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

**Electronic, 20 April – 30 April 2020**

**Agenda Item: 6.20.1.1 Open / ongoing proposals**

**Source: CMCC**

**Title: Summary for EN-DC cell reselection issue**

**Document for: Discussion and decision**

# 1 Introduction

Agreements in RAN2#108 on EN-DC cell reselection:

* We attempt to converge, based on Alt2, see CRs next meeting..

This paper is to collect companies’ views on EN-DC cell reselection based on the submitted contributions [1-10]

**[AT109bis-e][051][TEI16] EN-DC cell reselection (CMCC)**

Scope: Treat papers above on EN-DC cell reselection.

Wanted Outcome: Agreed solution, if possible Agreed-in-principle CR(s)

Deadline: April 28 0700 UTC

# 2 Companies’ views on the solution and CRs

10 contributions are submitted for this issue, as shown in the Reference [1-10]. Companies are invited to share views on the following questions to see if we can agree on the solutions or possible CRs.

The following CRs [2-4] are co-signed by 8 companies. May I check whether 36 series [2-4] CRs are agreeable?

1. [R2-2003491](../docs/R2-2003491.zip) 36.331 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo CR Rel-16 36.331 16.0.0 4229 1 B TEI16 R2-2002038
2. [R2-2003492](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003492.zip) 36.304 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo, OPPO CR Rel-16 36.304 16.0.0 0782 1 B TEI16 R2-2002037
3. [R2-2003493](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003493.zip) 36.306 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo, OPPO CR Rel-16 36.306 16.0.0 1755 - B TEI16

**Q1: Whether the above CRs [2-4] are agreeable?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| CMCC | Yes |  |
| Ericsson | Yes |  |
| OPPO | Yes |  |
| Huawei | Yes |  |
| Samsung | No | Before hastily agreeing on this, we first need to discuss which option is more preferable. See our comments in Q2. |
| SoftBank | Yes | It might be updated by outcome of this discussion (see our comments in Q2) |
| ZTE | Yes |  |
| Qualcomm | Yes |  |
| CATT | Yes |  |
| MediaTek | Yes, but | We support the alternative priority proposal. However, we think corresponding descriptions in 5.3.8.3 is needed. For example,  1> if the *RRCConnectionRelease* message includes the *altFreqPriorities*:  2> apply the alternative cell reselection priority information broadcast in the system information, when available;  Also, we may need to consider the validity (e.g. when to discard) of alternative priority, e.g., using a timer like t320, or discard when UE enters RRC\_CONNECTED. |
| LG | See comments | First we need to discuss which option is preferable. Additionally, as MediaTek mentioned, the CR needs to provide more clear validity of the alt-priority – regarding the case if UE performs cell reselection after receiving it from the source cell. We could introduce validity timer or validity area as which are used in early measurements. |

11 companies participated in this email discussion.

9/11 support CRs in R2-2003491, R2-2003492, R2-2003493 is agreeable.

MediaTek comments that the description for *altFreqPriorities-r16* in 5.3.8.3 is needed. It seems companies are ok with that. This comment will be considered together with Q2. The description in 5.3.8.3 will be updated according to the agreements.

LG comments on the validity timer or area, which can be considered together with Q2.

Considering most of the comments are related with 36.331 CR, rapporteur assumes 36.304 CR (R2-2003492) and 36.306 CR (R2-2003493) can be agreed in principle. 36.331 CR will be updated according to the agreements.

This doesn’t prevent any change to the 304 or 306 CRs, if needed.

**(9/11)Proposal 1: 36.304 CR (R2-2003492) and 36.306 CR (R2-2003493) can be agreed in principle. 36.331 CR will be updated according to the agreements in this meeting.**

The main difference between CMCC’s 36.331 CR [2] and Samsung’s 36.331 CR [9] is as follows:

* Option 1: CMCC’s 36.331 CR in [2] utilizes 1 bit *altFreqPriorities-r16* in RRC Release message to indicate whether the UE shall apply the broadcasted alternative frequency priority or not.
* Option 2: Samsung’s 36.331 CR in [9] requires all the EN-DC capable UEs to apply EN-DC cell reselection priority (same meaning as alternative frequency priority).

