**3GPP TSG RAN WG1 #106-e R1-2108425**

**e-Meeting, August 16th – 27th, 2021**

**Agenda item:** 7.2.11

**Source:** Moderator (NTT DOCOMO, INC.)

**Title:** Summary on [106-e-NR-UEFeature-MRDCCA-01]

**Document for:** Discussion and Decision

1. Introduction

This contribution summarizes the following email discussion/approval at RAN1#106-e meeting.

[106-e-NR-UEFeature-MRDCCA-01] Email discussion/approval on UE features for MR-DC/CA enhancement by August 20 – Hiroki (DOCOMO)

* For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly
  + In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1

1. Discussion on UE features for MR-DC/CA enhancement
   1. UE features for NR-DC power sharing (FG18-1, 18-1a, 18-1b)

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| 18. MR-DC/CA enhancement | 18-1 | Basic UL power sharing for DC | Semi-static power sharing mode1 between MCG and SCG cells of same FR for NR dual connectivity. |  | *intraFR-NR-DC-PwrSharingMode1-r16* | *CA-ParametersNRDC-v1610* | n/a | n/a | Absence means intra-FR DC is not supported. | Optional with capability signalling |
| 18. MR-DC/CA enhancement | 18-1a | Semi-static UL power sharing mode 2 for DC | Semi-static power sharing mode 2 between MCG and SCG cells of same FR for NR dual connectivity. | 18-1 | *intraFR-NR-DC-PwrSharingMode2-r16* | *CA-ParametersNRDC-v1610* | n/a | n/a | Semi-static power sharing mode 2 between MCG and SCG cells of same FR is applicable only for synchronous NR dual connectivity | Optional with capability signalling |
| 18. MR-DC/CA enhancement | 18-1b | Dynamic UL power sharing for DC | Dynamic power sharing between MCG and SCG cells of same FR for NR dual connectivity.  1) T\_offset | 18-1 | *intraFR-NR-DC-DynamicPwrSharing-r16,* | *CA-ParametersNRDC-v1610* | n/a | n/a | 1) {short, long} | Optional with capability signalling |

Following proposals are made in contributions.

