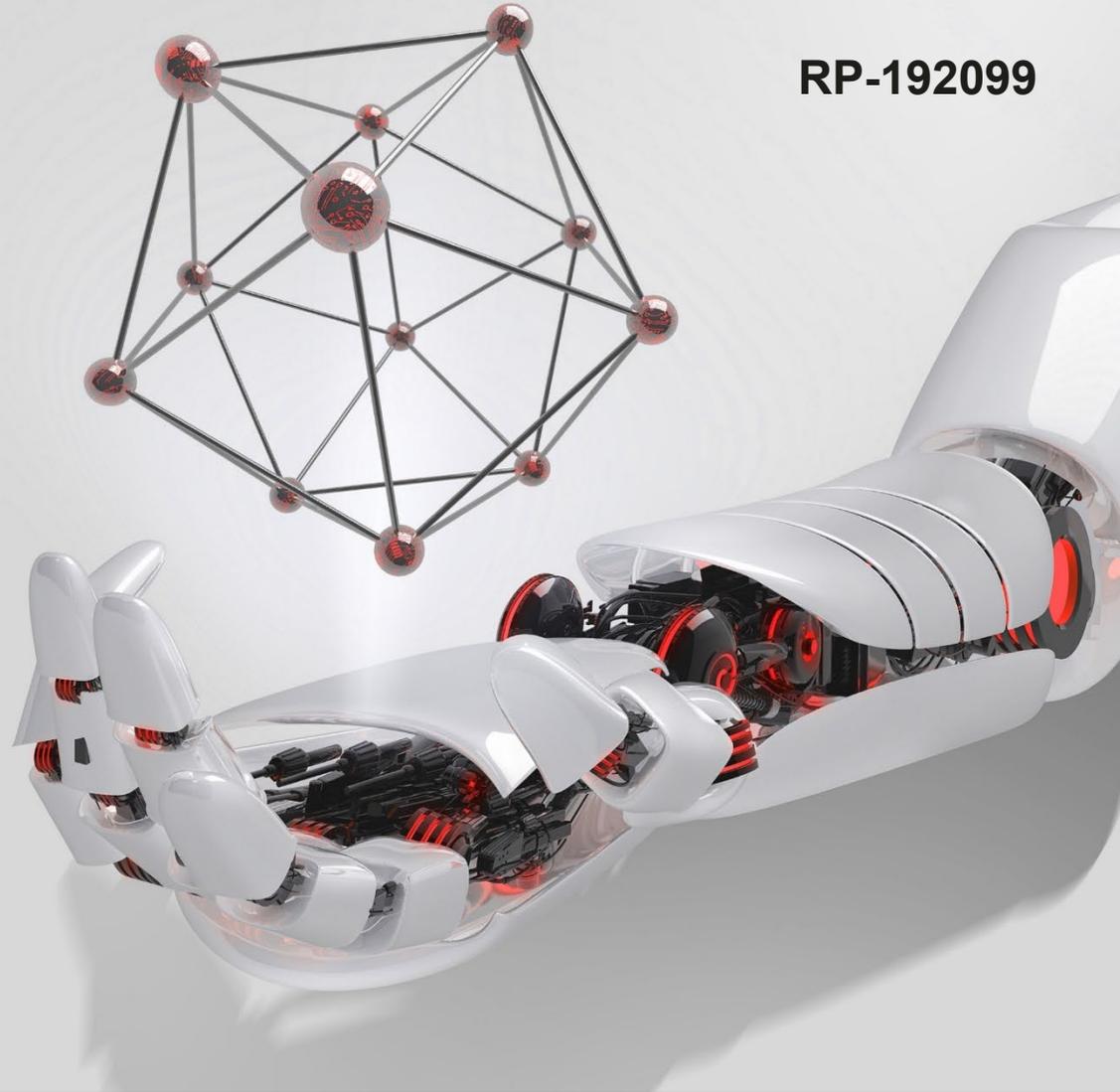


**3GPP TSG RAN meeting #85**  
**Newport Beach, USA, September 16-20, 2019**

**RP-192099**

# Proposal for Rel-17 RAN4 work area on LTE overlapping CA

**Source:** Huawei, HiSilicon  
**Agenda item:** 8.2.5  
**Document for:** Discussion



# Motivation: Utilize Guard Band to Save Spectrum

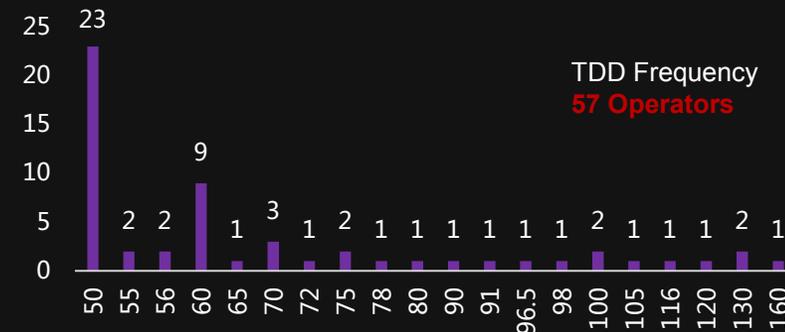
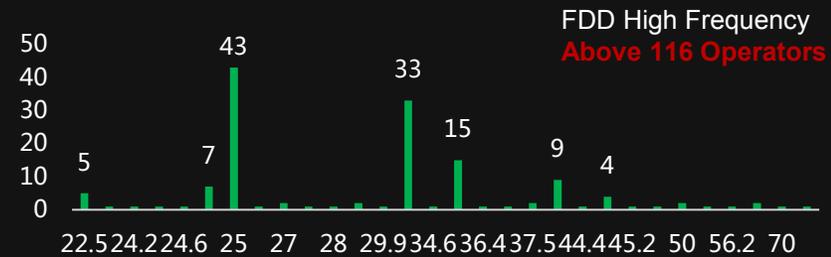
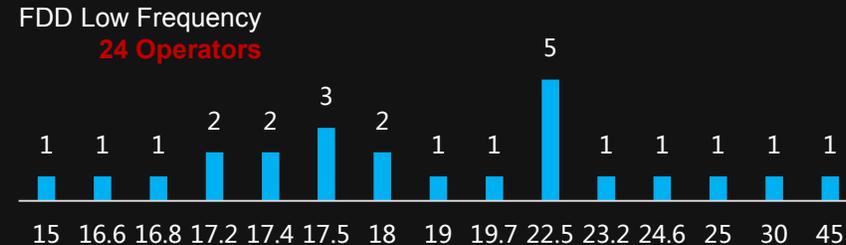
## Spectrum is expensive and scarce

 Germany	<b>Spectrum Auction Price</b>	<b>\$xx million</b> dollar
	Avg. Price@(900M、700M、 1500M、1800M)	
 India	<b>Spectrum Auction Price</b>	<b>\$xx million</b> dollar
	Avg. Price@(700~900M、 1800M~2600M)	
 Thailand	<b>Spectrum Auction Price</b>	<b>\$x billion</b> dollar /Per 10MHz @ Thailand
	Price@900MHz	

## Guard Band Spectrum in-between CC is Wasted

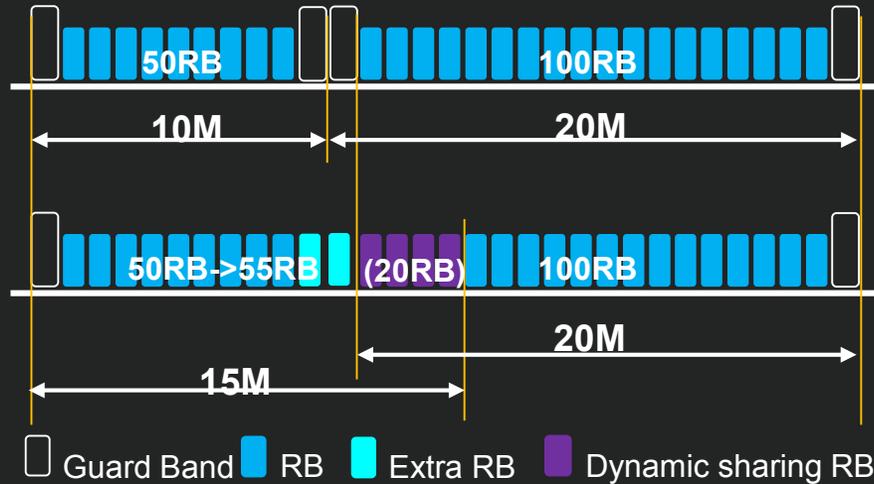


## 200+ Operators potentially in Global



# Concept of overlapping CA

## Overlapping CA @30MHz available spectrum



## Channel Spacing reduction according to the 36.101

### 5.7.1A Channel spacing for CA

For intra-band contiguous carrier aggregation with two or more component carriers, the nominal channel spacing between two adjacent E-UTRA component carriers is defined as the following unless stated otherwise:

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

