

3GPP TSG RAN meeting #103  
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Document for: Discussion/Decision

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## Views on RRM topics for Rel-19

Huawei, HiSilicon



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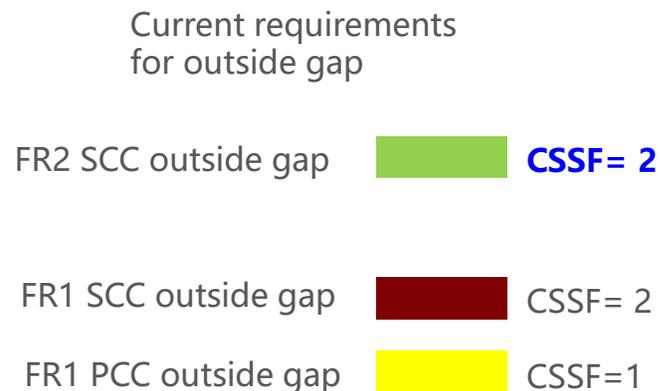
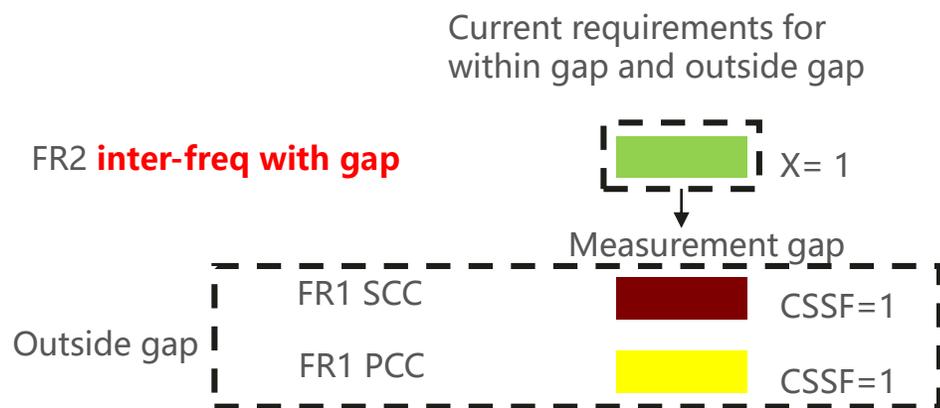
## RRM evolution and enhancements:

- L3 Measurement delay reduction with enhanced CSSF for FR1+FR2
- Fast SCell activation with EMR
- FR2 unknown SCell activation based on Temporary RS
- Interruptions enhancement at NR SRS antenna port switching
- L1/L2 mobility inter-frequency measurement enhancement

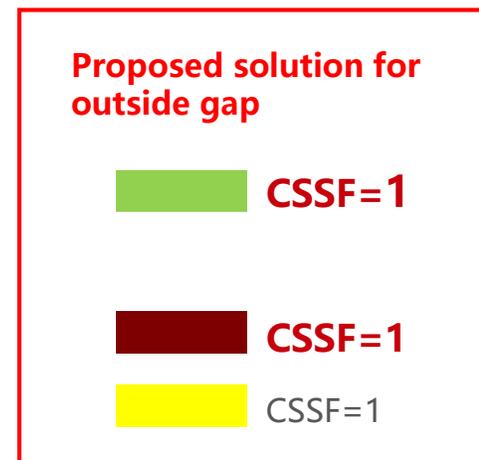
# L3 Measurement delay reduction with enhanced CSSF for FR1+FR2

- Motivation

- > Current status: Delay requirements for measurement outside gap are defined based on 2 searchers assumption for total CCs in FR1 and FR2
- > Observation: In FR1+FR2 scenario, a UE supporting **per-FR gap** shall support totally 3 searchers to meet the requirements for measurement **within gap** in FR2 and **outside gap** in FR1
- > Potential enhancement: when no gap is needed, the searcher within gap can be **borrowed** for outside gap, then 3 searchers are used for measurement outside gap. Shorter measurement delay for serving cell measurement (which is typically measured outside gap) can be achieved.