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| [2] | UE capabilities related to NR-DC power control are currently captured in 38.306 as shown below. While the RRC configuration of power sharing made can be differentiated for FR1 and FR2 (i.e., using *nrdc-PCmode-FR1* or *nrdc-Pcmode-FR2*), similar differentiation of UE capability is not present in current specs.  **Current capability definitions from 38.306 vg40**   | ***Definitions for parameters*** | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF | | --- | --- | --- | --- | --- | | ***intraFR-NR-DC-PwrSharingMode1-r16***  Indicates whether the UE supports intra-FR NR DC with semi-static power sharing mode1 between MCG and SCG cells of same frequency range as defined in TS 38.213 [11]. If this field is absent, the UE does not support intra-FR NR DC. | BC | No | No | No | | ***intraFR-NR-DC-PwrSharingMode2-r16***  Indicates whether the UE supports semi-static power sharing mode2 between MCG and SCG cells of same frequency range for synchronous intra-FR NR DC as defined in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.* | BC | No | No | No | | ***intraFR-NR-DC-DynamicPwrSharing-r16***  Indicates the UE support of dynamic power sharing for intra-FR NR DC between MCG and SCG cells of same frequency range with long or short offset as specified in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.* | BC | No | No | No |   Given current status with p-NR-FR2 decision by RAN4, the UE capability definitions should be modified such that Ues can at least indicate support for a particular power sharing mode for FR1 only (i.e., applicable only to cells with FR1 UL in MCG and SCG) without indicating it as supported for FR2.  RAN1 discussed possible updates to UE capabilities in [105-e-NR-UEFeature-MRDCCA-01] thread in RAN1#105e but the discussion could not conclude as RAN1 was waiting for RAN4 input. It was also discussed whether RAN1 could let RAN2 handle the UE capability aspect.  However, in our understanding, it was decided in RAN2#113b-e meeting to wait for RAN1 input on this topic including any changes to UE capabilities and so RAN1 should provide input to RAN2.    Two possible alternatives to update the UE capabilities are shown below.  One option (Option 1) is to enable FR1-FR2 differentiation for these capabilities so that if UE indicates ‘yes’ for a FR, the capability is applicable for power sharing between MCG and SCG cells with UL in that FR. This separates the capability for FR1 NR-DC reporting (as also achieved by Option 1) but additionally provides more forward compatibility if RAN4 continues discussion for p-NR-FR2 and p-UE-FR2 in Rel17.  **Proposed modification (Option 1)**   | ***Definitions for parameters*** | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF | | --- | --- | --- | --- | --- | | ***intraFR-NR-DC-PwrSharingMode1-r16***  Indicates whether the UE supports intra-FR NR DC with semi-static power sharing mode1 between MCG and SCG cells of same frequency range as defined in TS 38.213 [11]. If this field is absent, the UE does not support intra-FR NR DC.  If UE indicates support for a frequency range, this capability is applicable for power sharing between MCG and SCG cells with UL in that frequency range | BC | No | No | ~~No~~ Yes | | ***intraFR-NR-DC-PwrSharingMode2-r16***  Indicates whether the UE supports semi-static power sharing mode2 between MCG and SCG cells of same frequency range for synchronous intra-FR NR DC as defined in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.*  If UE indicates support for a frequency range, this capability is applicable for power sharing between MCG and SCG cells with UL in that frequency range | BC | No | No | ~~No~~  Yes | | ***intraFR-NR-DC-DynamicPwrSharing-r16***  Indicates the UE support of dynamic power sharing for intra-FR NR DC between MCG and SCG cells of same frequency range with long or short offset as specified in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.