3GPP TSG RAN Meeting #70
Sitges, Spain, 7 -10 December 2015

RP-151902

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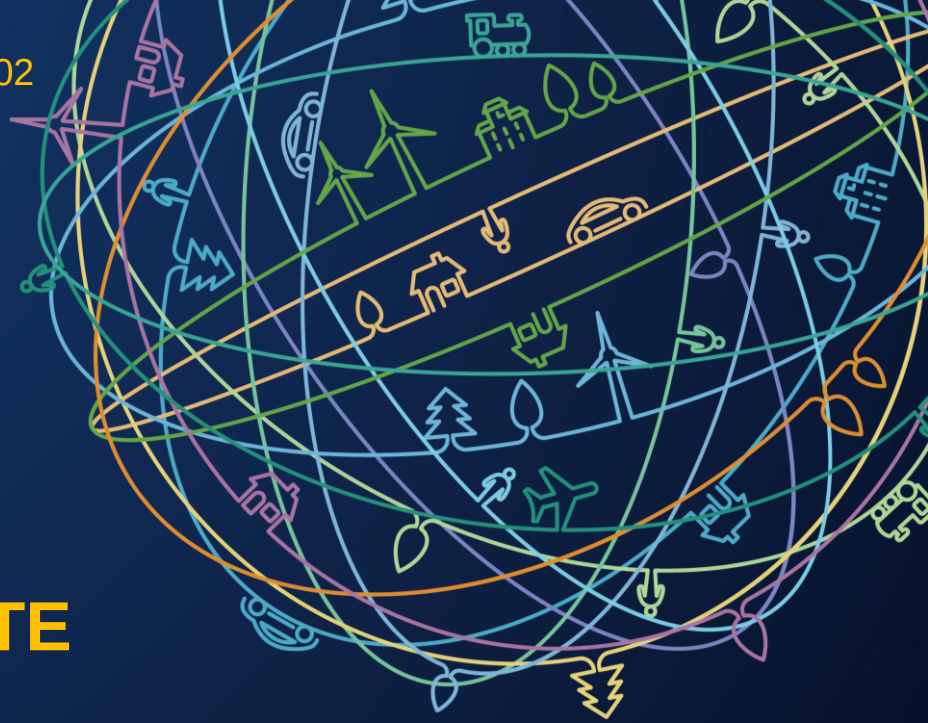
# Signaling Reduction for always-connected UEs in LTE



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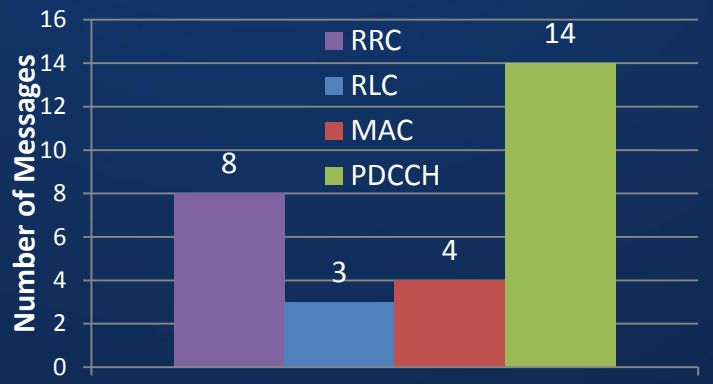
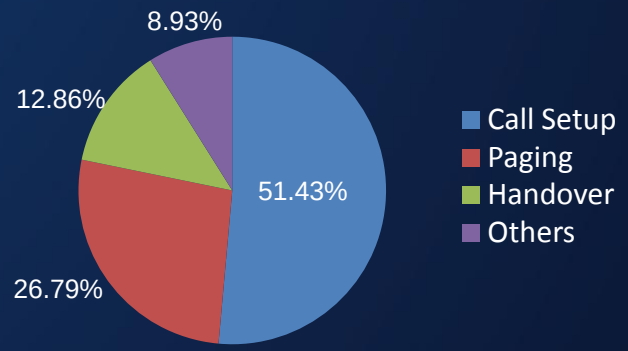
# Issues of starting from Idle mode

## Signaling overhead of one MO call




- Frequent transitions from Idle mode to connected mode are undesirable, because this will cause excessive RRC/Network signalling overhead.
- Transition from Idle mode to connected mode also causes service delay.

## Signaling statistics in real LTE networks




- RRC signaling due to call setup takes the major part (i.e. 51.43%) of the total air interface signaling overhead.