PCC uses one searcher; all SCCs share the other searcher



PCC uses searcher#1; FR1 SCC uses searcher#2; FR2 SCC uses searcher#3;

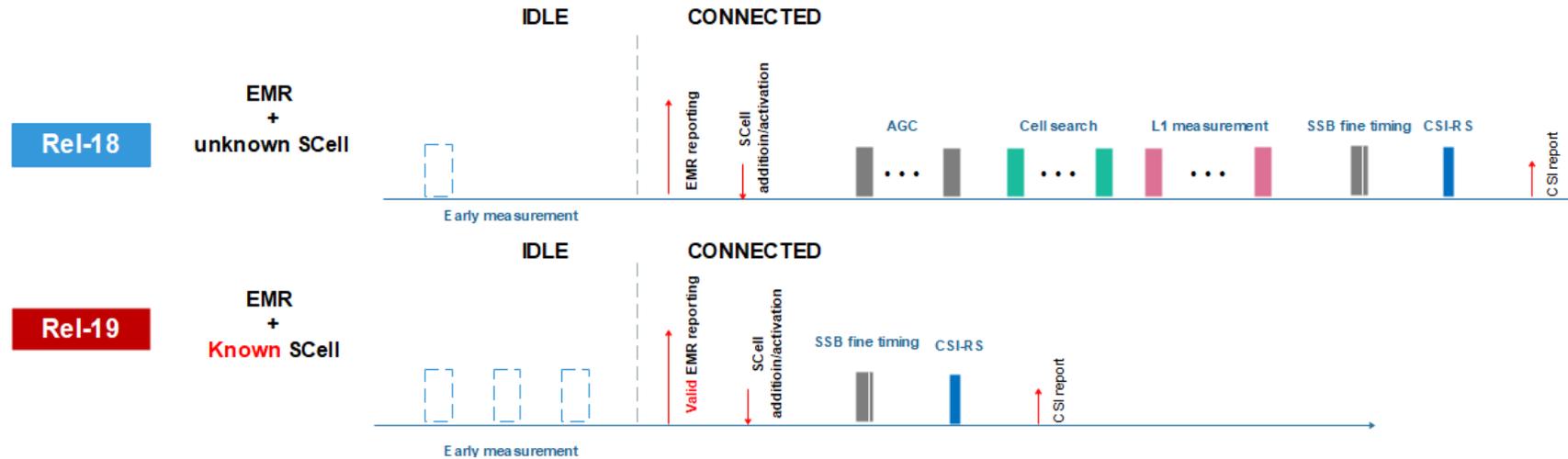
- Objective

- > L3 measurement delay reduction with enhanced CSSF (carrier-specific scaling factor) for connected mode

# Fast SCell activation with EMR

- Motivation

- > Early measure in IDLE/Inactive mode is introduced in Rel-16 to setup CA upon UE entering connected mode. According to the existing known cell condition, the to-be-added SCell is regarded as “unknown” even if the EMR report is valid, then SCell activation procedure would follow unknown requirements when UE enters CONNECTED mode from IDLE mode.
- > Fast SCell activation based on EMR is proposed to be enhanced when UE enters CONNECTED mode from IDLE/Inactive mode.