*  If UE indicates support for a frequency range, this capability is applicable for power sharing between MCG and SCG cells with UL in that frequency range | BC | No | No | ~~No~~  Yes |   Another option (Option 2) is to clarify in capability definitions that they are only applicable for FR1. i.e. as shown below. This is suitable if it is assumed that the capabilities are not needed for FR2 even in a future release (e.g. Rel17)  **Proposed modification (Option 2)**   | ***Definitions for parameters*** | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF | | --- | --- | --- | --- | --- | | ***intraFR-NR-DC-PwrSharingMode1-r16***  Indicates whether the UE supports intra-FR NR DC with semi-static power sharing mode1 between MCG and SCG cells of ~~same~~ frequency range 1 as defined in TS 38.213 [11]. If this field is absent, the UE does not support intra-FR NR DC. | BC | No | No | No | | ***intraFR-NR-DC-PwrSharingMode2-r16***  Indicates whether the UE supports semi-static power sharing mode2 between MCG and SCG cells of ~~same~~ frequency range 1 for synchronous intra-FR NR DC as defined in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.* | BC | No | No | No | | ***intraFR-NR-DC-DynamicPwrSharing-r16***  Indicates the UE support of dynamic power sharing for intra-FR NR DC between MCG and SCG cells of ~~same~~ frequency range 1 with long or short offset as specified in TS 38.213 [11]. The UE indicating the support of this also indicates the support of *intraFR-NR-DC-PwrSharingMode1-r16.* | BC | No | No | No |  **Conclusion** In this document, we discuss UE capability signaling impact due to the RAN4 LS [1] on p-NR-FR2. Given current status that RAN4 does not introduce the parameter P-NR-FR2 in Rel-16, an update to NR-DC UL power sharing capabilities is needed so that Ues can at least indicate support for a particular power sharing mode for FR1 only (i.e., applicable only to cells with FR1 UL in MCG and SCG) without indicating it as supported for FR2.  Considering that RAN2 is waiting for RAN1 input on this issue (per RAN2 discussion in RAN2#113b-e), we propose the following   * Agree on one of Option 1 or Option 2 (shown in section 2) to update the NR-DC power sharing UE capabilities by potentially also taking into account any RAN4 inputs received during RAN1#106e. * Send LS to RAN2 requesting corresponding updates to 38.306. |
| [3] | The status of the discussion from RAN1#105-e is as follows, as captured in the email discussion summary: **Updated FL proposal #1**  * **For FG18-1/1a/1b. add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1**   Though most companies seemed to be fine with the proposal above, a decision could not be reached in the meeting because RAN1 was waiting for a RAN4 LS that was on the imminence of being agreed. Unfortunately, RAN4 failed to send the LS in the end, though it is clear from the related RAN4 discussions that the pending issues are not directly impacting RAN1.  In our understanding, this proposal above is very well aligned with the current understanding from RAN4, which is reflected in an earlier LS [1]. In [1] it is clear that RAN4 does not intend to introduce power sharing mechanisms for FR2 in Rel-16, and hence it is not reasonable for RAN1 to redefine the FGs such that UE could indicate power sharing support in FR2. This would cause ASN.1 impacts for a feature that cannot be supported in Rel-16 in any case. Hence, we propose the following:  **Proposal: Confirm updated FL proposal#1 above, i.e.**   * **For FG18-1/1a/1b. add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1** |

