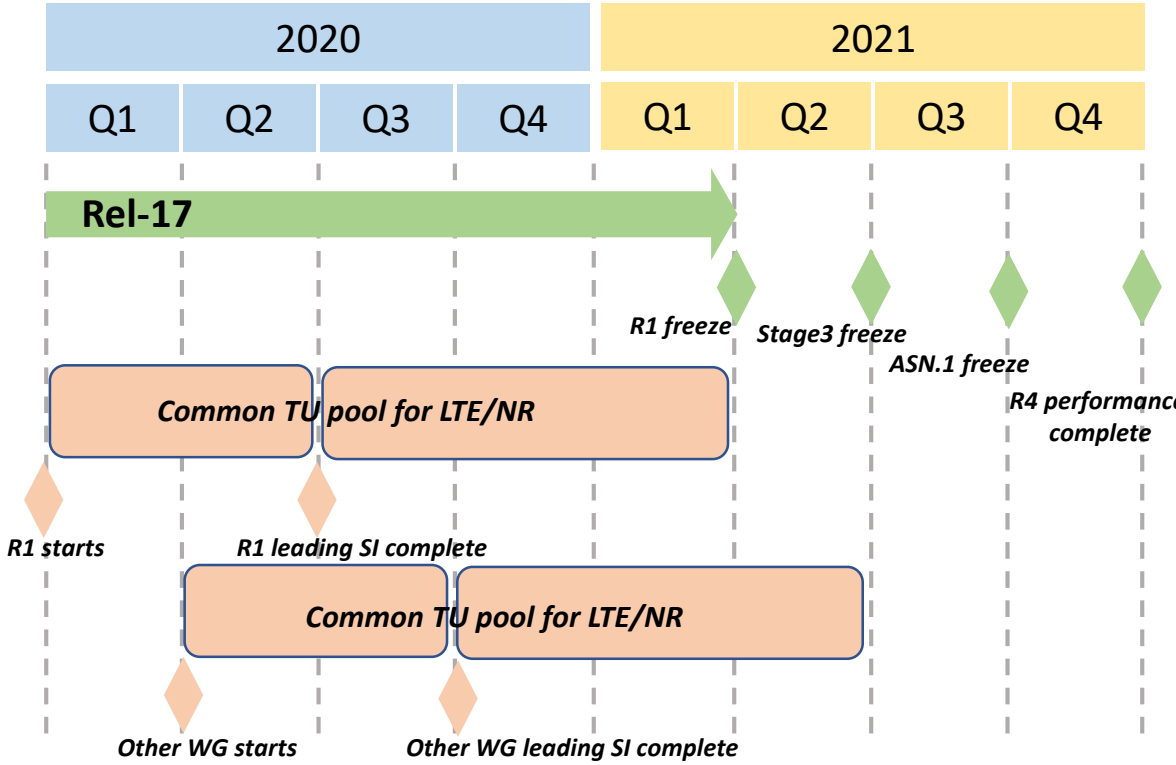
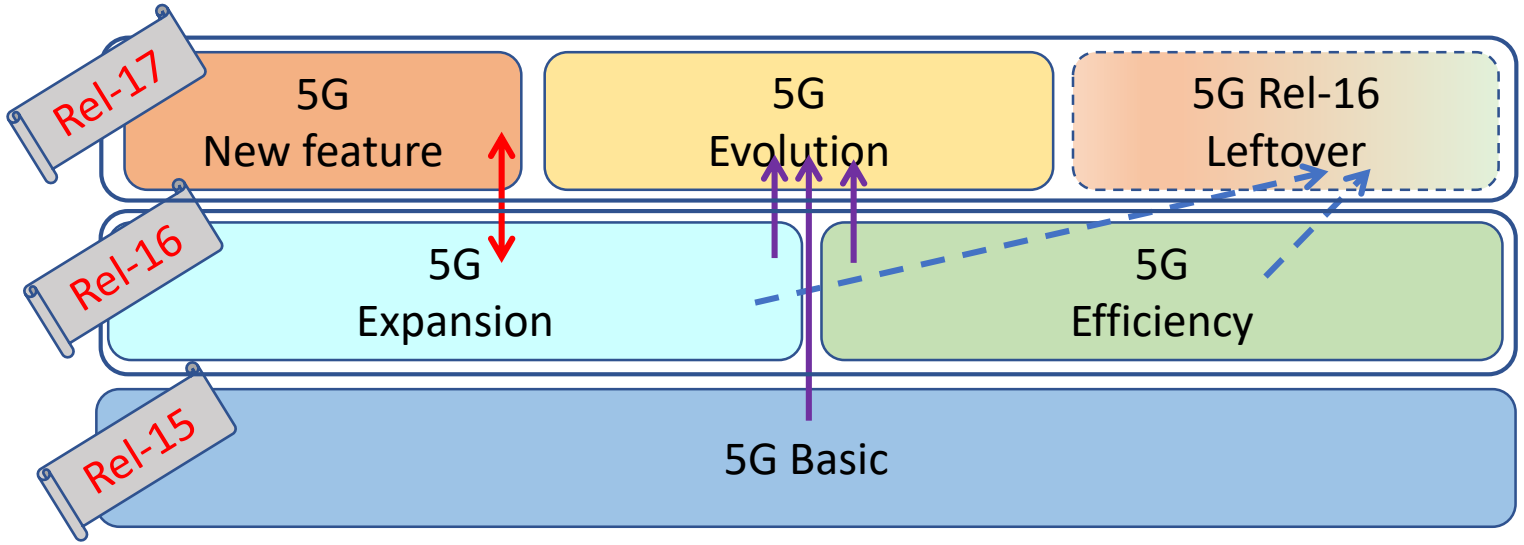
Rel-17 RAN Schedule