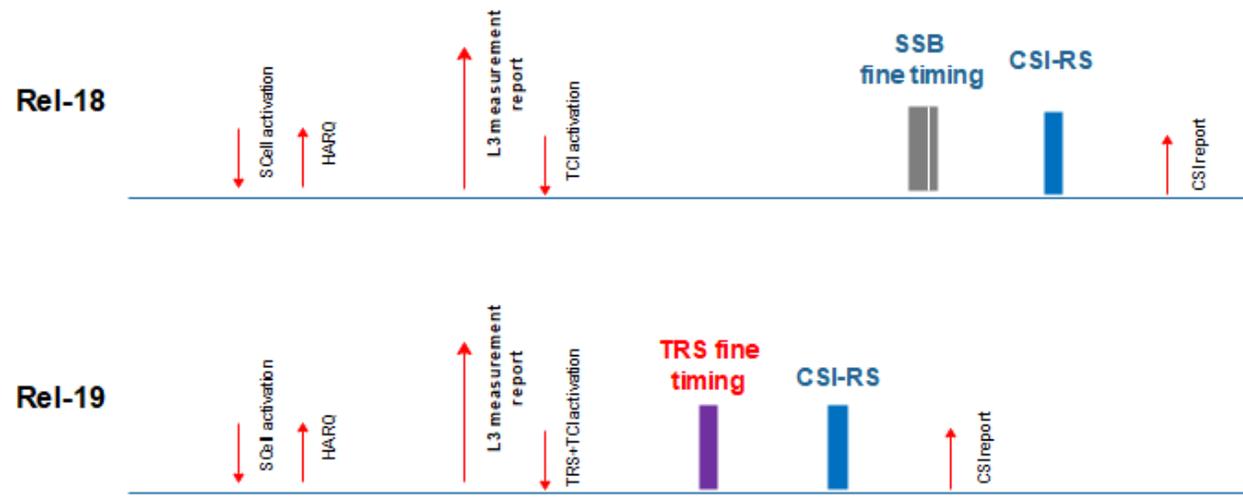
- Objective

- > Fast SCell activation with leveraging EMR reports upon UE enters connected mode
- > Introduce corresponding signaling if needed.

# FR2 unknown SCell activation based on Temporary RS

- Motivation

- > In Rel-18, one enhancement for FR2 SCell activation is to trigger L3 measurement by SCell activation command, and the activation delay can achieve comparable performance as known SCell activation. In Rel-17, Temporary RS is introduced for SCell activation delay reduction, which is not applicable for FR2 unknown cases without active serving in the same band.
- > If Temporary RS can be utilized based on L3 measurement triggered by SCell activation command, the SCell activation delay can be further reduced.



- Objective

- > FR2 SCell activation delay further reduction base on Temporary RS and L3 measurement triggered by SCell activation command.
- > Introduce corresponding signaling if needed.

# Interruptions at NR SRS antenna port switching

- Motivation

- > In current RRM spec, it is assumed that SRS resource for SRS antenna switching is allocated at the last 6 symbols of a slot. However, SRS starting in any symbol within a slot is already supported since Rel-16. Thus, some SRS antenna port switching scenarios are not covered by current RAN4 requirements.
- > In Rel-17 interruption requirements at NR SRS antenna port switching, following scenarios are considered:
  - *Scenario 1: when  $X=1$  SRS symbol is configured in a slot for SRS antenna port switching*
  - *Scenario 2: otherwise, using  $X=6$  SRS symbols in a slot as assumption of SRS transmission time*

Symbol level interruption requirement is only considered for scenario 1 for synchronized case. For all other cases, interruption requirement is defined in number of **slots**, which may be much longer than the actual interruption length.

- Objective

- > Interruption requirements at NR SRS antenna port switching when SRS starting in any symbol of a slot
- > Finer granularity of interruption requirements at NR SRS antenna port switching (i.e. symbol level interruption length for more applicable scenarios)

# L1/L2 mobility inter-frequency measurement enhancement

- Motivation

- > According to current R18 LTM progress, only L1/L2 inter-frequency measurement with Type 1 gap is specified in R18.
- > For UE who supports NCSG, during measurement occasion UE is expected to transmit and receive data on the corresponding serving carrier(s).

- Objective

- > L1/L2 inter-frequency measurement with NCSG (Network Controlled Small Gap)
  - In FR1, SSB based L1-RSRP measurement can be performed simultaneously with L3-RSRP measurement;
  - In FR2, SSB based L1-RSRP measurement is to be shared with L3 measurement with one NCSG, Or define a dedicated NCSG for L1-RSRP measurement