At the RAN1#105-e meeting, this issue was discussed and RAN1 concluded to wait for RAN4 response [4]. Although RAN1/2 have not received RAN4 LS response on this issue yet, during the preparation phase email discussion, following comments are provided and it seems companies are ok to discuss this issue.

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| ZTE | We are ok to discuss this issue. |
| Nokia, NSB | We are ok to discuss the issue |
| OPPO | Support to discuss it. |
| Ericsson | OK to discuss this issue. |

Based on the above, following proposal can be discussed in RAN1#106-e meeting.

**FL proposal #1**

* **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**
  + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1**

Companies are encouraged to check above FL proposal and to provide feedback if any in below. If you cannot accept the FL proposal, please put your company name after “Cannot accept the proposals” below and please provide your alternative proposal (in your comment) which could be acceptable to all in your consideration.

Cannot accept the proposal:

|  |  |
| --- | --- |
| Company | Comment |
| CATT | We are OK with FL proposal #1 |
| Intel | We are in principle OK with FL proposal #1  Further, it would be better to explicitly clarify that intra-FR power sharing is not supported in FR2. Otherwise, the absence of capability signaling may mean the absent feature is mandatory. |
| Nokia, NSB | We support FL proposal. We are OK with Intel clarification as well. |
| ZTE | We are ok with the FL proposal#1. |
| Moderator (NTT DOCOMO) | Thank you very much for the feedbacks!  As suggested by Intel, we can update the note to clarify that intra-FR power sharing is not supported in FR2 in Rel-16. **Updated FL proposal #1**  * **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1, and the intra-FR power sharing in FR2 is not supported in Rel-16.** |

**Updated FL proposal #1**

* **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**
  + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1, and the intra-FR power sharing in FR2 is not supported in Rel-16.**

Companies are encouraged to check above FL proposal and to provide feedback if any in below. If you cannot accept the FL proposal, please put your company name after “Cannot accept the proposals” below and please provide your alternative proposal (in your comment) which could be acceptable to all in your consideration.

Cannot accept the proposal:

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| Company | Comment |
| Qualcomm | We are OK with the FL proposal #1 but not OK with the Updated FL proposal #1. The exact meaning of “intra-FR power-sharing” is unclear and intra-FR NR-DC power-control for FR2 is pending RAN4’s feedback. |
| Nokia, NSB | Qualcomm does have a point here, because this is not RAN1’s decision to make. Perhaps the best way would be to keep the original proposal 1 and add a note to the minutes saying that eventual support of intra-FR power sharing in FR2 is up to RAN4.  Our understanding is that in case RAN4 decides that this is supported it will then trigger a discussion on capability signalling for it, especially considering it is such a late decision. And such capability would be independent of FG18-1/1a/1b, as this would be a separate feature altogether. |
| Ericsson | We prefer original FL proposal #1. Regarding “and the intra-FR power sharing in FR2 is not supported in Rel-16**.**”, our view also is this should be handled after receiving RAN4 LS reply. If needed, a note may be added in the text of the LS to address point raised by Intel but we do not see strong need for it as the FR2 power sharing handling is expected to be clarified after conclusion of RAN4 discussion. |
| Moderator (NTT DOCOMO) | Thank you very much for the feedbacks!  Based on the feedbacks from Qualcomm, Nokia and Ericsson, the proposal is further updated as below.  The added note is just for RAN1 minutes, not to be captured in RAN1 UE features list and TS38.306 at this moment. If it is not necessary even for RAN1 minutes, we can delete it. **Updated FL proposal #1**  * **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1~~, and the intra-FR power sharing in FR2 is not supported in Rel-16~~.** * **Note: eventual support of intra-FR power sharing in FR2 is up to RAN4** |

**Updated FL proposal #1**

* **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**
  + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1.**
* **Note: eventual support of intra-FR power sharing in FR2 is up to RAN4**

Companies are encouraged to check above FL proposal and to provide feedback if any in below. If you cannot accept the FL proposal, please put your company name after “Cannot accept the proposals” below and please provide your alternative proposal (in your comment) which could be acceptable to all in your consideration.

