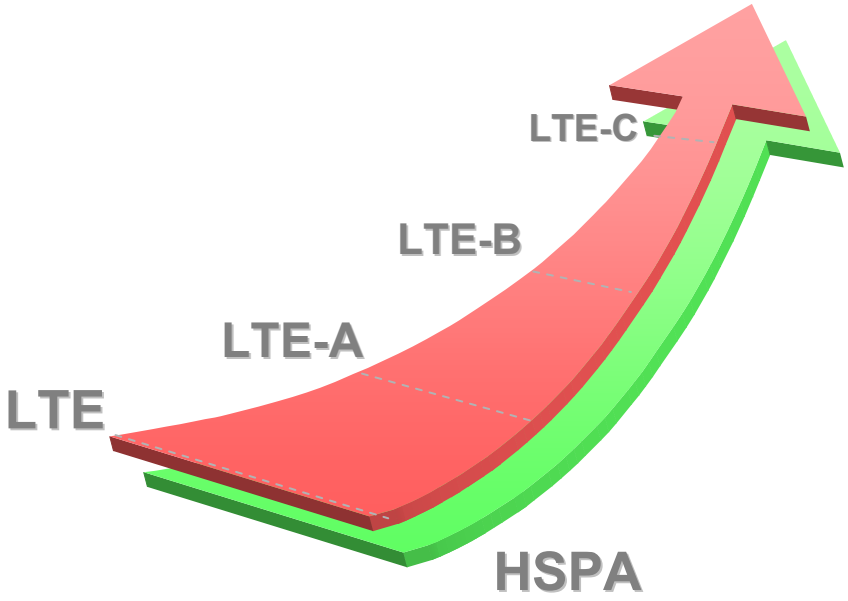
RWS-120003

ST ERICSSON

ERICSSON

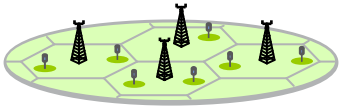
VIEWS ON REL-12



REL-12 SCOPE

Ericsson high-priority targets for Rel-12

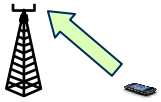
- Local-area enhancements (“Soft Cell”)



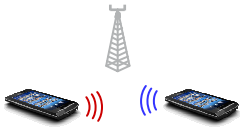
- Stand-alone new carrier type (“Lean Carrier”)
- Beamforming enhancements (incl RAN4 req.)

- Machine-type communication enhancements

- HSPA uplink enhancements (TDM scheduling)



- D2D – network-assisted device discovery



LOCAL-AREA ACCESS

› Rapid increase in number of users *and their service expectation*
  – Majority of usage in local/hotspot scenarios

➡ Optimizations targeting local-area access

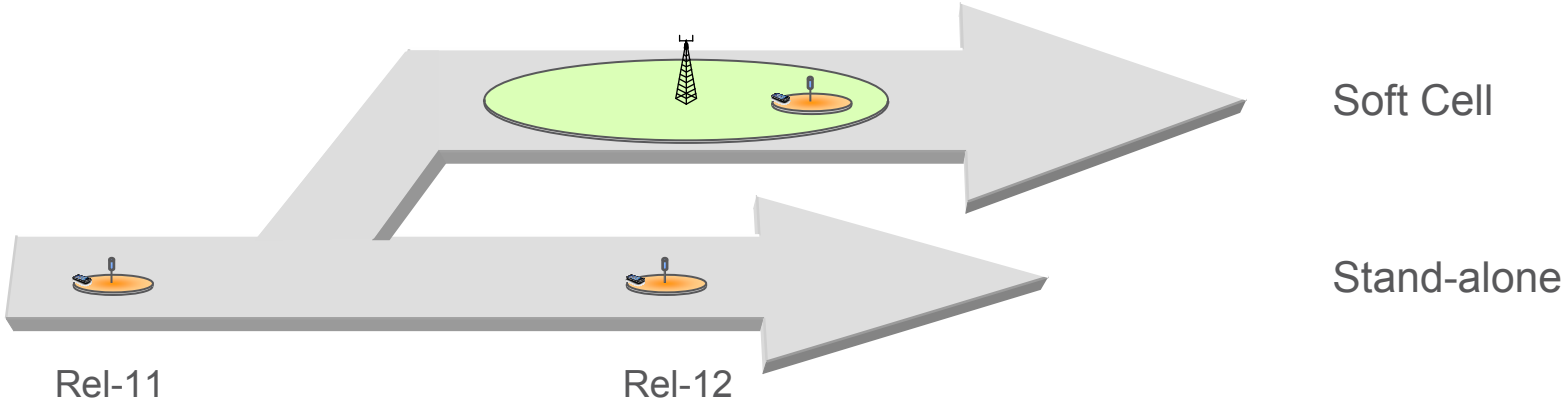
› New spectrum mainly at high frequencies
  – Primarily suitable for local-area access

➡ Frequency-separated local-area access

LOCAL-AREA ACCESS

- Stand-alone nodes necessary in coverage holes...
  - Supported by existing specifications, enhancements possible
- ..but often local-area nodes deployed for capacity and data rates
  - Exploiting existing wide-area coverage can provide significant benefits

