

Views on Rel-12 and Onwards

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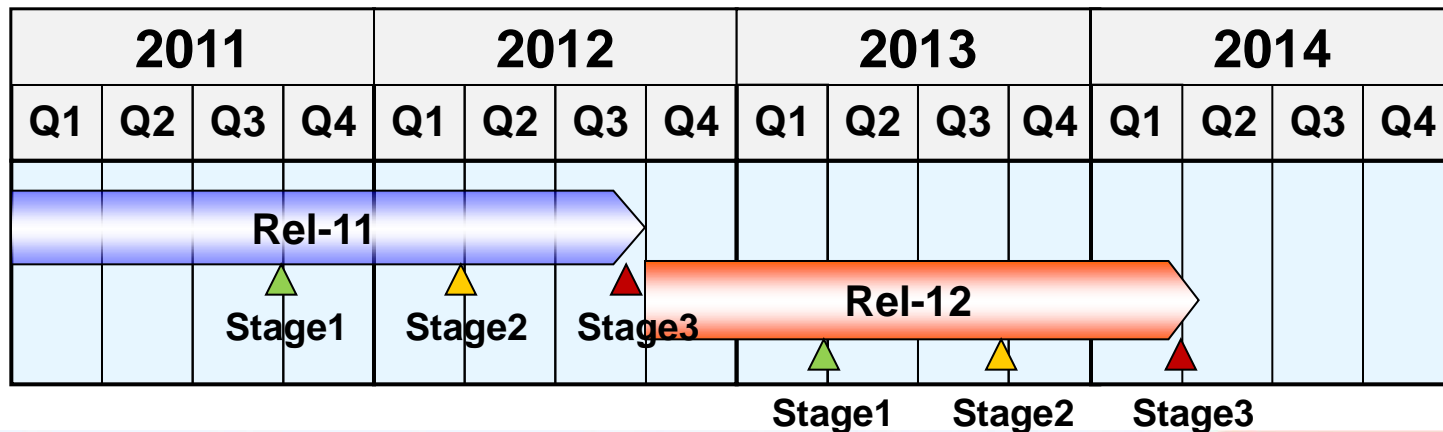
Scope and Timeline for Rel-12

➤ Scope

- **Refinement** of Rel-11 for further performance improvement
- Investigation on features that have been studied but not supported in Rel-11 due to time limitation
- **Backward compatibility** is of higher priority than revolution considering current Rel-11 status

➤ Timeline

- Similar time length as Rel-11, i.e., around 1.5 years, should be appropriate



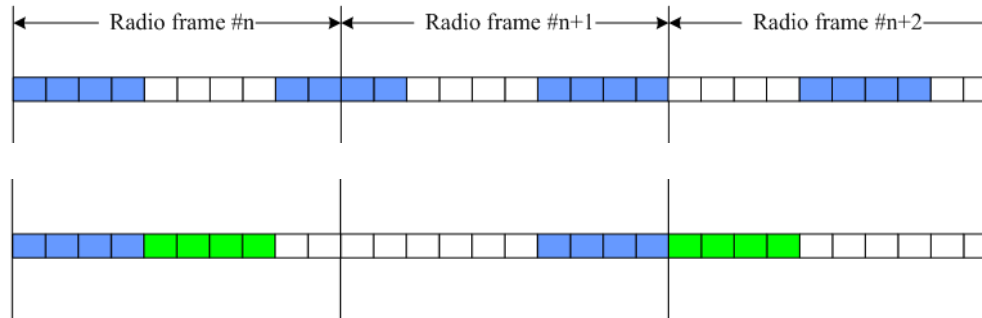
Requirements for Rel-12

- Backward **compatibility**
- Further **coverage** enhancement over Rel-11
- Performance optimization considering **any backhaul** conditions
- Increased **uplink** spectral efficiency to balance with downlink
- Increased **cell-edge** UE throughput to improve user experience
- Effective interference and mobility management for **denser network**
- **Inter-working** between different RATs
- **Low cost** and more **flexible** deployment
- **Latency** reduction

- Coverage enhancement
- HetNet
- Performance requirements for 8Rx at eNB
- Inter-RAT coordination / CA
- CoMP
- DL MIMO enhancement