**Q2: Which option do you prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comments** |
| CMCC | 1 | We would prefer the alternative priority can be flexible configured by the network. For example, network can configure the NSA only UE to apply alternative frequency priority, while let the NSA+SA UE still apply the legacy LTE frequency priority.  Considering lots of UEs will support both NSA and SA, by option 2, all the NSA only UEs and NSA+SA UEs will mandate to apply EN-DC priority, which is not preferable for load balancing point of view.  Therefore, we would prefer the UE camping is controlled by network side. |
| Ericsson | Option 1 | Same comments as CMCC. Option-1 gives more flexibility to the network implementation. |
| OPPO | Option 2 | If one UE enter idle mode and the RRCRelease message did include the indication mentioned by CMCC, e.g the last serving eNB does not support the EN-DC or R15 eNB. Then the UE perform cell reselection to cell where the cell supports the alternative priority. In this case, the UE will not apply the alternative priority due to no indication configured by the network. So, it seems the indication will delay to apply the alternative priority in some case.  It seems that the alternative priority has high priority than the normal frequency priority. But it is not clear which one has higher priority between alternative priority and dedicated priority, e.g. the dedicated priority configuration is received by the R14 eNB or inherit from another RAT. |
| Huawei | Option 1 | Agree with CMCC’s view. This provides flexibility for operators deployment. |
| Samsung | Option 2 | We understand Option 1 is the majority's preference but Option 1 and Option 2 are actually more or less the same, except that Option 1 gives more NW flexibility. But Option 2 is much simpler with quite marginal specification impact. If Option 1 is agreed, we think some further clarifications/ discussions are needed:   * **(Combination of *alterFreqPriorities-r16* and dedicated priorities with t*320*):** We think it is not allowed to configure both *alterFreqPriorities-r16* and dedicated priorities with *t320* in dedicated signalling i.e. only either a*lterFreqPriorities-r16* or dedicated priorities with *t320* is configured in RRCConnectionRelease message. * **(When to delete the configured *alterFreqPriorities-r16)*:** It is unclear to us when to delete configured *alterFreqPriorites-r16*. We need to discuss when to delete *alterFreqPriorities-r16* i.e. does the UE delete it the same as dedicated priority handling? For example, do we assume that the UE deletes *alterFreqPriorites-r16* provided by dedicated signalling when:   + the UE enters a different RRC state; or   + A PLMN selection is performed on request of NAS   Besides, we also need to discuss when the UE enters in Camped on Any cell state do we delete the configured *alterFreqPriorities-r16* or preserves it and applies it upon entering Camped Normally state?  Having said that, we think Option 2 is the right way to go at this late stage. If the majority's preference is Option 1, Option 1 can be acceptable to us if our above concerns are validated. |
| SoftBank | Option 1 | Same views with CMCC. It is preferable whether the network could indicate to use the alternative frequency priority or not.  For the priority handling raised by OPPO, we think the dedicated priority is always prioritized as it is covered by the current text in 36.304; “If priorities are provided in dedicated signalling, the UE shall ignore **all** the priorities provided in system information.”.  Other issues raised by Samsung, it is good to clarify to avoid unexpected UE behaviours and it would be captured somewhere, if needed.  Our views are as follows:  For 1) combination with dedicated priority and 2) delete timing of *alterFreqPriorites-r16*, we have the same assumptions with Samsung (i.e. not allowed to configure both in release message and delete *alterFreqPriorites-r16* the same as the dedicated priority).  For 3) camped on any cell state, we slightly prefer to preserve the *alterFreqPriorities-r16* and in this state the UE shall apply the legacy priorities rather than the alternative priority. When the UE finds the suitable cell, the UE can apply the alternative frequency priority if provided. |
| ZTE | Option 1 | After UE access the network and enter connected mode, network gets to know the characteristics of UE so that network can decide to enable additional reselection priority for some UE while others continue to follow the existing reselection priority. |
| Qualcomm | Option 1 | We also like the flexibility not to enable this all the time. However, it would be good to capture the validity of this indication to address Samsung concern. I was assuming it would be treated just like dedicated priorities. |
| CATT | Option 1 | Option1 provides more flexibility for operators deployment |
| MediaTek | Option 1 | The two options are almost the same, and we prefer to have more flexibility. |
| LG | Option 2 | We do not understand why per-UE configuration is needed. Why some of EN-DC capable LTE UEs apply alternative frequency priority but others do not? However, if we introduce the explicit indication in RRCRelease, the UE behavior should be clarified.  Our understanding to the reason why per-UE indication is needed is that each EN-DC capable cell may have different understanding to an EN-DC capable LTE UE. It means, when the alt-priority is provided and UE reselects to another EN-DC capable cell, the new cell may not want the UE to use the alt-priority. However, current CR from CMCC does not support this scenario. To handle this scenario, we could introduce such as validity area – the UE does not apply the alternative frequency priority while camping on a cell which is not included in the validity area.  CMCC: Maybe I didn’t fully understand, but I thought you are mentioning a new scenario. We clarify the scenario in our answer to Q2. |

