**3GPP TSG-RAN** **WG2 Meeting #109bis-e R2-200xxxx**

**Electronic, April 20 – 30, 2020**

**Source: Qualcomm Incorporated**

**Title: Summary of email discussion [AT109bis-e][044][NR16 Other] Support for ECN in 5GS (Qualcomm)**

**Document for: Decision**

**Agenda Item: 6.19**

# Introduction

This document summarizes the following email discussion.

FDD band capability signalling for uplink sharing

[R2-2002526](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002526.zip) LS on FDD band capability signalling for uplink sharing (R4-1916180; contact: Nokia) RAN4 LS in Rel-16 NR\_FDD\_bands\_varduplex To:RAN2

[R2-2002575](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002575.zip) ULSUP applicability to FDD bands Qualcomm Incorporated discussion Rel-16 NR\_FDD\_bands\_varduplex

[R2-2003446](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003446.zip) Discussion on UL sharing for variable-duplex FDD bands Huawei, HiSilicon discussion Rel-16 NR\_FDD\_bands\_varduplex

[R2-2002576](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002576.zip) Introduction of UE capability for ULSUP with FDD band Qualcomm Incorporated, Nokia, OPPO CR Rel-15 38.331 15.9.0 1507 - F NR\_FDD\_bands\_varduplex

[R2-2002577](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002577.zip) Introduction of UE capability for ULSUP with FDD band Qualcomm Incorporated, Nokia, OPPO CR Rel-15 38.306 15.9.0 0263 - F NR\_FDD\_bands\_varduplex

* [AT109bis-e][040][NR16 Other] FDD band capability signalling for uplink sharing (QC)

Scope: Treat papers above on FDD band capability signalling for uplink sharing

Wanted Outcome: Agreed-in-principle CRs

Deadline: April 28 0700 UTC

# Discussion

RAN4 in their LS [R2-2002526](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002526.zip) indicated as follows.

* *RAN4#93 has agreed to use the UE capability signalling* *‘ul-SharingEUTRA-NR’ for the* ***NR FDD bands*** *in addition to the NR SUL […]*

The LS was discussed in RAN2 #109-e: [AT109e][052][R16 Other WISI] UL sharing for variable-duplex FDD bands. RAN2 however could not come to a consensus as to how to capture the RAN4 agreement.

Looking at the documents submitted to this #109bis-e meeting, there are two solutions proposed.

**OPTION 1:** No change to RAN2 specifications ([R2-2003446](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003446.zip), Huawei)

**OPTION 2:** Introduce a new capability per band per band combination ([R2-2002576](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002576.zip), [R2-2002577](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002577.zip), Qualcomm Incorporated, Nokia, OPPO)

The key reasoning for option 1 above is that RAN4 defines all band combinations supporting ULSUP. Since the existing *ul-SharingEUTRA-NR* is signalled per band combination, it is clear which pair of E-UTRA and NR bands the UL sharing is supported in.

On the other hand, the option 2 is motivated to provide more generic UE capability signalling solution where it is not necessary to distinguish between fixed duplex FDD band and flexible duplex FDD band, because the new UE capability parameter is signalled per band (per band combination).

Companies are requested to provide their preference between option 1 and option 2. Companies can also provide other options in the comment column.

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| --- | --- | --- |
| **Company name** | **Option 1 / Option 2** | **Comments** |
| Qualcomm Incorporated | Option 2 (proponent) | Option 1 certainly works with the band combinations with UL sharing that RAN4 defines today. But it can cause problems once RAN4 defines UL sharing band combination where more than one pair of bands can be sharable.  Because of the release-independent nature of band combinations and to avoid possible inter-operability problem in the future, we think it makes sense to take a generic approach. |
| Nokia | Option 2 (proponent) | Same as Qualcomm |
| Intel | Opt 1.5 ☺…  We think Opton-1 can work. | We can introduce new signalling if RAN2 feels so. And the new signalling would be like the current one -> perBC. Opt-2 of doing it per-band-perBC would be going more than what RAN4 agreed, and is not necessary.  As long as RAN4 introduces this for flexible duplex FDD bands (which would be using new band numbers), we think option-1 actually should be ok (no NBC). |
| Apple | Option 1 | We do not see the need to introduce new signalling for now as long as current field *ul-SharingEUTRA-NR* can serve the purpose requested by RAN4. We feel putting a new UE capability into per band per BC as Option 2 seems a little bit overkilled since RAN4 hasn’t introduced any BC with more than one pair of variable FDD band. |
| MediaTek | Option 1 | Same understanding as Intel, we understand R4 would always introduce new band number for flexible duplex FDD, so there is no backward compatible concern. Therefore, from R2 signalling point of view, we think it is ok to reuse *ul-SharingEUTRA-NR* for now.  We can always add new signaling later if there is NBC concern. |
| CATT | Option 1 | Not sure why the discussion paper is R16 but CRs are for R15…  Regarding these two options, we believe in this stage there is no urgency to go beyond what is needed to support RAN4 work. So we prefer Option 1 which does not require change to RAN2 spec. We should focus on completion of R16 at this very late stage.  If in the future there is real use case for more, we can always discuss then. |
| Huawei | Option 1 | We think we should follow what RAN4 has agreed. Currently RAN4 only agreed to apply UL sharing for variable duplex FDD bands and therefore we don’t think it is the right way forward to make a further step in RAN2 now. |
| Ericsson | Option 2-ish | We are supportive to support this for any FDD band as Qualcomm and Nokia suggest, but we wonder if we need signalling per band per BC. Possibly we could do as Intel suggest with one bit per BC, or maybe only one bit per band (outside the BC). |
| NTT DOCOMO | Option 2-ish | Given the past experience from legacy RATs, (UMTS, LTE), late extension due to band/RF issues causes messy in the spec. Therefore, we also prefer the generic approach, if RAN4 is likely to support the new case, i.e. ULSUP with an FDD band. On the other hand, we share the same concern as Intel/Ericsson expressed in terms of the signalling overhead. In addition to the alternatives Ericsson provided, there is another alternative that the capability signalling is defined in FeatureSetDownlink. |
| OPPO | Option2  (Proponent) | Same as Qualcomm. |
| ZTE | Option 2 | We share the same view as Qualcomm and Nokia, we support option 2 for better forward compatibility. To save more bits, this parameter can be further limited to the FDD NR bands as below.  ***bandList-v15x0***  The UE shall include the same number of entries, and listed in the same order, as the FDD NR band entries inbandList (without suffix). |
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**Proposal 1: xxxx**

# Conclusion

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# Reference

[1]