



Fragmented carriers in the DL

A proposal for Rel-19 study item
RAN plenary #102

TELUS, Bell Mobility, T-Mobile USA, Telstra Limited,
US Cellular Corporation, Nokia, Nokia Shanghai Bell



Background

- NR data rates are limited by the number of supported CA component carriers (CCs)
- It is not expected that the number of CCs that chipsets support will go up significantly in the coming years (6 or 7 is likely the limit in the FR1 range)
- Fragmented spectrum in FDD bands contributes to a high CC count even if only 2 or 3 bands are aggregated, thus limiting the data rate
- Having multiple CCs per band may not be necessary - some chipset vendors have so far demonstrated that fragmented blocks require the same number of baseband processing units as single non-fragmented blocks (e.g., 7A-7A requires single downlink processing unit, same as 7A)
- Receiver design could be modified to make fragmented blocks appear as a single CC in FR1 as long as the intra-band DL bandwidth is narrower than the widest channel bandwidth
- 3GPP has already specified a similar wideband NRU solution where different blocks are treated as part of the same carrier

Example of fragmented blocks in FR1 mid-bands in Canada

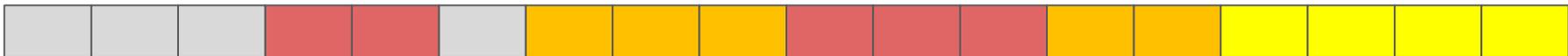
PCS (n25) example of fragmented spectrum in Toronto*



BRS (n7) example of fragmented spectrum in Toronto*

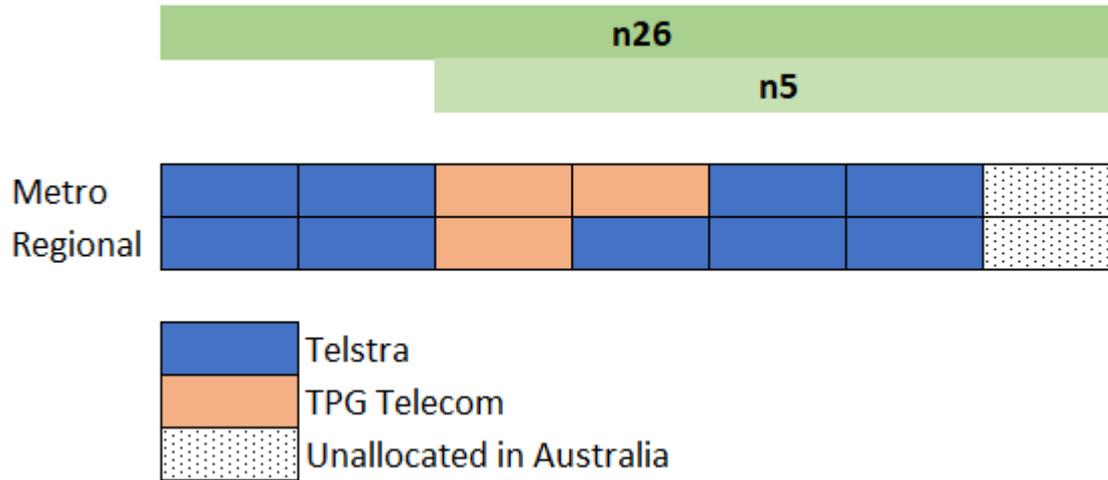


AWS1/3/4 (n66) example of fragmented spectrum in Toronto*



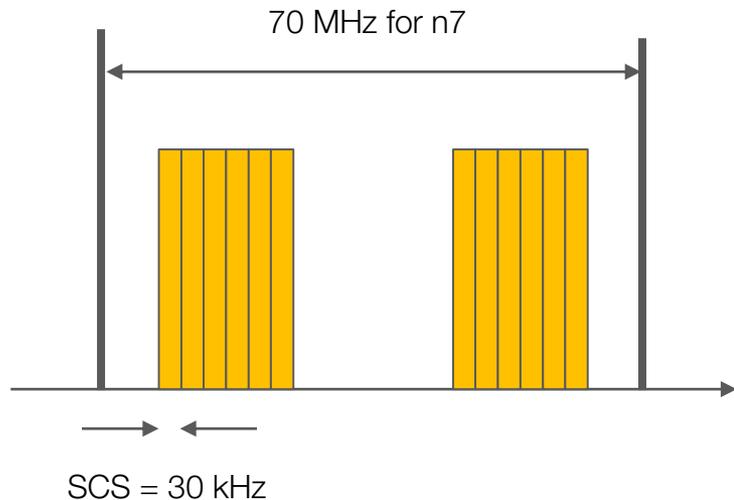
*Same colour indicates spectrum access for the same operator; each block is 5 MHz wide

Example of fragmented blocks in FR1 low-band in Australia



*Same colour indicates spectrum access for the same operator; each block is 5 MHz wide

Example bands that can be treated as a single CC



A 70 MHz channel can have blank PRBs in the missing portion of the spectrum (where other operators' blocks are present)

Two 20 MHz fragmented blocks within a **70 MHz DL n7 bandwidth** is illustrated on the left.

n25 band is 65 MHz wide, likely a 70 MHz solution would work there too.

n66 band is 90 MHz wide, a 90 MHz profile is needed.

n26 band is 35 MHz wide, a 35 or 40 MHz profile is needed.

Proposal for Rel-19

- a new study item on how to consider fragmented intra-band blocks as a single CC in the DL
- limit the scope to FDD bands, where individual DL bandwidth is ≤ 100 MHz
- evaluate the feasibility of using a single Rx chain per fragmented FDD band, while studying the near-far problem and unwanted emissions implications

