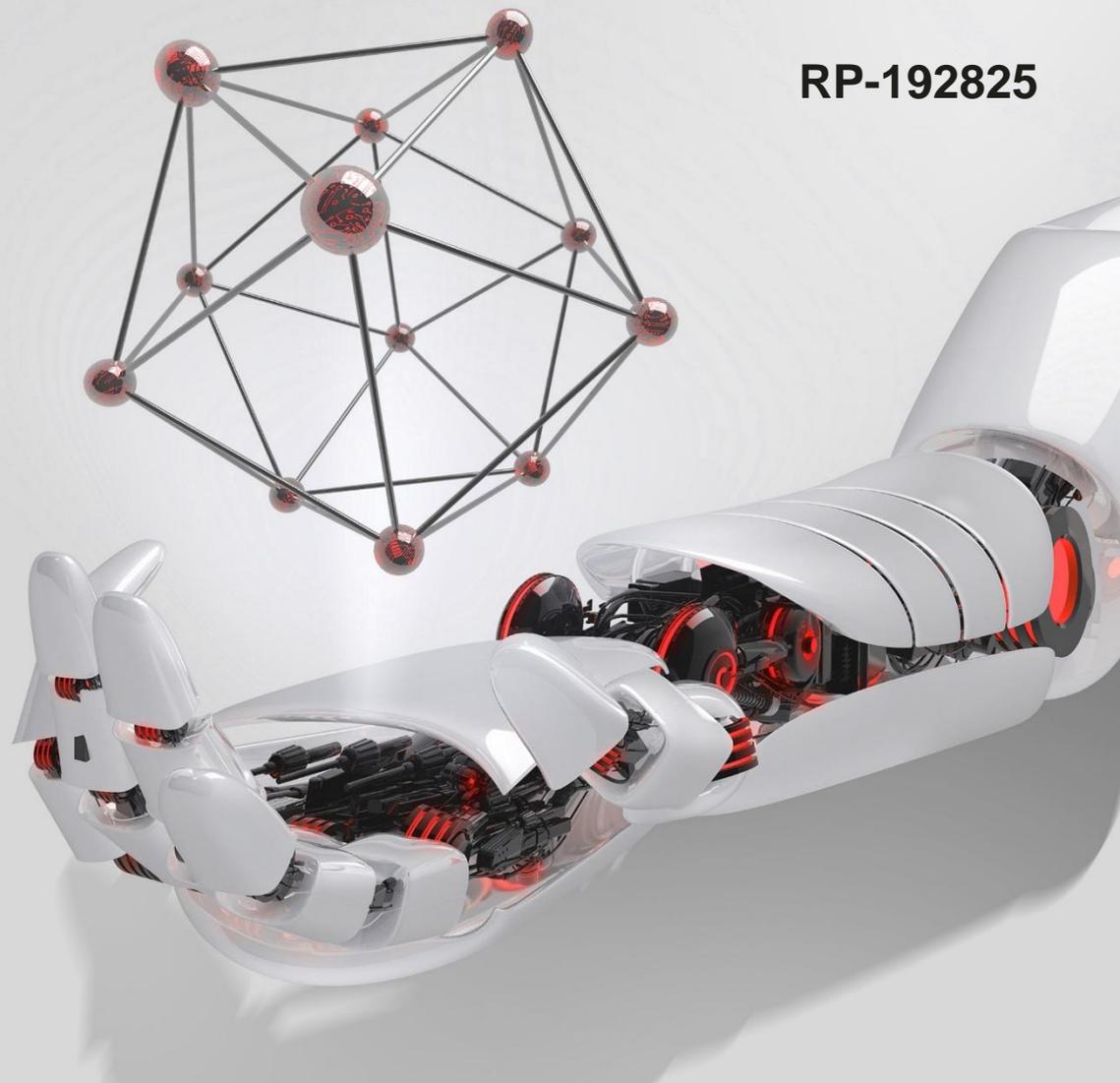


**3GPP TSG-RAN Meeting#86**  
**Sitges, Spain, 9th – 12th December 2019**

RP-192825

# Motivation of new WID on supporting overlapping CA for LTE

**Source:** Huawei, HiSilicon, Etisalat  
**Agenda item:** 10.1.4  
**Document for:** Discussion

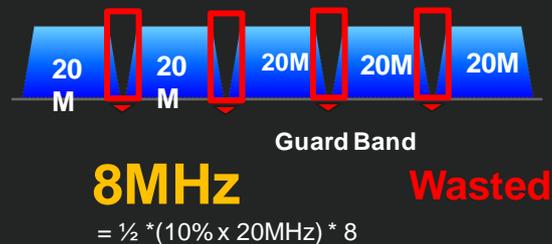


# Motivation: Utilize Guard Band to Save Spectrum

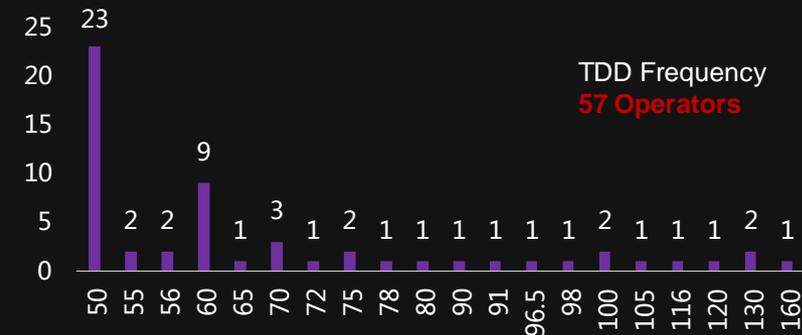
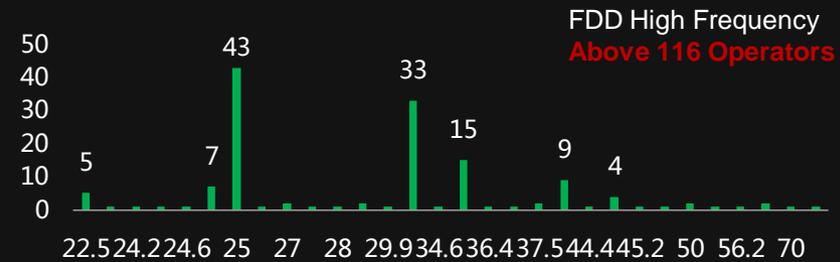
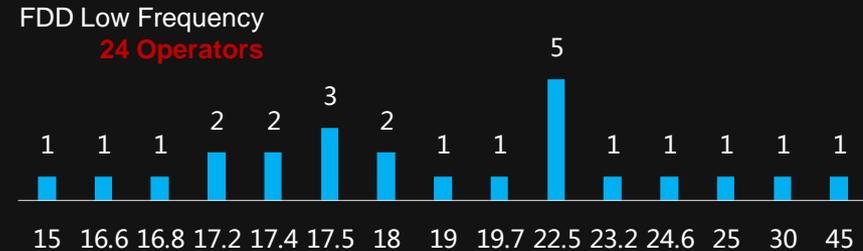
## Spectrum is expensive and scarce

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

## Guard Band Spectrum in-between CC is Wasted

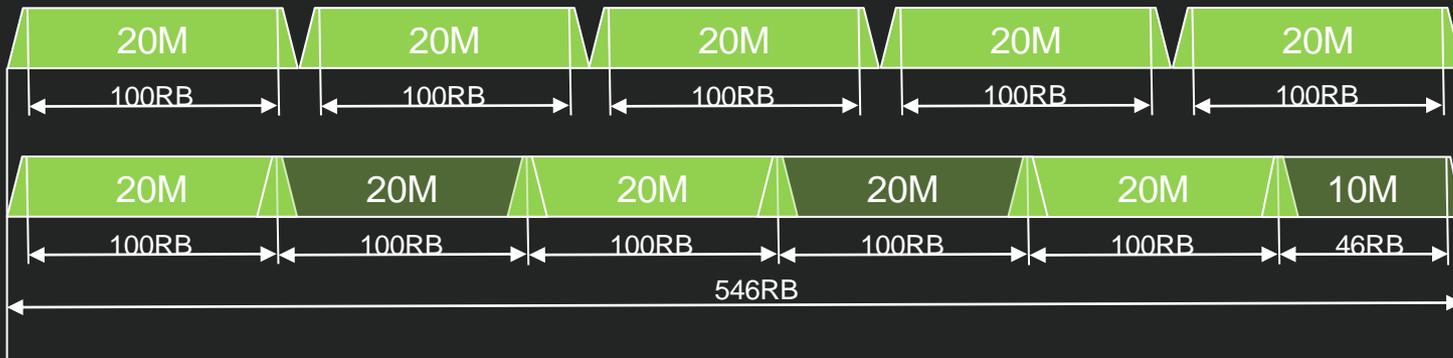


