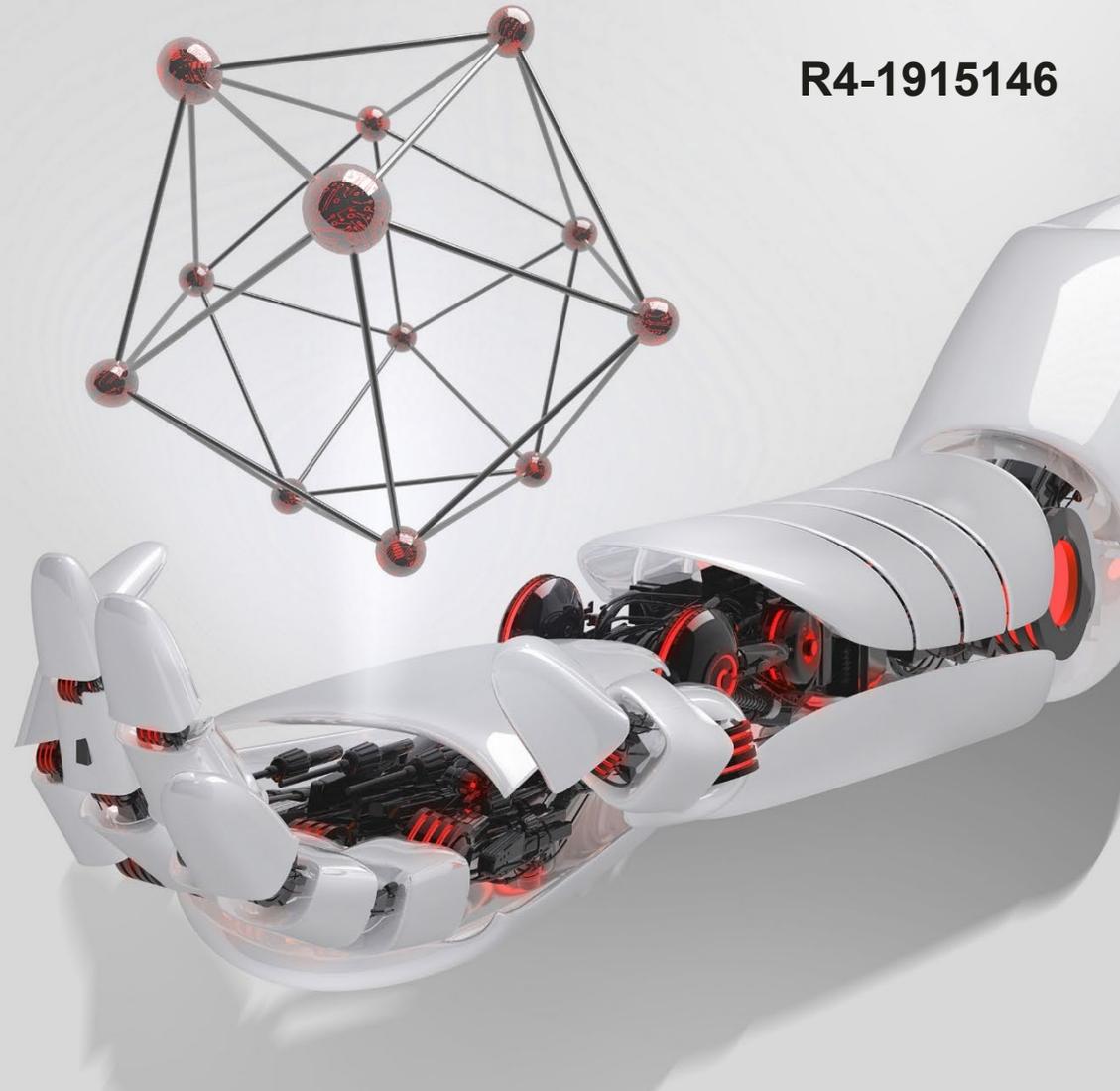


3GPP TSG-RAN WG4 Meeting #93
Reno, Nevada, USA, 18 - 22 November, 2019

R4-1915146

Motivation of new WID on supporting overlapping CA for LTE

Source: Huawei, HiSilicon
Agenda item: 13.1
Document for: Discussion



Motivation: Utilize Guard Band to Save Spectrum

Spectrum is expensive and scarce

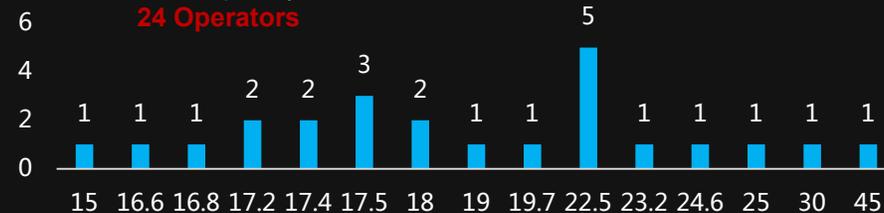
 Germany	Spectrum Auction Price	\$xx million dollar
	Avg. Price@(900M、700M、1500M、1800M)	
 India	Spectrum Auction Price	\$xx million dollar
	Avg. Price@(700~900M、1800M~2600M)	
 Thailand	Spectrum Auction Price	\$x billion dollar /Per 10MHz @ Thailand
	Price@900MHz	