➡ Main focus on wide-area assisted local-area access (”Soft Cell”)

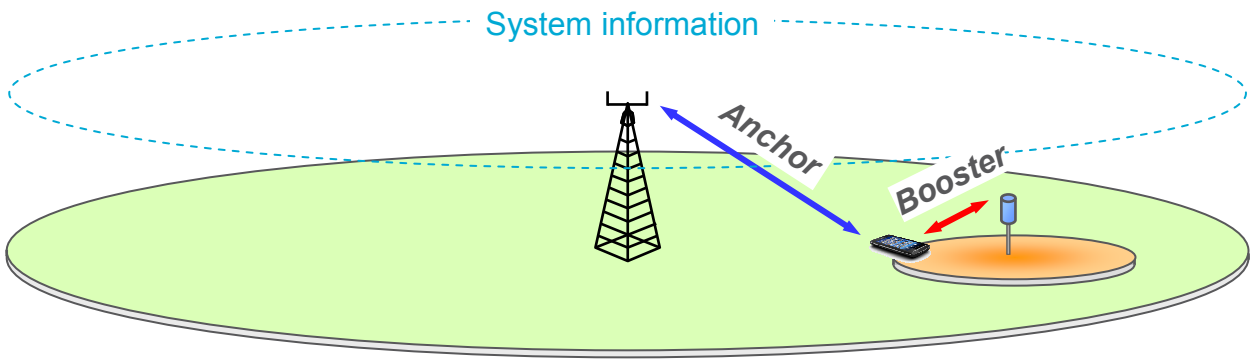


LOCAL-AREA ACCESS
SOFT CELL

- Dual connectivity – *anchor* and *booster* carriers
  - Logical connection on anchor *and* booster carrier
  - Does not necessarily imply simultaneous UE physical-layer Rx/Tx of booster and anchor carrier(s)

- Anchor carrier
  - Macro node connection
  - System information, basic RRC
  - Low-rate/high-reliability user data
  - Based on Rel-8 – Rel-11 structures

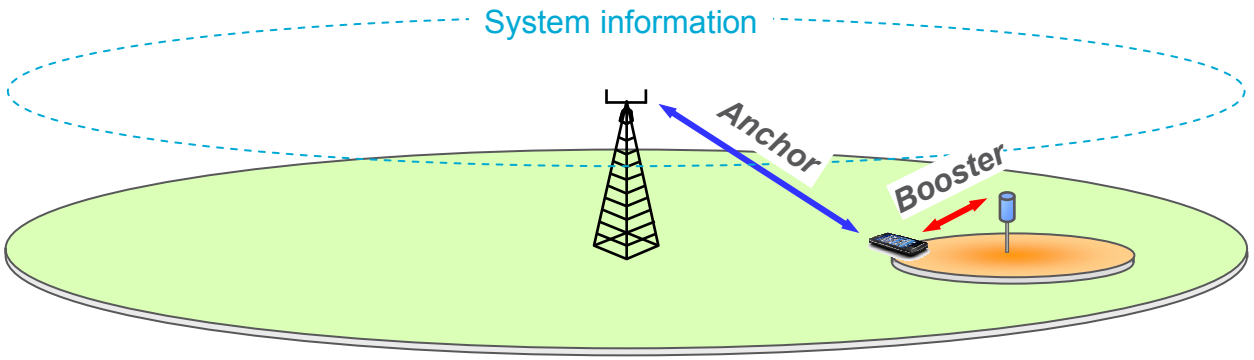
- Booster carrier
  - Pico node connection (when beneficial)
  - Offloading of large data volumes
  - Ultra-lean transmissions, minimum amount of overhead



LOCAL-AREA ACCESS
SOFT CELL – BENEFITS

- Wide-area system *assisting* local access
  - Mobility robustness

- Ultra-lean booster carrier transmissions
  - Interference minimization – enabler for ultra-dense deployments
  - Network energy efficiency

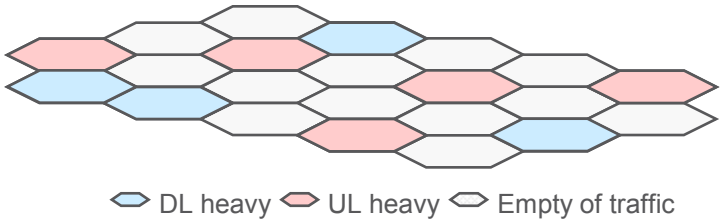


LOCAL-AREA ACCESS
GENERAL BUILDING BLOCKS

- *Frequency-separated* macro/pico operation
  - Same-frequency operation also supported
  - Separated ➡ different duplex in macro and pico possible

