**3GPP TSG-RAN WG2 Meeting #110-e** **R2-200xxxx R2-200**

**Electronic, 1 Jun – 11 Jun 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#109bis-e meeting on EN-DC cell reselection:

R2-2003492 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 R2-200203

**[051] Agreed in princple**

R2-2003493 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

**[051] Agreed in principle**

R2-2003491 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

**Email discussion to next meeting**

R2-2004237 Summary for EN-DC cell reselection issue CMCC

**[051] Noted**

Agreements Email [051]

* 1 bit *altFreqPriorities-r16* in RRC Release message to indicate whether the UE shall apply the broadcasted alternative frequency priority or not.
* *altFreqPriorities-r16* and dedicated priority should not be configured together in release message.
* The delete mechanism for *altFreqPriorities-r16* is the same as dedicated priority handling as in R15.
* 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.
* 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.
* We don’t address SA at this point in time. Assume SA can be left to further release.

This email discussion is to collect companies’ views on the open points and agreeable CRs. We suggest to separate the discussion into 2-phase. Phase 1 to collect views on open points, and Phase 2 to check agreeable CR.

**[Post109bis-e][051][TEI16] EN-DC cell reselection (CMCC)**

Scope: RRC CR   
Intended Outcome: agreeable CR

Phase 1: Share views on open points (deadline: 2020.5.13)

Phase 2: Agreeable CR (deadline: 2020.5.20)

# 2 Phase-1 Finalize open points

During the email discussion [AT109bis-e][051], 4 companies mentioned that a new timer can be introduced for the validity of *altFreqPriorities-r16*. And RAN2 agreed that the delete mechanism for altFreqPriorities-r16 is the same as dedicated priority handling as in R15.

Here t320 is provided for comparison.

t320 ENUMERATED {

min5, min10, min20, min30, min60, min120, min180,

spare1} OPTIONAL, -- Need OR

**Q1: Does companies agree that a new timer T3xx is introduced and can be configured together with *altFreqPriorities-r16*? If yes, what’s the value range?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Yes/No** | **Value range** | **Comments** |
| CMCC | Yes | Same range as t320 |  |
| SoftBank | Yes | Same range as t320 |  |
| MediaTek | Yes | Same range as t320 |  |
| Samsung | No |  | Since the UE shall *ignore* all the priorities provided in system information if priorities are provided in dedicated signalling, it makes sense to have the validity time of dedicated priorities (T320 timer) i.e. the UE can apply common priorities in broadcast signalling upon T320 expiry.  On the other hand, if the UE is configured with *alterFreqPriorities-r16*, the UE applies EN-DC common priorities if broadcast; otherwise the UE applies legacy common priorities. Since the only difference here is *which* common priorities will be applied depending on whether the cell broadcasts legacy common priorities and/ or EN-DC common priorities, there seems no real need/ benefit to configure *altFreqPriorities-r16* with any dedicated timer.  We also want to highlight that NW will configure either dedicated priorities or *altFreqPriorities-r16* in release message. So if the *altFreqPriorities-r16* can be configured with any dedicated timer, there seems no need for a different timer i.e. same field can be re-used considering that proponents indicate its same value range. |
| vivo |  | Not sure | If we have new timer Txx, do we need *altFreqPriorities-r16 at all?* The new timer can implicitly means *altFreqPriorities-r16.* |
| Huawei | Yes |  | We think to have a separate timer is a clean way to separate dedicated priorities and the alternative priorities. However we actually see some reason as Samsung commented, as this is an alternative common priority, if the value range is exactly the same as t320, this sounds not so practical as common priorities are regarded as cell specific and should not be changed so frequently. We think we can have larger granularity and adds like 60 min, 120 min, 180 min and some even larger number. |
| Ericsson | Yes | Same value range works fine but if companies believe there is a need to have more granular values, we are open to such discussion | We share some sympathy with Samsung’s comments. However, having a new timer is cleaner approach and from a UE perspective only one timer will be running. So, it will not be any overhead. It makes the specification reading easier where each timer is used for a specific purpose. |
| OPPO | No |  | If we configure the new timer just for *altFreqPriorities-r16* configuration, it seems the *altFreqPriorities-r16* IE is not necessary. We agree that *altFreqPriorities-r16* IE will not be configured with dedicated frequency priority together, I think *altFreqPriorities-r16* IE can be configured in *CellReselectionPriorities* IE and reuse the T320.  CellReselectionPriorities ::= SEQUENCE {  freqPriorityListEUTRA FreqPriorityListEUTRA OPTIONAL, -- Need M  freqPriorityListNR FreqPriorityListNR OPTIONAL, -- Need M  t320 ENUMERATED {min5, min10, min20, min30, min60, min120, min180, spare1} OPTIONAL, -- Need R  ...  } |