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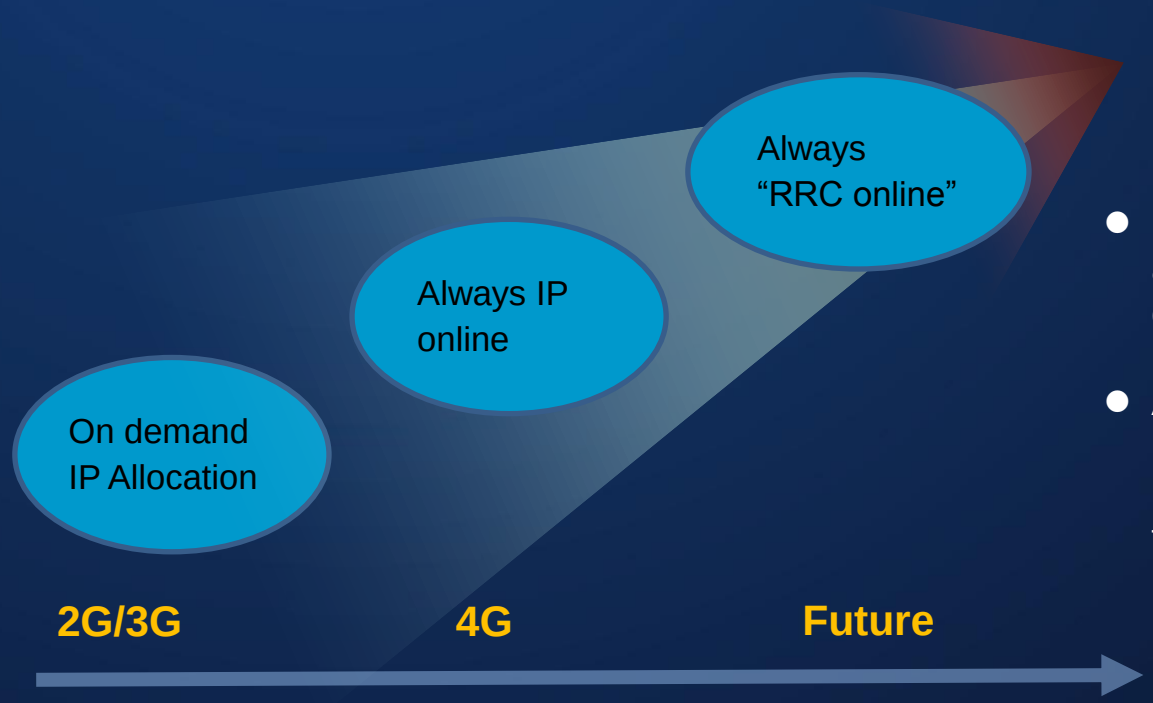
# Trend of always-on




- Numerous applications require an always-on mobile-broadband experience.
- Always RRC connected (possibly permanently after the UE was powered on) will significantly improve the end user experience.



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# Always RRC-connected

- Always RRC-connected has already been recognized to be a very efficient way to handle the UEs during studies in previous releases:
  - Less RRC/Network signaling overhead
  - Short delay/latency
- eNB capacity on UE context storage is increased nowadays. This facilitates the support of a large population of connected users.



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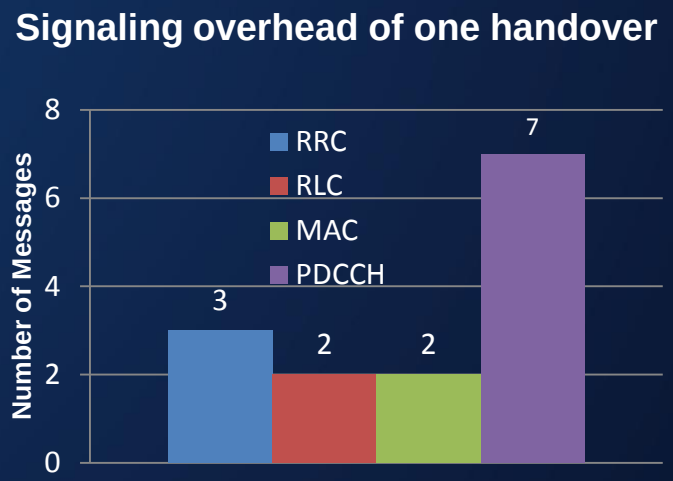
# Cost of staying in legacy RRC connected mode




The cost of staying in legacy RRC connected mode includes:

- Signaling overhead due to handovers.
- System resources management considering a large population of connected users (e.g. UE identifier, admission control, etc).
- Higher UE power consumption compared to Idle mode.



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# UEs in connected mode and temporarily inactive

- There may be no data activity for a period during which several handovers across several cells occur
- This causes unnecessary signalling overhead in each of the involved cells.
- Especially in hotspot areas where small cells are deployed.



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# Scope of Work Item

The objective of this Work Item is to identify and specify mechanisms that allow LTE to provide improved always-on connectivity at the RAN level.

In the initial phase of the Work Item, identify necessary enhancements in the following areas for UEs in RRC_CONNECTED state that are temporarily inactive:

- Enhancements to reduce the RRC signalling overhead as well as the network signalling overhead.
- Enhancements to enable a more efficient management of system resources, considering potentially a large user population in connected mode.
- The above enhancements should enable optimisations on UE power consumption.

Then, based on the outcome of the initial phase, the Work Item will:

- Specify the enhancements that demonstrate sufficient benefits.



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