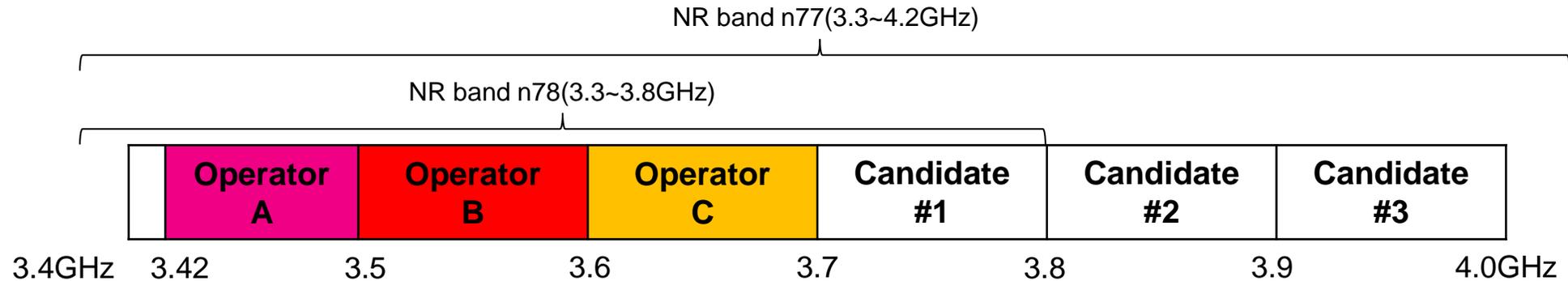


Proposal for addition of PC2(HPUE) FR1 TDD Intra-band non-contiguous UL CA in n77

LG Uplus, KT, SKT, LGE, Ericsson, Ericsson-LG, Huawei, Samsung

- **NR FR1 spectrum in Korea and potential block for auction planning in H2, 2021**



- Globally also n77 is being used or in planning in Canada, Egypt, Japan, Lithuania, Myanmar, Taiwan, the U.K., the U.S., and Vietnam with contiguous or non-contiguous manner.

- **Related standardization status in 3GPP**

- (Rel-16) CR for PC3 FR1 TDD intra-band non-contiguous UL CA requirement was agreed w.r.t. **n41, n77 and n78** in [1].
 - affected clauses in TS 38.101-1 : 5.3A.5, 5.5A.2, 6.2A, 6.3A, 6.4A, 6.5
(UE CH BW, Configurations, TX power, Output power dynamics, TX signal quality, Output RF spectrum emissions)
- (Rel-17) (New WI) RAN4 RF requirements enhancement for NR FR1 in Rel-17 approved in RAN 89E [2].
 - One of the main three objectives is PC2(HPUE) for TDD intra-band contiguous UL CA with example bands as n41 and n78.
 - So the non-contiguous case was not included.

- **(Observation1) Current specification status will not be able to meet the Korean operators' market requirements in near future.**
 - In 2021 auction, if one operator(C) acquires the adjacent 100MHz spectrum(#1), other 2 operators will not be able to provide UL CA from HPUE since there is no specification for HPUE FR1 TDD Intra-band non-contiguous UL CA in n77 but n78 contiguous only.
 - In 2021 auction, if one operator(C) cannot acquire the adjacent 100MHz spectrum(#1), all three operators will not be able to provide UL CA from HPUE since there is no specification for HPUE FR1 TDD Intra-band non-contiguous UL CA in n77 but n78 contiguous only.

- **(Observation2) PC2 FR1 TDD Intra-band non-contiguous UL CA needs to be specified in Rel-17; otherwise, 5G market have no choice but to wait for Rel-18 (standard(2023), commercialization(2025)).**
 - Rel-17 finalization is expected to be Q1, 2022 considering new timeline with 6 additional months.
 - Then, Rel-18 finalization would be Q2, 2023 with general 15 months timeline and corresponding commercialization will be in 2025 as the fastest schedule.
 - Not want to justify more here for importance of HPUE in link imbalance problem in real networks and 5G industrial applications since the HPUE specifications are being appeared more as time goes.

Summary and proposal

- **(Background1) NR FR1 spectrum in Korea and potential block for auction planning in H2, 2021**
 - Currently Korean operators are using 3.42~3.7GHz and 3.7~4.0GHz will be the candidates for the next auction.
 - Globally also n77(3.3~4.2GHz) is being used or will be allocated in Canada, Egypt, Japan, Lithuania, Myanmar, Taiwan, the U.K., the U.S., and Vietnam with contiguous or non-contiguous manner.
- **(Background2) Related standardization status in 3GPP**
 - For Rel-16, PC3 FR1 TDD intra-band non-contiguous UL CA requirement was agreed.
 - For Rel-17, PC2(HPUE) FR1 TDD intra-band non-contiguous UL CA is not included in related WI.
- **(Observation1) Current specification status will not be able to meet the Korean operators' market requirements about PC2(HPUE) FR1 TDD Intra-band non-contiguous UL CA for n77 in near future.**
- **(Observation2) PC2 FR1 TDD Intra-band non-contiguous UL CA needs to be specified in Rel-17; otherwise, 5G market have no choice but to wait for Rel-18 (standard(2023), commercialization(2025)).**
- **(Proposal) To include PC2(HPUE) FR1 TDD Intra-band non-contiguous UL CA in n77 in the objective scope of Rel-17 RAN4 WI, RF requirements enhancement for NR FR1 in Rel-17.**

Proposed text modification

- **(Proposal) To include PC2(HPUE) FR1 TDD Intra-band non-contiguous UL CA in n77 in the objective scope of Rel-17 RAN4 WI, RF requirements enhancement for NR FR1 in Rel-17.**

- **3)** HPUE for TDD intra-band contiguous/non-contiguous UL CA
 - Take n41 and n78 intra-band contiguous UL CA for examples
 - The two example intra-band contiguous UL CA configurations are under considerations
 - CA_n41C, CA_n78C
 - Take n77 intra-band non-contiguous UL CA for example
 - The one example intra-band non-contiguous UL CA configurations is under considerations
 - CA_n77(2A)
 - Investigate and specify the 26dBm power class for n41, n77 and n78 intra-band contiguous/non-contiguous UL CA
 - Identify the impact of different UE architectures on the requirements
 - Power class relation between single CC and intra-band contiguous/non-contiguous CA on HPUE band is clarified if any
 - Specify the mechanism to meet SAR requirements if necessary
 - Mechanism for HPUE on single carrier can be a start point considering the same UL-DL configuration assumption
 - A-MPR requirement
 - Specify MPR requirements

References

- [1] R4-2016815, “CR for intra-band UL CA non-contiguous CA requirement”, Huawei, HiSilicon, Nokia
- [2] RP-202088, “New WID proposal: RF requirements enhancement for NR frequency range 1 (FR1) in Rel-17”, Huawei, HiSilicon, China Telecom