- Within 15-month release cycle, we prefer:
  - Mainly 6 months for SID, 9 months for WID to complete Rel-17 specification
    - ✓ SIs/WIs are not mandated to start/complete the works at the same timing
    - ✓ Miscellaneous evolutions could be gathered as single WI to avoid fragmentary TU allocations
  - Common TU pool for LTE/NR to enable better flexibility and utility of resources
    - ✓ Up to RAN chairman self-assessment on SID/WID progress
    - ✓ Certain feature should be limited to either LTE or NR to avoid duplicated works
    - ✓ At most three parallel sessions per WG shall be sustained



Rel-17's Mission

- Per agreed schedule, Rel-17 is expected to be commercialized after 2022 Q2
  - 5G has already been on-service at least 2 years globally
  - Expectation of more than 1 billion 5G connected devices
- Rel-17 shall bring momentum to inspire 2nd wave of 5G deployment & new applications
  - Requirement to have "Essential" differences from Rel-15 and Rel-16:
    - ✓ Shall explore new vertical/applications
    - ✓ Shall provide evolution/improvement for existing Rel-15/16
    - ✓ Time allocation on dealing with Rel-16 leftover shall be limited



Potential Rel-17 Topic Profiling

5G New Feature

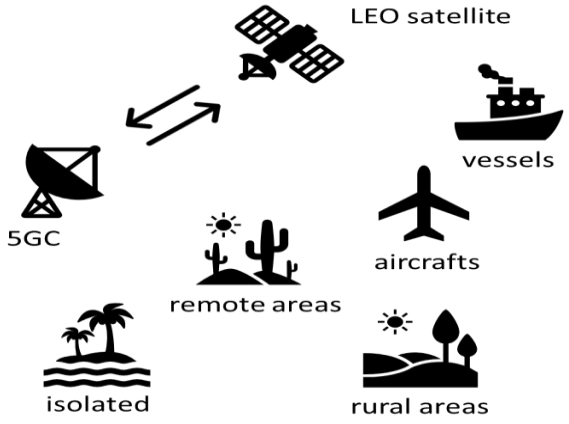
- ✓ New RAT for above 52.6GHz
- ✓ NTN
- ✓ NR IoT
- ✓ 5G MBMS
- ✓ Wi-Fi inter-networking