Guard Band Spectrum in-between CC is Wasted

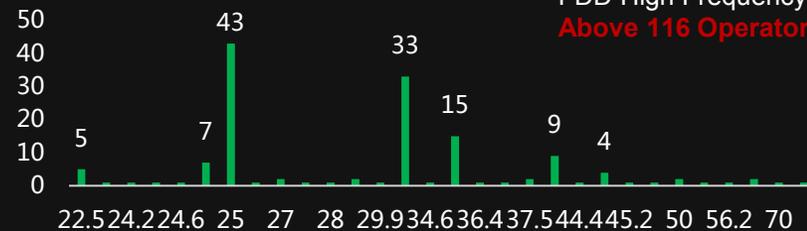


200+ Operators potentially in Global

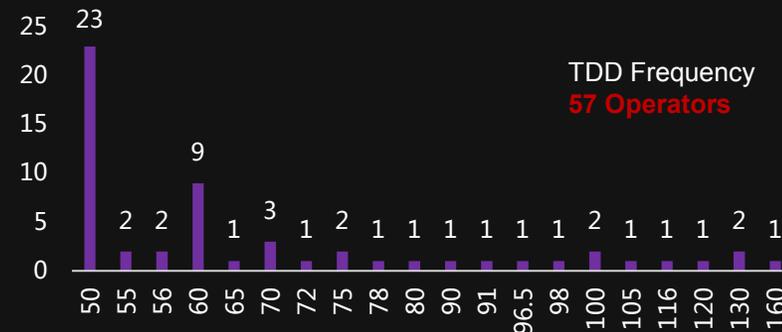
FDD Low Frequency



FDD High Frequency
Above 116 Operators

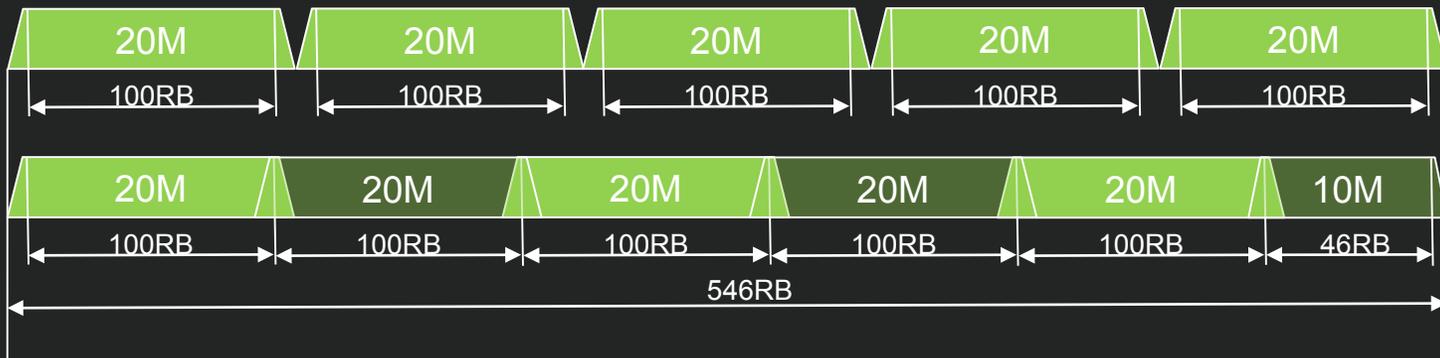


TDD Frequency
57 Operators

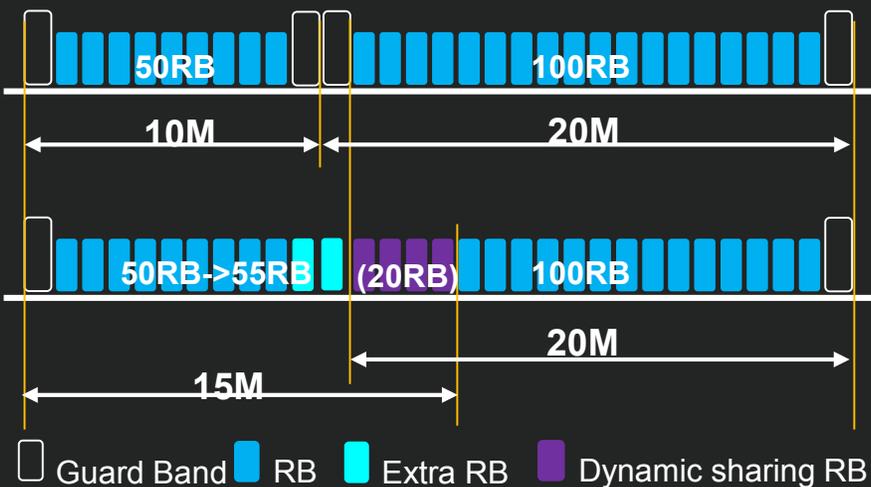


Concept of overlapping CA

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
 - Study and address the overlapping issues for CRS/PDCCH
 - 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