8/11 companies support Option 1.

3/11 companies support Option 2.

Consider majority companies support option 1, email rapporteur suggest we go with option 1. And we address companies’ comments based on option 1.

**(8/11)Proposal 2: 1 bit *altFreqPriorities-r16* in RRC Release message to indicate whether the UE shall apply the broadcasted alternative frequency priority or not.**

There are also some further details need to be settled.

OPPO, Softbank, Samsung and Qualcomm comments on the relation between *altFreqPriorities-r16* and dedicated priority. Softbank and Samsung propose that *altFreqPriorities-r16* and dedicated priority should not be configured together in release message. Since no other companies share views and it looks simple and straightforward. Rapporteur suggest we go this way.

**Proposal 3: *altFreqPriorities-r16* and dedicated priority should not be configured together in release message.**

Softbank, Samsung and Qualcomm also suggest to define the validity of *altFreqPriorities-r16* indication. Softbank recommends that the configuration and delete mechanism for *altFreqPriorities-r16* is the same as dedicated priority. That is to say, *altFreqPriorities-r16* reuses T320, and *altFreqPriorities-r16* will be deleted each time UE goes to RRC\_ Connected mode, same as dedicated priority. If T320 is not configured, *altFreqPriorities-r16* will also be deleted upon UE goes to RRC\_Connected mode. By this means, there will not be any override issues. Rapporteur suggest we can try to agree on this proposal.

**Proposal 4: The configuration and delete mechanism for *altFreqPriorities-r16* is the same as dedicated priority, i.e.*****altFreqPriorities-r16* can be configured together with T320, and will be deleted when timer expired or UE goes to RRC\_Connected mode.**

Softbank and Samsung mentioned the UE behaviour for *camped on any cell* state. As recommended by Softbank, the legacy principle for dedicated priority can be reused, i.e. preserve the *alterFreqPriorities-r16* and in this state the UE shall apply the legacy priorities rather than the alternative priority, and applies it upon entering Camped Normally state.

**Proposal 5: For *camped on any cell* state, the legacy principle** **for dedicated priority can be reused, i.e. preserve the *alterFreqPriorities-r16* and in this state the UE shall apply the legacy priorities provided in system information rather than the alternative priority, and applies it upon entering Camped Normally state.**

**Proposal 6: An email discussion after the meeting is suggested to be kicked off to finalization the open points if any, and agree-in-principle the updated CRs.**

During online and offline discussion, it has been proposed to apply the alternative frequency priority not only for NSA case, but also to extend to SA case.

For example, in some deployment [1], an operator could use them for separating EN-DC UEs and non EN-DC UEs by allowing the EN-DC UEs to access the alternate priorities. But in some other scenarios, the framework could be used for separating NR-DC capable UEs and those that do not. So, the reason for creating this flexible framework as to allow for other deployments to take advantage of this framework as well. From the UE perspective, it is blind as to why the network has configured alt priorities through RRC Release message (EN-DC related or NR-DC related or something else).