➤ Continuous work based on Rel-11 study

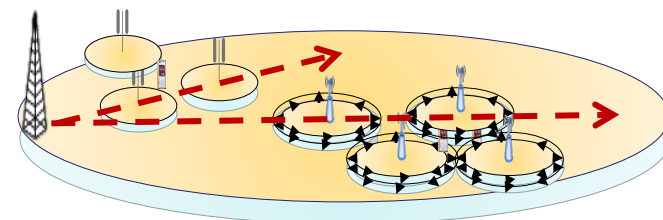
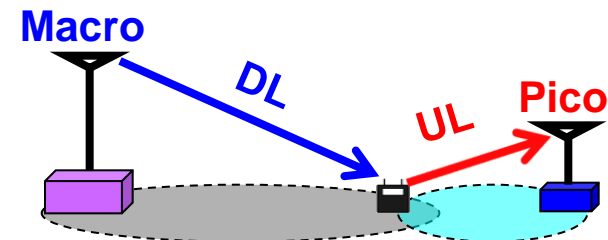
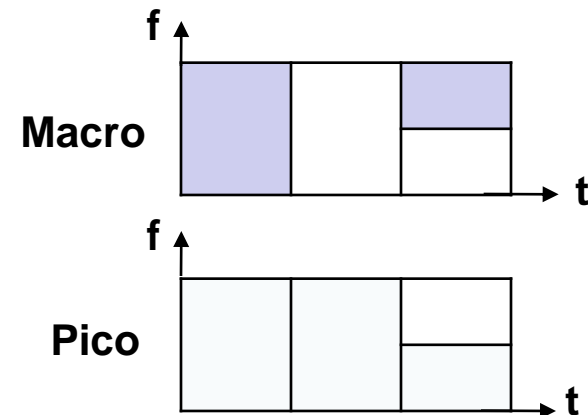
- The coverage issues and potential solutions have been identified in Rel-11.
- The continued work is expected in Rel-12 based on Rel-11 study.



➤ Study on further coverage enhancement

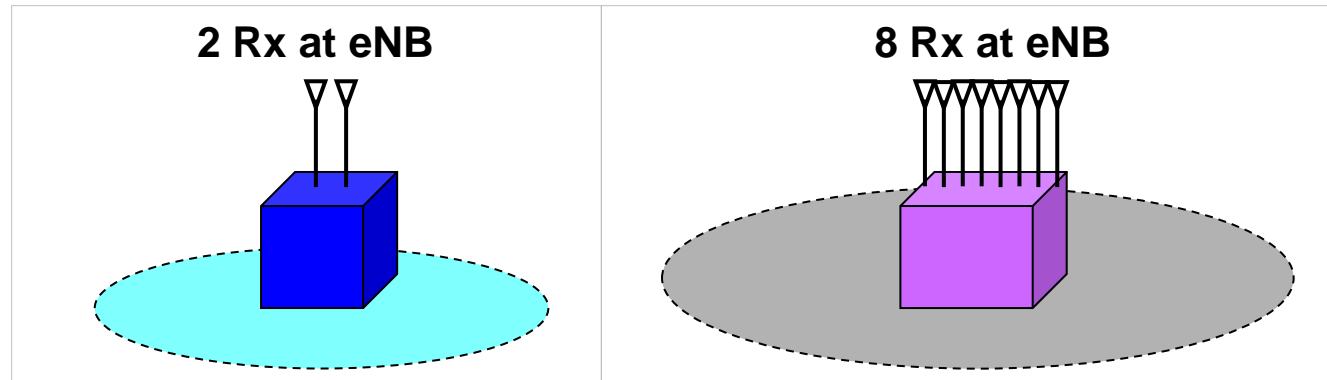
- Advanced UL transmission schemes with **more coverage benefit and better balance** with control and DL channels
- Coordinated transmission and receiving for **any backhaul**
- Advanced receiver

- **More flexible resource coordination**,
(e.g., hybrid FDM/TDM)
 - Improved flexibility in resource allocation
 - Improved interference coordination, especially for control channel and legacy UEs
- **Enhanced DL/UL decoupling**
 - Further investigate based on Rel-11 study.
 - Need for PUSCH/PUCCH power control enhancements.
 - With any backhaul.
- **Enhanced mobility management for dense network deployment**
 - Efficient / autonomous neighbouring cell detection
 - Optimization of handover parameters



Performance Requirement for 8Rx at eNB

- Significant coverage gap between UL and DL exists, and **8 Rx at eNB** is one way to achieve the benefit for **UL coverage enhancement**.
 - The gain has been extensively verified through lab and field test by China Telecom.