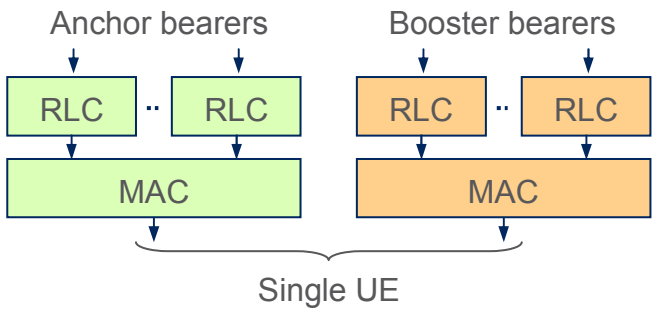
- Local-access-only frequency bands beneficial
  - Enables relaxed RF requirements
    (current pico requirements as strict as macro)

- Dynamic TDD in local-access layer
  - Low per-node traffic load,
    highly varying traffic conditions

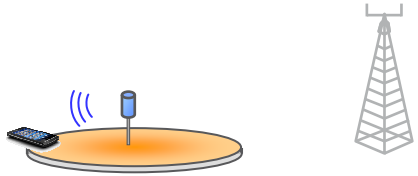


LOCAL-AREA ACCESS
SOFT CELL BUILDING BLOCKS

- Protocol architecture
  - *Multiple* transport channels and MAC entities
  - Scheduling of anchor and booster carriers in macro and pico node, respectively



- Pico node discovery
  - Discovery of and synchronize to pico nodes
  - Macro-assistance aiding UE operation (e.g. avoiding simultaneous Rx at multiple frequencies)



MACHINE-TYPE COMMUNICATION

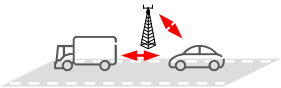
› Wide range of applications ➡ *very* different requirements

Consumer Electronics | Smart grids | Surveillance | ePayment | Security | Smart Transportation

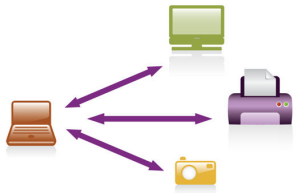
› Low-cost devices
  – Reduced-bandwidth operation, reduced peak-rate, half-duplex FDD
› Reduced power consumption
  – Longer DRX cycles, less frequent mobility measurements
› Signaling load reductions

DEVICE-TO-DEVICE

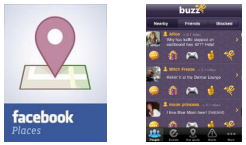
- Many use cases…but which are relevant?
  - Drastically different requirements



Traffic Safety

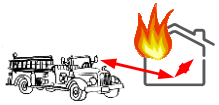


Local data transfer



Proximity based social networking

Proximity-enabled communication



NSPS

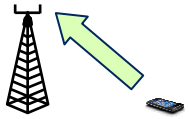
- Focus on network-assisted proximity-detection first
  - Proximity detection provides a value in itself

- Study potential benefits of D2D communication later
  - Conclude SA1 study first

HSPA UL ENHANCEMENTS

› Backward-compatible enhancements essential!
  – *Very* large fleet of legacy UEs

› Uplink enhancements
  – Improved TDM scheduling
  – Improved load control



SUMMARY

› LTE *and* HSPA will evolve in Rel-12... but constraints/requirements differ!

› Local-area enhancements (“Soft Cell”)

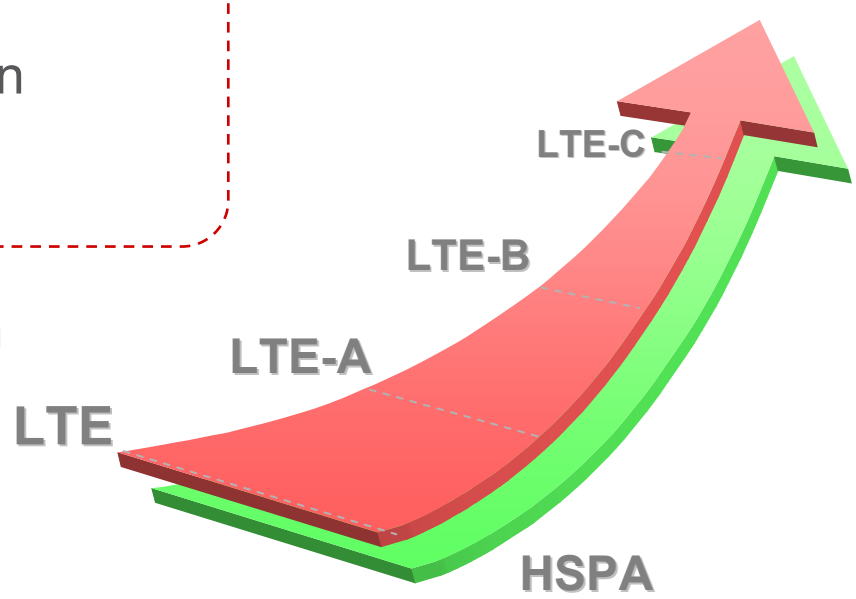
› Lean Carrier

› Beamforming Enhancements

› Enhanced machine-type communication

› HSPA uplink enhancements

› D2D – NW-assisted proximity detection



ERICSSON