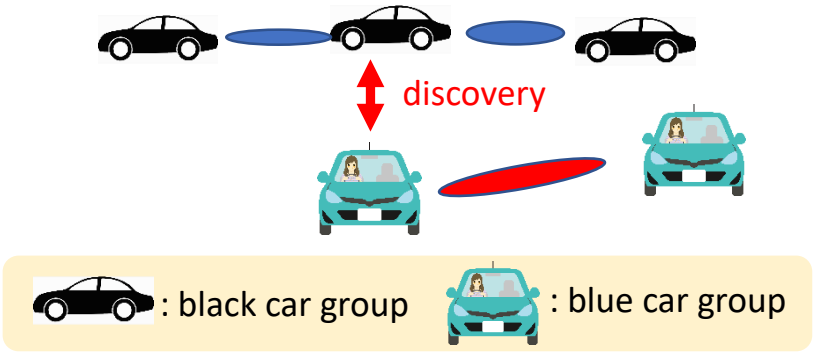
5G Evolution

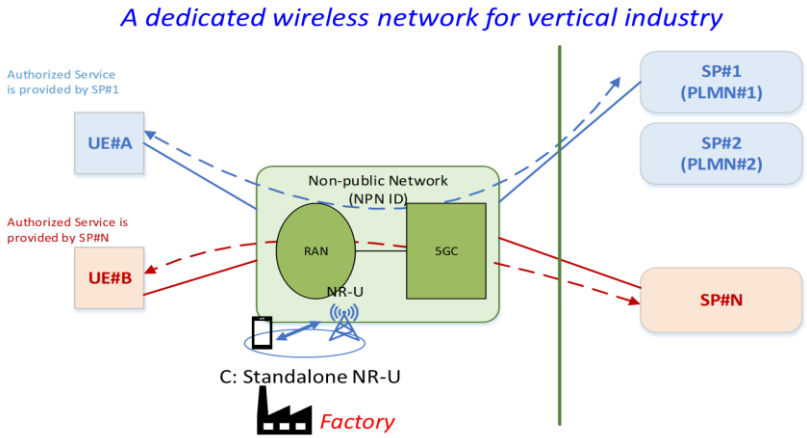
- ✓ NR eV2X
- ✓ feMIMO
- ✓ NR-U evolution
- ✓ IAB + eMIMO
- ✓ FR2 improvement
- ✓ Other Rel-15 improvement

5G Rel-16 Leftover

- ✓ NR V2X leftover
- ✓ eMIMO leftover
- ✓ Power saving leftover







- The scope of each Rel-17 WI/SI shall not be overlapped with others and scope division must be clear

Our Prioritization

5G New Feature

- ✓ New RAT for above 52.6GHz
- ✓ NTN
- ✓ NR IoT
- ✓ 5G MBMS
- ✓ Wi-Fi inter-networking