Cannot accept the proposal:

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| Company | Comment |
| Intel | We are a bit confused by the note. In RAN4 LS to RAN2/1 in R1-2102303, it is explicitly informed that both p-UE-FR2 and P-NR-FR2 are not introduced in Rel-16. Our question is that, without p-UE-FR2 and P-NR-FR2, if there a way to support semi-static or dynamic power sharing between CGs for FR2 (as FG 18-1/1a/1b)?  From the other aspect, even if RAN4 find a new way to handle power control for FR2, which is different from semi-static or dynamic power sharing, it will not impact our current discussion on FG 18-1/1a/1b. |
| Qualcomm | It is true that RAN1 spec describes the behavior of semi-static and dynamic power sharing also for FR2. However, this is irrelevant from the capability signalling definition. In order to address your concern, how about the following?   * + **In case MCG and/or SCG have cells in different frequency ranges, this FG indicates the capability of ~~is applicable for~~ the power sharing only between those MCG and SCG cells with UL in FR1.** |
| Huawei, HiSilicon | We share similar concern with Intel that no support of intra-FR2 power sharing should be confirmed along with any change to the UE capability. Otherwise, the proposed change makes the feature of intra-FR2 power sharing be mandatory to a UE capable of NR-DC, or additional ASN.1 change is required now or in the future. Since the motivation of the proposal is to make ASN.1 stable as early as possible, a complete solution is needed. We feel the confirmation on on support of intra-FR2 power sharing for NR-DC is necessary. |
| Qualcomm | No. The text we are discussing is an additional explanation of FG18-1/1a/1b. With the main bullet, these FGs are only for FR1. It is quite unclear why we have to explain NR-DC power-sharing for FR2 in the rows for FG18-1/1a/1b that are only for FR1.  In addition, we do not understand the exact meaning of “no support of intra-FR2 power-sharing”. If we support NR-DC band combination that contains FR2 band(s) in MCG and the other FR2 band(s) in SCG, then power-control for those FR2 bands should be available. So far, we do not know yet how it can be done but it is premature to say “no support of intra-FR2 power-sharing”. |
| Nokia | First, I think RAN4 has already decided that intra-FR2 power sharing is not supported, so the question is just what do we do with the RAN1 spec that defines how that power sharing is supposed to work, and what do we do with the UE capability that allows indicating support for it.   * 1st alternative is along the lines of the Nokia draft CR in 7.2.10 to simply make the “not supported” statement in 38.213 power control section. * 2nd alternative is to make a “not supported” statement in the UE capability. Here the FL proposal version that had the “, and the intra-FR power sharing in FR2 is not supported in Rel-16.” Was one good way of achieving this * 3rd alternative is to have both 38.213 and the UE capabilities * 4th alternative is to do nothing, and everyone is just supposed to realize that intra FR2 power sharing cannot be supported as a piece of thread is missing in RAN4.   In this email thread we are discussing if at least the UE capability taking care of this is the way to go, and we’d be OK with the FL proposal that had the red text above. We could also decide not to have such a statemen in the UE capabilities but take care of the same in the 38.213 CR only while leaving the UE capability in place. In Nokia’s view, we should at least take care of this with the UE capability somehow, and preferably ALSO make sure that 38.213 somehow explains that the behaviour defined for FR2 power sharing is actually not supported.  On the question of what to expect from RAN2 ASN.1 in the future if the capability is finally introduced. Based on what I have seen in the past, I am guessing that RAN2 would not use Rel-16 UE capability signalling to indicate support of something the spec completed the definitions for in a later release, but a new capability would be added (personally I have always considered this a waste, but apparenty it makes it clear that at which spec version the feature actually is supposed to mean the new feature and where it is just something everyone is supposed to ignore) |
| Apple | We understand Fred’s concern that it seems a bit wired to add something for Feature A into Feature B description. On  the other hand, Yingyang point is valid considering the current situation for FR2-FR2 power sharing. Without this note, it can be interpreted by testing vendors that FR2-FR2 power sharing is mandated as there is no any UE capability defined for it and it is supported by spec context. Although where to add note is not perfect, it can clarify the situation and avoid confusion as explained above.  If Note is not acceptable, we may need to make the “not supported” statement in 38.213 power control section as 1st alternative at least for this release and even for future release until receiving RAN4 update.  Our preference is actually alt. 3 listed by Karri: note + statement in 38.213. We do not think Alt.4 is a way to go because it will create a lot of confusion and work for delegates in the future and you can expect a lot of questions/blames from your own product team on this.  In summary, the following is our preference order from high to low   * Alt.3: note + statement in TS 38.213 * Alt.1: statement in TS 38.213 * Alt.2: ue capability note. |
