3GPP TSG-RAN WG2 Meeting #118 Electronic R2-220xxxx

Online, 9th May – 20th May 2022

**Agenda item: 6.24.1**

**Source: Nokia (Rapporteur)**

**Title: Offline [AT118-e][042][NR17] FR2 CA BW Classes and CBM/IBM (Nokia)**

**WID/SID: NR\_RF\_FR2\_req\_enh2-Core**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report of the following email discussion:

FR2 CA BW CBM/IBM

offline, CB online W2 if needed

* [AT118-e][042][NR17] FR2 CA BW Classes and CBM/IBM (Nokia)

 Scope: Treat R2-2204854, R2-2205562, R2-2204850, R2-2204851, R2-2204889, R2-2204890

 Ph1 Determine agreeable parts, Ph2 agree CRs

 Intended outcome: Report, Agreed CRs

 Deadline: Schedule 1

R2-2204854 Reply LS on release independence aspects of newly introduced FR2 CA BW Classes and CBM/IBM UE capability Nokia, Nokia Shanghai Bell LS out Rel-17 NR\_RF\_FR2\_req\_enh2-Core R2-2202377 To:RAN4

R2-2205562 Discussion on FR2 new bandwidth class Huawei, HiSilicon discussion Rel-17 NR\_RF\_FR2\_req\_enh2-Core

R2-2204850 Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai Bell, , Huawei, HiSilicon, Ericsson, ZTE Corporation, Sanechips, Qualcomm, Xiaomi Communications CR Rel-17 38.306 17.0.0 0678 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2203975

R2-2204851 Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai BellNokia, Nokia Shanghai Bell, Huawei, HiSilicon, Ericsson, ZTE Corporation, Sanechips, Qualcomm, Xiaomi Communications CR Rel-17 38.331 17.0.0 2867 3 B NR\_RF\_FR2\_req\_enh2-Core R2-2203974

R2-2204889 CR on the CBM/IBM reporting-38331 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.0.0 2916 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2204005

R2-2204890 CR on the CBM/IBM reporting-38306 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.306 17.0.0 0690 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2204006

**Topic 1: FR2 CA BW Classes**

**[1]** R2-2205562 Discussion on FR2 new bandwidth class Huawei, HiSilicon discussion Rel-17 NR\_RF\_FR2\_req\_enh2-Core

**[2]** R2-2204850 Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai Bell, , Huawei, HiSilicon, Ericsson, ZTE Corporation, Sanechips, Qualcomm, Xiaomi Communications CR Rel-17 38.306 17.0.0 0678 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2203975

**[3]** R2-2204851 Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai BellNokia, Nokia Shanghai Bell, Huawei, HiSilicon, Ericsson, ZTE Corporation, Sanechips, Qualcomm, Xiaomi Communications CR Rel-17 38.331 17.0.0 2867 3 B NR\_RF\_FR2\_req\_enh2-Core R2-2203974

**[4]** R2-2204854 Reply LS on release independence aspects of newly introduced FR2 CA BW Classes and CBM/IBM UE capability Nokia, Nokia Shanghai Bell LS out Rel-17 NR\_RF\_FR2\_req\_enh2-Core R2-2202377 To:RAN4

**Topic 2: CBM/IBM reporting**

**[5]** R2-2204889 CR on the CBM/IBM reporting-38331 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.0.0 2916 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2204005

**[6]** R2-2204890 CR on the CBM/IBM reporting-38306 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.306 17.0.0 0690 2 B NR\_RF\_FR2\_req\_enh2-Core R2-2204006

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Nokia (Rapporteur) | Amaanat Ali | amaanat.ali@nokia.com |
| OPPO | Qianxi Lu | qianxi.lu@oppo.com |
| ZTE | Wenting Li | Li.wenting@zte.com.cn |
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| Huawei, HiSilicon | Tong Sha | shatong3@hisilicon.com |
| Xiaomi | Yumin Wu | wuyumin@xiaomi.com |
| Ericsson | Håkan Palm | hakan.l.palm@ericsson.com |
| CATT | Shijie | shijie@catt.cn |
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# 3 Discussion

The rapporteur proposes to continue the discussion from the previous meeting. The CRs for both the topics were endorsed as baseline for further work because the topics were still under discussion in RAN4.