5G Evolution

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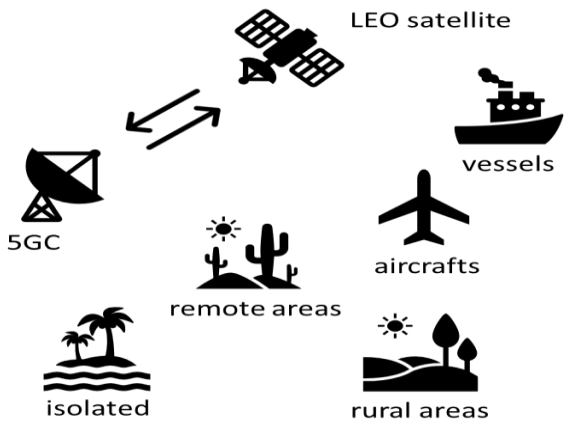
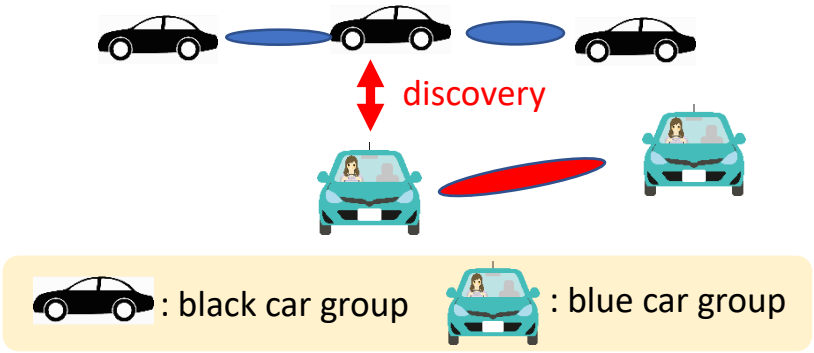
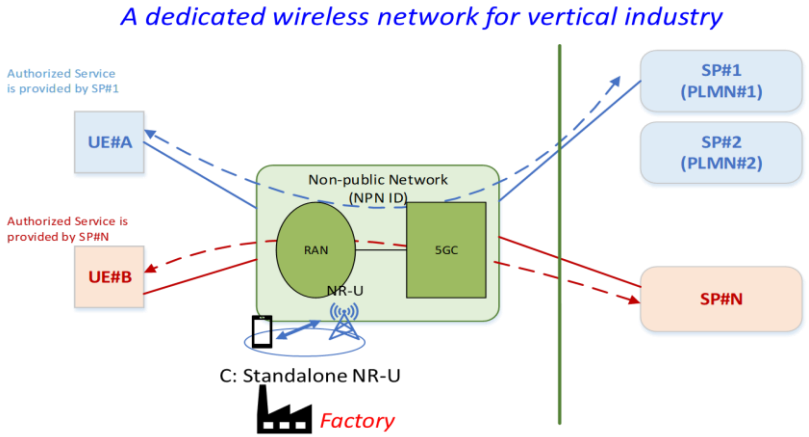




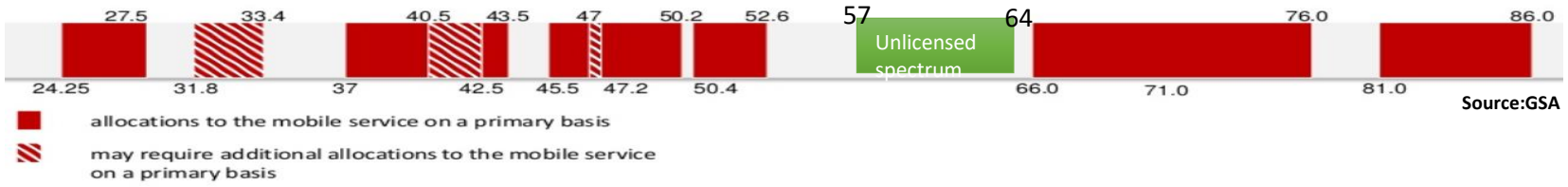


New RAT for above 52.6 GHz

- Justification
  - Wider spectrum and beneficial on IIoT, V2X usage
  - Due to increased pathloss, less-efficient RF components, larger bandwidth, and number of antenna elements, physical layer enhancements are needed

Rel-15	Rel-16	Rel-17
NR design on FR1 and FR2	Study on NR beyond 52.6 GHz (Plenary level)	Study potential impacts of the scenarios and define related solutions on NR

- Objective
  - Study new waveform, numerology, and it impact on physical layer channels and procedures
  - Enhance beam management for supporting massive beams with better power efficiency
  - Enhance BWP on much larger BW
  - Revisit the feasibility of current URLLC/NR-U design if issues be identified