| Moderator (NTT DOCOMO) | Thank you very much for the discussion!  Based on the feedback so far, the original FL proposal (without red part) is enough for FG18-1/1a/1b while it is necessary to clarify about intra-FR power sharing in FR2 somewhere to avoid a confusion.  According to the preparation phase input from companies for Nokia’s CR for 38.213 to clarify it, can we clarify it in 38.213 (i.e., Alt.1) after receiving RAN4 feedback?  My suggestion for this email discussion is to agree on the original FG18-1/1a/1b or Qualcomm’s suggested version, and we can work for 38.213 CR after receiving RAN4 feedback.  **FL proposal #1**   * **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this capability is applicable for power sharing only between those MCG and SCG cells with UL in FR1**   or   * + **In case MCG and/or SCG have cells in different frequency ranges, this FG indicates the capability of the power sharing only between those MCG and SCG cells with UL in FR1.** |
| Nokia, NSB | We have the same order of preference as Apple. If the Alt3 with both note and statement is not possible, then we’d hope to get a clear spec statement to make things clear. If that is not acceptable, then we can live with a UE capability note.   * Alt.3: note + statement in TS 38.213 * Alt.1: statement in TS 38.213 * Alt.2: ue capability note. |
| Qualcomm | I have a couple of questions to understand the concerns better:   * RAN2 agreed that necessary parameters for NR-DC power-sharing modes in FR2 specified in TS38.213 7.6.2 are not used. Now for FG18-1/1a/1b, we are almost agreeing to say that the FGs indicates NR-DC power-sharing mode only for FR1.   + If RAN1 do nothing other than the above, what power-sharing mode is supposed to be mandated and how is it supposed to be configured? * RAN1 endorsed an LS to RAN4 (R1-2104018). It captures RAN1’s question on potential NR-DC power-control for FR2. Isn’t it sufficient information that RAN1 is pending the spec update? Just wondering why a statement is necessary in 213. * RAN4 has not yet defined any NR-DC band combination that includes MCG cell and SCG cell in FR2. Why should we hurry to address the issue in RAN1 spec?   + I think more problematic/urgent is inter-band NR-CA in FR2. Current 213 7.5 is dynamic power-sharing. * “NR-DC power-sharing is not supported for FR2” seems not accurate description. RAN4 spec allows some degree of power backoff for total power determination (i.e., P-MPR). Therefore, we should avoid to say not supported. |
| Apple | On current UE feature description, we can leave with current version without ’Note’ to make progress. We can separately discuss how to handle this problem by TS 38.213 CR in the future meeting. As I explained earlier, I share views that they are for FR2 and sort of irrelevant to the field description of FG 18-1/1a/1b here. On the other hand, I hope it is common understanding that current specification has some sort of hole for FR2 and we need to fix it by one of the following ways:   * Statement in TS 38.213. We can do it after receiving LS reply from RAN4. * If no CR can be agreed, we have to re-discuss in Hiroki-san session to introduce some new UE capabilities for FR2, similar as current FG 18-1/1a/1b to allow UE indicating it is not support for FR2, even it support FR1, i.e. differenatation of FR1 vs. FR2.   + Otherwise, without any UE capability, it can be interpreted that dynamic power sharing is mandated for FR2-FR2 DC according to the RAN1 specification TS 38.213.   + It maybe the case that also referably RAN2 specification together, we can conclude that dynamic power sharing is not supported for FR2-FR2 DC as mentioned by Fred-san. However, we should make RAN1 specification itself readable especially when the situation is very clear i.e. FR2-FR2 DC power sharing is not possible.   Regarding the accuracy of ‘NR-DC power-sharing is not supported for FR2’, I believe here ‘NR-DC power-sharing’ schemes specified in TS 38.213. Without the parameter of ‘p-NR-FR2’, the power sharing scheme in TS 38.213 of course is not supported. Regarding P-MRP, it is used for power management operation to meet regional emission requirement. It is defined per CC basis and not related to power sharing across CCs in NR-DC. Although some sort of coordination across CC maybe used in UE implementation as long as requirement is met, it is not really  tightly related to NR-DC power sharing support, which it causes by the absent of key parameter ‘p-NR-FR2’ based on RAN4 LS.  We are ok with current field description without note. Also hope it is common understanding that we need CR to fix 38.213. We can discuss CR context later in Karri session after receiving RAN4 LS reply.  In worse case (Hopefully not happen), we are allowed to bring new UE capabilities for FR2 if nothing can be agreed to fix TS 38.213. Is it ok, Hiroki-san? |
| Moderator (NTT DOCOMO) | Thank you very much for further discussion!  Based on the discussion, I believe that all companies are fine with following proposal itself, as it is common understanding that FG18-1/1a/1b are not related to concerned point (intra-FR power sharing in FR2 including that for inter-band CA in FR2).  **FL proposal #1**   * **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this FG indicates the capability of the power sharing only between those MCG and SCG cells with UL in FR1.**   So, again, the moderator’s suggestion is to agree on above for now.  As companies have different preferences/views on how to clarify about the support of “intra-FR power sharing in FR2 including that for inter-band CA in FR2” due to lack of RAN4 conclusion/response, I think we should wait for RAN4 conclusion/response.  Please provide your feedback/alternative suggestion if you cannot accept above moderator’s suggestion by 23:59 UTC on 23rd August. |