**Q3: Do you agree to extend the framework to SA case, see CRs in [5-7]?**

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| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| CMCC | Yes |  |
| Ericsson | Yes | In our understanding, the framework designed for the NSA related changes is a generic framework. We believe the same framework can be used for SA as well. |
| OPPO | Yes |  |
| Huawei | No | We do not see enough motivation for NR-DC. We assume NR-DC is one option within a single RAT, and this does not necessarily deserve an alternative set of priorities. This part has not been discussed before and we think we should focus on EN-DC part only. |
| Samsung | Yes (some comments) | We agree with the intention but we prefer to extend it affecting EN-DC part only with Option 2. |
| SoftBank | Yes | It is useful to apply a generic framework for both NSA and SA. |
| ZTE | No | Agree with Huawei that having additional reselection priority for NR-DC seems to be a new proposal which has not been discussed and decided.  We do not see strong motivation to support additional reselection priorities for NR-DC and would like to ask for more clarifications on the potential use cases. |
| Qualcomm | Yes | The same reasoning for this in original CMCC paper is applicable to NR-DC as well. |
| CATT | No | Agree with Huawei and ZTE  Additional reselection priority for NR-DC seems to be a new proposal which has not been discussed and decided. |
| MediaTek | Yes, but | If we introduce alternative priority for EN-DC but not NR-DC, similar proposal will appear again for NR-DC unless we find a good reason to block it in NR-DC. However,  - We should work on EN-DC part first  - We need to clarify the UE behavior when *altFreqPriorities* and inter-RAT redirection info (e.g. *RRCRelease* message includes *redirectedCarrierInfo* indicating redirection to *eutra*) are both configured. Or we simply don’t allow this. |
| LG | No | Purpose of the alternative frequency priority is to provide separate frequency priority for LTE only UEs and EN-DC capable LTE UEs. We do not see necessity to NR SA case. |

5/11 companies support to extend to SA case, while other companies not so positive on that and suggest we should focus on EN-DC first.

Considering time limit, rapporteur suggest we can leave the SA case to further release.

**(6/11)Proposal 7: SA case can be left to further release.**

# Reference

1. [R2-2003490](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003490.zip) Further consideration on EN-DC cell reselection CMCC,SoftBank, Ericsson, Huawei, ZTE, CATT, vivo, OPPO, Xiaomi discussion Rel-16
2. [R2-2003491](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003491.zip) 36.331 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo CR Rel-16 36.331 16.0.0 4229 1 B TEI16 R2-2002038
3. [R2-2003492](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003492.zip) 36.304 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo, OPPO CR Rel-16 36.304 16.0.0 0782 1 B TEI16 R2-2002037
4. [R2-2003493](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003493.zip) 36.306 CR to introduce alternative cell reselection priority for EN-DC CMCC, SoftBank, Ericsson, Huawei, ZTE, CATT, vivo, OPPO CR Rel-16 36.306 16.0.0 1755 - B TEI16
5. [R2-2003494](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003494.zip) 38.331 CR to introduce alternative cell reselection priority for SA CMCC, Ericsson, SoftBank, vivo CR Rel-16 38.331 16.0.0 1463 1 B TEI16 R2-2000915
6. [R2-2003495](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003495.zip) 38.304 CR to introduce alternative cell reselection priority for SA CMCC, Ericsson, SoftBank, vivo CR Rel-16 38.304 16.0.0 0146 1 B TEI16 R2-2000914
7. [R2-2003496](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003496.zip) 38.306 CR to introduce alternative cell reselection priority for SA CMCC, Ericsson, SoftBank, vivo CR Rel-16 38.306 16.0.0 0290 - B TEI16
8. [R2-2003724](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003724.zip) Further discussion on EN-DC cell reselection Samsung Electronics Co., Ltd discussion Rel-16 TEI16
9. [R2-2003733](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003733.zip) CR on separate cell reselection priority in EN-DC cell reselection in 36.331 Samsung Electronics Co., Ltd CR Rel-16 36.331 16.0.0 4284 - F TEI16
10. [R2-2003739](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003739.zip) CR on separate cell reselection priority in EN-DC cell reselection in 38.331 Samsung Electronics Co., Ltd CR Rel-16 38.331 16.0.0 1581 - F TEI16