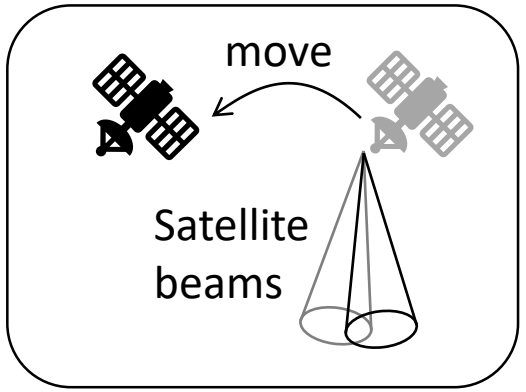
Source:GSA

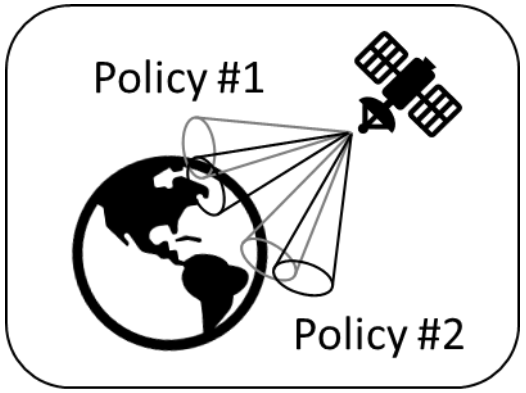
Non-Terrestrial Network (NTN)

- Justification
  - For expanding NR technology in the market and increasing the user penetration, and NR serving coverage

Rel-15	Rel-16	Rel-17
Study deployment scenarios and related system parameters	Study potential impacts of the scenarios and define related solutions on NR	Normative works on NR

- Objective
  - Support NR connectivity via NTN
  - Enhance NR mobility for moving RAN
  - Enhance NR AMC for rain fades
  - Enhance UE location for country-specific policies
  - Enhance NR TA/HARQ for long RTT
  - Enhance NR RACH for large cell sizes



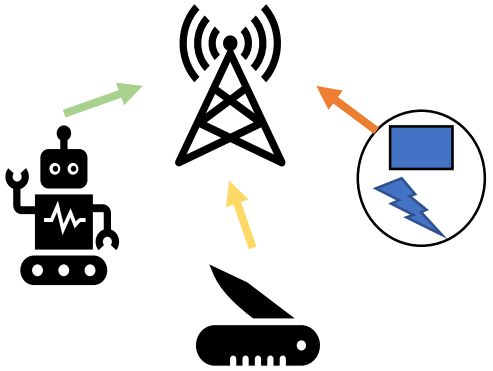


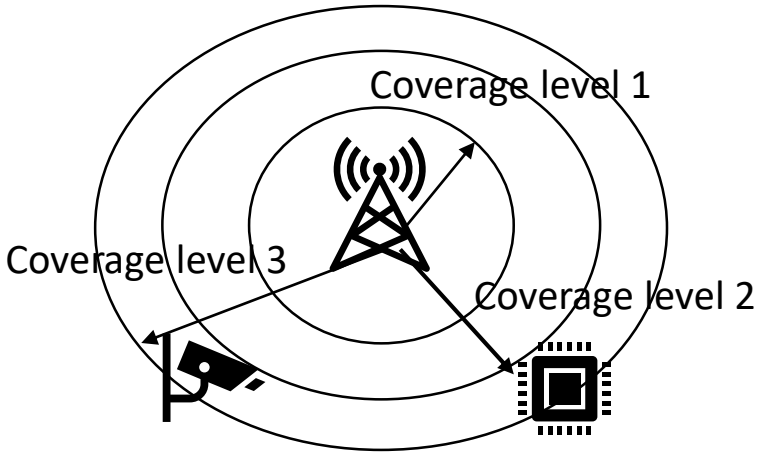
NR IoT

- Justification
  - To support NR in-band diverse IoT use cases
    - ✓ With different bandwidth, latency and reliability requirement
    - ✓ With different coverage level environment
    - ✓ Both licensed/unlicensed spectrum be considered

Rel-15	Rel-16	Rel-17
NR protocol stack and basic URLLC	eURLLC/IIoT/Power saving	Low complexity with better coverage and capacity support

- Objective
  - Beam and/or MAC simplification
  - Small data transmission
  - CG capacity expansion
  - Different coverage level support