## 200+ Operators potentially in Global

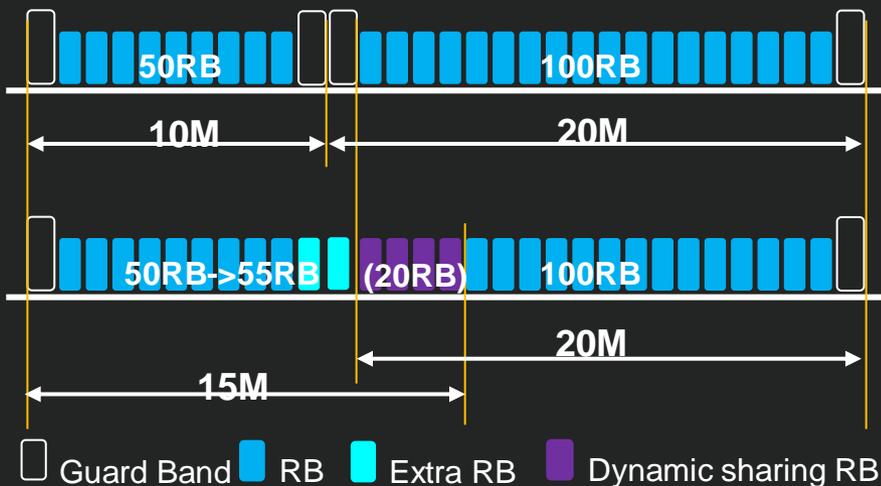


# Concept of overlapping CA: for downlink

100M Scenario , resource gain:(546-500)/500=9.2%



## Orthogonally joint based on sub-carrier level



## Channel Spacing reduction obeys 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 would like to propose to have a new RAN4-led LTE SI/WI to enable such kind of overlapping CA
  - Downlink overlapping intra-band contiguous CA is considered
  - Study and address the potential issues for RF/RRM when there is CRS/PDCCH overlapping
  - Specify the necessary UE RF requirements, e.g., channel arrangement and emission requirements, and/or UE demodulation performance requirements
  - Specify the necessary signaling to support it