**Updated FL proposal #1**

* **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**
  + **In case MCG and/or SCG have cells in different frequency ranges, this FG indicates the capability of the power sharing only between those MCG and SCG cells with UL in FR1.**

Companies are encouraged to check above FL proposal and to provide feedback if any in below. If you cannot accept the FL proposal, please put your company name after “Cannot accept the proposals” below and please provide your alternative proposal (in your comment) which could be acceptable to all in your consideration.

Cannot accept the proposal:

|  |  |
| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | As commented before, similar views as Apple and Nokia, we are sorry but not OK with the proposal. The modification in the proposal is motivated by the issue of intra-FR2 power sharing, and it is clear that some changes to current spec including TS 38.213 is needed, therefore, we prefer a complete solution to resolve it and avoid unnecessary spec misalignments between TS 38.306 and TS 38.213. If any companies hesitate to make spec change for intra-FR2 power sharing until RAN4 reply, it would be OK to postpone this discussion. |
| Nokia, NSB | We’d be OK with the proposal, although we expect the following two points to be discussed further   * We still think there should be something in 38.213, either removing the FR2 power sharing altogether, or more referably just stating that the functionality is not supported in this release * The current note still implies that the different power sharing modes can be supported if all carriers in MCG and all carriers in SCG are on FR2. |
| CATT | We are OK with the proposal. If we would clarify in 38.213, we can add a note that   * Alt1: Power sharing applies to both UL cells in FR1 only * Alt2: Power sharing does not apply to an UL cell in FR1 and an UL cell in FR2 or both UL cells in FR2. |
| Ericsson2 | We are OK with the FL proposal. As discussed in our contribution, updates to capability signalling are needed to resolve the issue for FR1 part. We prefer to handle the FR2 part after receiving RAN4 LS reply. |
| Qualcomm | Just to be clear, we support the Updated FL proposal #1. We think it is necessary. Without the note on FG18-1/1a/1b, the capabilities for FG18-1/1a/1b are for both FR1 and FR2 altogether (i.e., ‘yes’ for FR1 means ‘yes’ for FR2), which is harmful.  It is possible to update RAN1 spec later when the RAN4 LS reply is received. However, for the capability signallings for FG18-1/1a/1b, it would be better to fix them for now. Not fixing FG18-1/1a/1b would negatively impact on FR1-FR1 NR-DC power-control. |
| Huawei | We understand the motivation for a fix of the UE capability . But as Intel commented, the current proposal has a side effect to mandate a UE to support the UE behavior specified in TS 38.213 for intra-FR2 power sharing. Since it is not acceptable for some companies to fix the TS 38.213 until a RAN4 reply, in this situation, we are sorry but we prefer to wait for RAN4’s reply before changing the UE capability. |
| Moderator (NTT DOCOMO) | Thank you very much for the discussion!  As the potential concern to agree on the FL proposal is only on the yellow highlighted part (the current proposal has a side effect to mandate a UE to support the UE behavior specified in TS 38.213 for intra-FR2 power sharing), maybe having an additional note in RAN1 chair note can address the concern?  **Updated FL proposal #1**   * **For FG18-1/1a/1b, add following note and ask RAN2 to modify the descriptions in TS38.306 accordingly**   + **In case MCG and/or SCG have cells in different frequency ranges, this FG indicates the capability of the power sharing only between those MCG and SCG cells with UL in FR1.** * **Note: above clarification for FG18-1/1a/1b does not mean that Rel-16 UEs are mandated to support power sharing mechanisms like FG18-1/1a/1b for FR2-FR2 DC.**   Different from previous proposed note, above note is just to avoid misinterpretation regarding mandatory support and does not affect/relate to RAN4 on-going discussion.  Although it may not be the best way, I think anyway we all have the same understanding on the situation/issue for FG18-1/1a/1b.  So, I hope we can solve the issue on FG18-1/1a/1b without mixing other issues. |
| Qualcomm | We are OK with the updated proposal.  In the current RAN1 spec, following are quite clear (explicitly written as such). With these understanding, we wonder what are supposed to be mandatory.   * Semi-static power-sharing modes use the RRC parameters *p-NR-FR2* for MCG and *p-NR-FR2* for SCG   + However, RAN2 decided not to use them in this version of specification. * Dynamic power-sharing mode works only if a UE is provided *dynamic* for *nrdc-PCmode-FR2* and indicates a capability to support dynamic power sharing for intra-FR NR DC.   + This means if the UE does not indicates the capability, dynamic power sharing is not operated.   If we do not agree the FL proposal, the FGs are considered as common for intra-FR1 and intra-FR2. Then, if the UE reports dynamic power-sharing capability for FR1 NR-DC, the UE is supposed to support the same power sharing for FR2 NR-DC. The risk of “power-sharing mandated for intra-FR2” does exist if the FL proposal is not agreed. |
| Apple | We agree that it is impossible to enable semi-static power sharing for FR2 at least based on current RAN2 ASN.1 structure as p-NR-FR2 is absent.  However, on the dynamic power sharing mode, if we adopted the proposal to limit the UE capability ’18-1b' to FR1, it means there is no UE capability to indicate whether supports DPS  for FR2.  That’s the reason why we need to fix it later in specification.  To make it clear, we are ok with what Hiroki-san proposed below to add ’Note’ in chairman note. |
| Huawei | We are sorry but not OK with the latest proposal. As Hong explained, a UE capability is needed in the spec to indicate FR2 intra-FR power sharing for NR-DC.           As a response to Fred question, if a UE report a BC with {FR1#1, FR2 CC#2, FR2 CC#3}, then the UE should report the concerned UE capability to indicate whether intra-FR2 power sharing is supported. If a UE capability signaling is missing in the spec, then the power sharing is always supported by the UE. |
| Moderator (NTT DOCOMO) | Thank you very much for the discussion.  Unfortunately we cannot reach consensus on the proposal in this meeting.  We can continue discussion on the issue in future meeting. |

1. Conclusion

There is no consensus on the proposal in RAN1#106-e meeting, and the proposal may be discussed in future meeting.

Reference

[1] R1-2106502 Discussion on positioning UE features Huawei, HiSilicon

[2] R1-2107997 Update to NR-DC Power sharing UE capabilities Ericsson

[3] R1-2108196 On Rel-16 UE Features Nokia, Nokia Shanghai Bell

[4] R1-2106158 Summary on [105-e-NR-UEFeature-MRDCCA-01] Moderator (NTT DOCOMO, INC.)

[5] R1-2108147 Removal of power sharing for FR2-FR2 dual connectivity from Rel-16 Nokia, Nokia Shanghai Bell

[6] 3GPP TR38.822 v16.0.0

[7] 3GPP TS38.306 v16.5.0