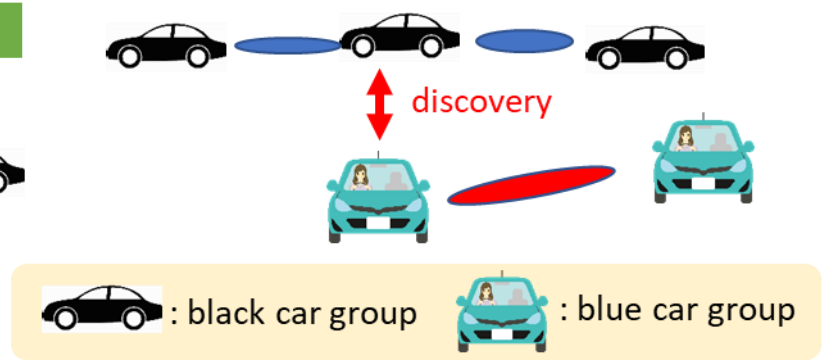


NR eV2X

- Justification
  - To support advanced V2X application, need further enhancements on
    - ✓ Extend NR SL coverage to support rural network deployment and coverage hole
    - ✓ Enhance NR SL energy efficient to support VRU (e.g., 5G portable devices)
    - ✓ NR SL latency and reliability enhancement
    - ✓ Smart resource allocation mode adaption for diverse services

Rel-15	Rel-16	Rel-17
Study advanced V2X use case and requirements	NR PC5 interface, basic groupcast L1/L2 design	Coverage expansion, URLLC embedded, smart services deliver

- Objective
  - SL discovery & relaying
  - SL DRX
  - Cast-type mode adaption
  - Rel-16 leftover (e.g., beam management)

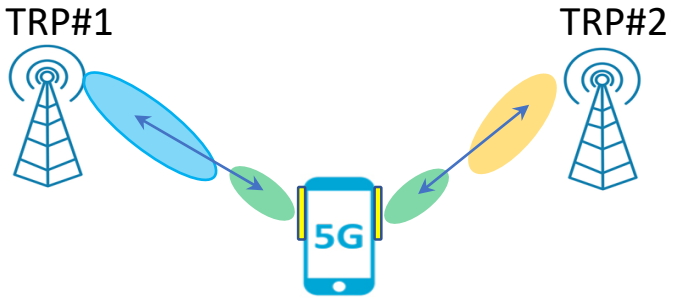


feMIMO

- Justification
  - Robustness enhancement for URLLC based on multi-TRP scenario is not complete in Rel-16
  - Multi-PUSCH transmission principle is desirable for UL
  - Multi-beam + multi-TRP scenario for achieving full capacity of different UE implementation

Rel-15	Rel-16	Rel-17
Multi-beam operation for single-TRP/panel operation	MU-MIMO enhancement Multi-TRP operation upon PDSCH Multi-beam enhancement for multi-panel UE and single-TRP	Multi-TRP operation for all channel Multi-beam + Multi-TRP + [Multi-panel]

- Objectives
  - Multi-TRP operation extension for URLLC
    - ✓ Support robustness enhancement for control and UL data channels
  - Multi-TRP multi-beam operation extension for eMBB
    - ✓ Both fast panel switch and simultaneous panel usage is considered
  - Revisit beam management overhead and efficiency in consideration of envisioned scenarios e.g., V2X, URLLC, IAB