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| [R2-2203974](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203974.zip) Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai Bell CR Rel-17 38.331 16.7.0 2867 2 B NR\_RF\_FR2\_req\_enh2-Core* [059] Endorsed as baseline for further work (not for R17 merge, not for TSG RAN)

[R2-2203975](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203975.zip) Introduction of FR2 FBG2 CA BW classes Nokia, Nokia Shanghai Bell CR Rel-17 38.306 16.7.0 0678 1 B NR\_RF\_FR2\_req\_enh2-Core* [059] Endorsed as baseline for further work (not for R17 merge, not for TSG RAN)

[R2-2204005](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2204005.zip) CR on the CBM/IBM reporting-38331 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.331 16.7.0 2916 1 B NR\_RF\_FR2\_req\_enh2-Core- [056] Rapporteur proposes that the CRs in R2-2204005/R2-2204006 are endorsed as a baseline and agreed when RAN4 updates the feature list in accordance with R16 capability* [059] Endorsed as baseline for further work (not for R17 merge, not for TSG RAN)

[R2-2204006](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2204006.zip) CR on the CBM/IBM reporting-38306 ZTE Corporation, Sanechips, Nokia, Nokia Shanghai Bell CR Rel-17 38.306 16.7.0 0690 1 B NR\_RF\_FR2\_req\_enh2-Core* [059] Endorsed as baseline for further work (not for R17 merge, not for TSG RAN)
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**Topic 1: FR2 CA BW Classes**

Companies, please note that the contributions in [2], [3] are resubmitted to this meeting using the Rel-17 baseline specification and are still open to companies for further discussion and will be amended based on the RAN4 conclusion on this topic. Rapporteur is not proposing to agree anything yet on this topic knowing fully that the capability discussion is still pending in RAN4.

First of all, thanks a lot for the company to bring the contribution in [1] discussing the different alternatives under discussion in RAN4 while making observations about how this will possibly impact RAN2 discussions. To quickly summarize the alternatives here for companies to have common understanding:

**Alternative 1:** Organize the new CA bandwidth classes under a new FBG (say FBG 5). With this approach the fallback principle of allowing a UE to fallback to a lower order CA within the same FBG remains unchanged. Then there are two sub-options dealing with how to organize the R, S, T and U either as part of the new FBG or retain it in the same FBG it is discussed earlier (i.e. FBG 2).

* **Option 1** (Option 2B in RAN4 discussion): previously agreed bandwidth classes R/S/T/U are NOT replaced i.e., they remain in FBG 2.
* **Option 2:** (Option 2C in RAN4 discussion): previously agreed bandwidth classes R/S/T/U are replaced i.e.; they are moved to FBG 5.

**Alternative 2:** This is **Option 3:** Define new CA BW classes (i.e., V, W, X and Y) in a current fallback group, i.e., FBG2 or FBG3. In this alternative, the fallback principle seems broken since the UE with new BW classes is able to fallback to the BW classes in another fallback group. Since the new BW classes have a mix bandwidth combination of 100MHz and 200MHz, it is unclear how to make fallback across different fallback groups.

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| **Observation 1: For Alternative 1 (Option 1), the mechanism defined by endorsed CRs [2][3] can be fully reused.****Observation 2: For Alternative 1 (Option 2), the mechanism defined by endorsed CRs [2][3] can be reused, while the extension of existing BW class and reporting via different BC entry is also feasible.****Observation 3: It is desirable to find a unified way to support more BW classes in a future-proof way.****Observation 4: For Alternative 2 (Option 3), it is not clear how the UE with new BW classes fallbacks to legacy BW classes across different fallback groups, which breaks the current fallback principle.****Proposal 1: Inform RAN4 the RAN2 analysis above on RAN4 candidate solutions for new bandwidth classes.** |

Let’s check companies’ views on the observations 1-4 above in the first week of discussions and then conclude on the proposal in 2nd week.