where  $BW_{\text{Channel}(1)}$  and  $BW_{\text{Channel}(2)}$  are the channel bandwidths of the two respective E-UTRA component carriers according to Table 5.6-1 with values in MHz. **The channel spacing for intra-band contiguous carrier aggregation can be adjusted to any multiple of 300 kHz less than the nominal channel spacing to optimize performance in a particular deployment scenario.**

For intra-band contiguous carrier aggregation with two or more component carriers in Band 46, the requirements apply for both 19.8 MHz and 20.1 MHz nominal carrier spacing between two 20 MHz component carriers, and for 15.0 MHz nominal carrier spacing between 10 MHz and 20 MHz component carriers.

For intra-band non-contiguous carrier aggregation the channel spacing between two or more E-UTRA component carriers in different sub-blocks shall be larger than the nominal channel spacing defined in this subclause.

Scheme	Guard band
Non-CA	10MHz + 20MHz: 1.5MHz in-between, 0.5+1MHz on edges
CA nominal spacing	10MHz + 20MHz: 900KHz in-between, 2MHz on edges
Overlapping CA	15MHz + 20MHz: N/A in-between, ~2MHz on edges



- Up to 5.5% spectrum gain for CA mode @30MHz spectrum
- More gain when spectrum > 30MHz
- 10MHz CC → 15MHz from UE perspective which operates in single CC mode

# Proposal

- In Rel-17, enable LTE overlapping CA
  - In Rel-17, we propose a new RAN4-led LTE WI to enable overlapping CA
    - Study and address the overlapping issues for CRS/PDCCH
    - Specify the necessary UE RF requirements including channel raster,
    - Specify the UE demodulation performance requirements to verify support of overlapping CA
    - Specify the necessary signaling to support it
  
- Suggest to starting discussion on RAN4-led working area in December 2019