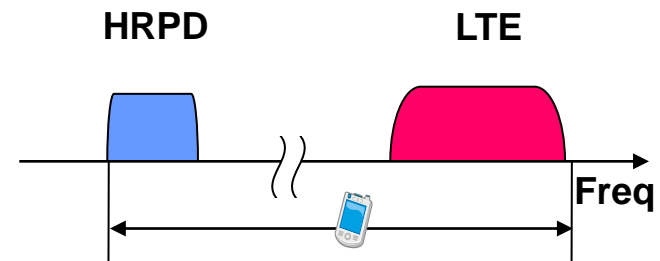
- 8-Antenna MIMO has been supported in RAN1, and it is natural to support 8-Antenna in RAN4 as well.
- In RAN4, the performance requirement is specified for up to 4 Rx at eNB, and **the extension to 8 Rx is expected**.

➤ LTE-CDMA coordination

- Improve **interworking performance** and user experience
- Relevant issues may include inter LTE-CDMA SON, and energy saving, etc

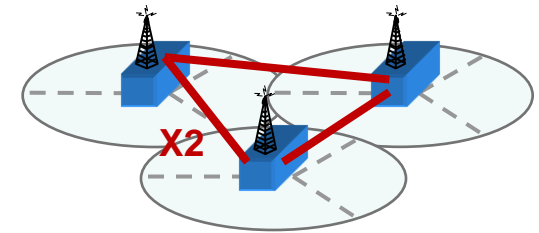
➤ LTE-HRPD carrier aggregation

- **Dynamic load balancing** between the two spectrums
- Higher **peak data** transmission rate is expected
- Possible to improve **spectrum efficiency** and **user experience**
- Solutions of HRPD and LTE carrier aggregation
- Potential standardization impacts.



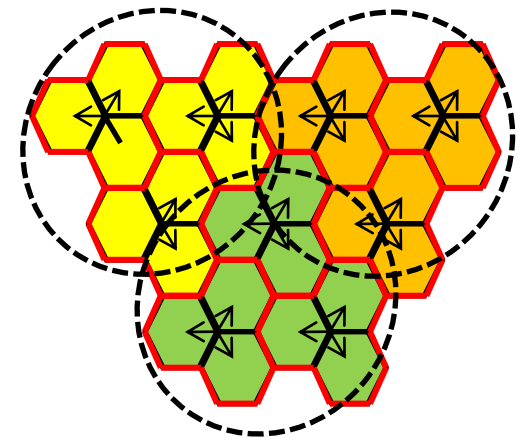
➤ CoMP with more practical conditions

- Consider **practical backhaul**: delay and capacity
- Consider **impairments** from practical time/frequency synchronization and transmission delay difference among different points



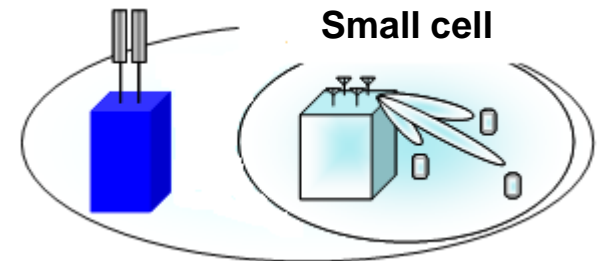
➤ CoMP enhancement with coordination of CoMP clusters

- For improvement of UE performance at edge of CoMP cluster



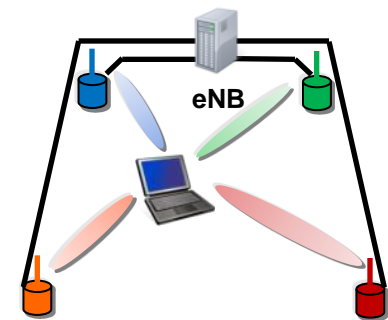
- Continuous work on **CSI feedback enhancement** for Macro cell and small cell

- Increased quantization / feedback granularity in spatial / frequency domain
- Additional feedback for MU-MIMO



- **Other scenarios** de-prioritized in Rel-11, e.g., MIMO with geographically separated antennas

- 3D-MIMO Beamforming



Thank You!