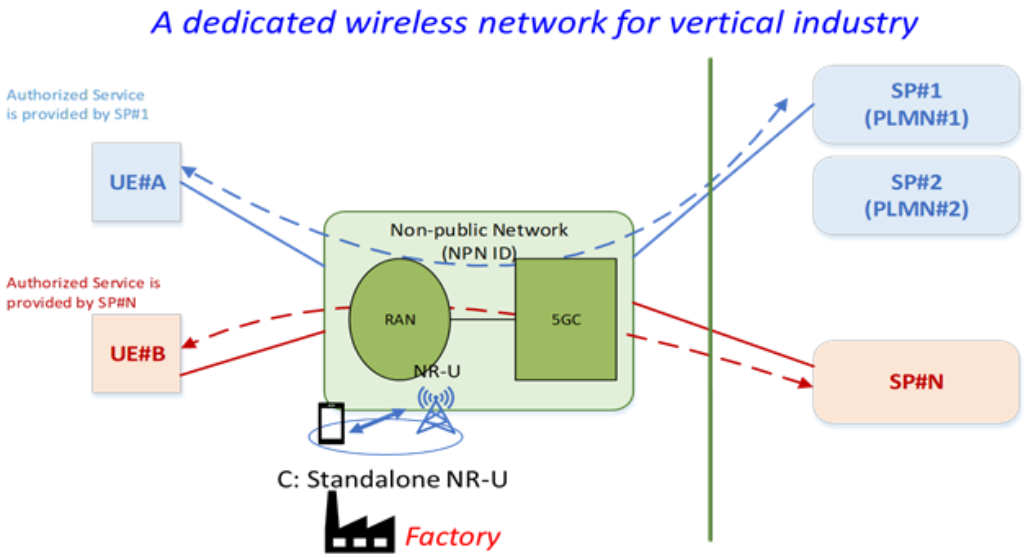


NR-U Evolution

- Justification
  - Require good integration of NR-U+URLLC+NPN for enterprises and factories
  - Inter-band NR-U

Rel-15	Rel-16	Rel-17
Study regulation, use case, scenario	Normative works	Integration of respective features Inter-band NR-U CA

- Objective
  - Revisit designs on NR-U+URLLC+NPN
  - Shared COT enhancement
  - Study directional LBT
  - Study inter-band NR-U
  - Mobility enhancement for NR-U
    - ✓ Intra NR-U Handover
    - ✓ Inter NR-U / NR Handover

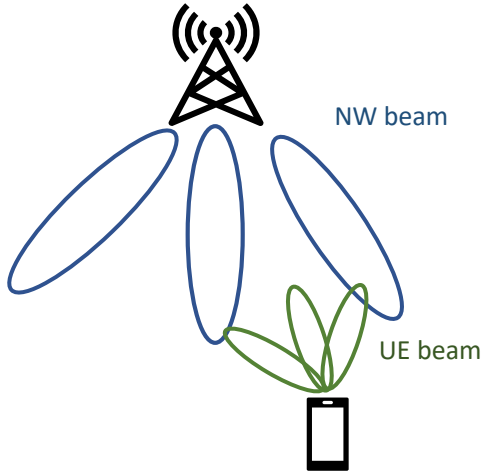


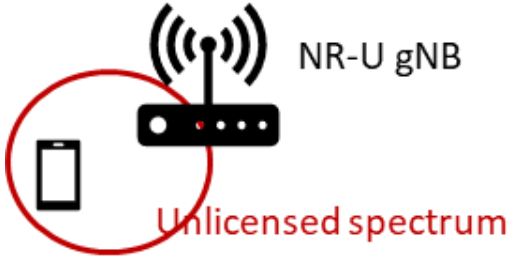
Power Saving Leftover

- Justification
  - Power consumption saving for Rel-16 feature (e.g. V2X) is desirable
  - Due to limited time in Rel-16, some features or mechanisms be postponed to Rel-17

Rel-15	Rel-16	Rel-17
Normal DRX	WUS, smart adaption, RRM relax	Rel-16 leftover, power saving upon respective Rel-16 expansion

- Objective
  - Power saving in eMIMO
  - Power saving in NR-U
  - Power saving in V2X
  - Power saving in MR-DC
  - Rel-16 Leftovers
    - ✓ C-DRX enhancement, WUS enhancement
    - ✓ UE assistance info
    - ✓ Power saving in idle/inactive mode





NR Evolution

- Justification
  - Due to time budget, some small but useful NR evolutions are not introduced in Rel-15/16
    - ✓ Fast FR2 activation, on-demand SI in RRC connected state, RAN sharing, Multi-SIM, UE type negotiation
    - ✓ Coexistence between different deployment options
  - Suggest gathering them into a WI for continue evolutions on NR (different from TEI)

Rel-15	Rel-16	Rel-17
NR normative works	Efficiency improvement	Fast FR2 operation Diverse UE type support Deployment options coexistence

- Objective
  - Specify the mechanisms for faster SCell activation on FR1/FR2
  - Address support of diverse device types
    - ✓ Specify the UE capability reduction for low-end devices, UE behavior for multi-USIM devices
  - Specify the on-demand SI request procedure in RRC connected state
  - Study coexistence of deployment options

Thanks!