**Question 1: Do companies agree that following Alternative 1 rather than Alternative 2 has lower impact on the RAN2 specifications (lower impact: signalling structure reusable from endorsed CRs, no requirement to changing fallback principle, etc.). Please provide your views below.**

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| Answers to Question 1 |
| Company | Yes/No | Technical Arguments |
| Nokia | Yes | Yes, it is desirable to reuse the currently endorsed CRs and we don’t favour necessarily changing the principle of UE being able to fallback across different FBG as describing that behavior in RAN2 specification is not trivial and RAN2 specifications have been agnostic to definition of a fallback group. The difficulty lies in describing how the fallback across different FBG works especially as the component carrier bandwidths are not necessarily the same let alone their ordering. |
| OPPO |  | We are not sure if R2 has to do such discussion, since based on our R4 colleague, it is likely that this R4 meeting will conclude on this issue. |
| ZTE |  | We share the similar view as OPPO. According to our colleagues feedback, there are also several papers submitted to RAN4 on different options, so we think it’s better to wait for RAN4’s decision. |
| Samsung |  | We agree that RAN2 wait for RAN4 decision. |
| Apple |  | Agree with majority here to wait for RAN4 to conclude. |
| Qualcomm Incorporated |  | Wait for RAN4. |
| Huawei, HiSilicon | Yes | We understand the introduction of new BW classes does have an important RAN2 signalling impact which should be sync with RAN4. We suggest to provide our observations to RAN4 for their information, to help define a more future-proof way for new BW classes, and avoid the repeated discussion every time a new BW class is introduced in future. |
| Xiaomi | Yes | We share the same understanding with Nokia that requiring the UE to fallback across different FBG may need more changes in the RAN2 specifications, and make the RAN2 specification more difficult for maintenance. |
| Ericsson |  | We also think better wait for RAN4. Companies could influence their colleagues in RAN4. |
| CATT |  | Wait for RAN4. |
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**Summary 1**: There are no fresh comments to the previous meetings baseline CRs in [R2-2203974](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203974.zip)/[R2-2203975](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203974.zip). On the aspect of discussion on the different alternatives (being proposed in RAN4) which influence the signalling choices in RAN2 companies are fine to wait until RAN4 concludes their discussions.

**Proposal 1: No additional comments to the baseline CRs in** [**R2-2203974**](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203974.zip)**/**[**R2-2203975**](file:///C%3A%5CUsers%5Cmtk65284%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2_RL2%5CTSGR2_117-e%5CDocs%5CR2-2203974.zip)**. Rapporteur proposes to wait for RAN4 conclusion on this topic before concluding RAN2 work on signalling.**

**Topic 2: CBM/IBM reporting**

As RAN4 now concluded the capability topic here, proposal is just to agree the set of CRs in [5] and [6]

**Question 2**: Rapporteur proposes that CRs in R2-2204889 and R2-2204890 can be agreed. Any opposite view?

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| Answers to Question 3 |
| Company | Yes/No | Technical Arguments |
| Nokia | No | We agree the CRs in R2-2204889 and R2-2204890 can be agreed. |
| OPPO | No |  |
| ZTE | No opposite view (proponent) |  |
| Samsung | No |  |
| Qualcomm Incorporated | No | We are fine with the CRs.No opposite view (Probably the way the question is formulated can be confusing 😊). |
| Huawei, HiSilicon | No |  |
| Xiaomi | No |  |
| Ericsson | No | We are also fine with the CRs. |
| CATT | No |  |
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**Summary 2**: No additional comments received for the CRs in R2-2204889 and R2-2204890.

**Proposal 2: Rapporteur proposes to agree the CRs R2-2204889 and R2-2204890.**

# 4 Conclusion

TBD.