Next question we need to discuss is when to start/stop the timer. According to the agreements, I provide the corresponding Start/Stop/AtExpiry behaviour for T3xx. The change is made in red font. T320 is copied here for comparison.

Add a new timer for chapter 7.3 Timers:

|  |  |  |  |
| --- | --- | --- | --- |
| Timer | Start | Stop | At expiry |
| T320 | Upon receiving t320 or upon cell (re)selection to E-UTRA from another RAT with validity time configured for dedicated priorities (in which case the remaining validity time is applied). | Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT (in which case the timer is carried on to the other RAT) , or upon reception of RRCEarlyDataComplete or RRCConnectionRelease for UP-EDT | Discard the cell reselection priority information provided by dedicated signalling. |
| T3xx | Upon receiving *t3xx* or upon cell (re)selection to E-UTRA from another RAT with validity time configured for alternative broadcasted frequency priorities (in which case the remaining validity time is applied). | Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT (in which case the timer is carried on to the other RAT) , or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT | Discard the *altFreqPriorities* provided by dedicated signalling. And discard the alternative cell reselection priority information provided by broadcasted signalling. |

Add the following description in 5.3.8.3

1. if the *RRCConnectionRelease* message includes the *altFreqPriorities*:

2> apply the alternative cell reselection priority information broadcast in the system information, when available;

2> if the *t3xx* is included:

3> start timer T3xx, with the timer value set according to the value of *t3xx*;

In addition, the Start/Stop T3xx also needs to be added in 5.3.3.4, 5.3.8 and 5.3.12, where T320 also exists.

**Q2: Do you agree with the above added description in red font for Start/Stop/AtExpiry behaviour for 36.331CR?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes |  |
| SoftBank | No | As we agreed SA is not considered in Rel-16, a new timer is introduced for EUTRA only. Therefore, I’m not sure which timer is inherited from another RAT. Then, the related text should be removed for now.  Start:  Upon receiving *t3xx* ~~or upon cell (re)selection to E-UTRA from another RAT with validity time configured for alternative broadcasted frequency priorities (in which case the remaining validity time is applied)~~.  Stop:  Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT ~~(in which case the timer is carried on to the other RAT)~~ , or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT.  For at expiry, it is not needed to discard the alternative cell reselection priority to avoid SIB re-reading.  Discard the *altFreqPriorities* provided by dedicated signalling. ~~And discard the alternative cell reselection priority information provided by broadcasted signalling.~~ |
| MediaTek | See Comment | Yes on the proposed change for 5.3.8.3.  For the change in timer table (chapter 7.3), we agree the further changes suggested by SoftBank except for the expiry part. We think that it is OK to discard the stored alternative cell reselection priority since it is useless now. And this does not imply that the UE shall re-read the SIB.  So the “*And discard alternative cell reselection...“* sentence, could be kept. |
| Samsung | See comments | It depends on the outcome of Q1 i.e. whether any dedicated timer can be configured with *altFreqPriorities-r16* or not. Regardless of whether any dedicated timer is configured with *altFreqProrities-r16* or not, we are fine to delete the *altFreqProrities-r16* in the added description for Stop behaviour except inherit case i.e. we agree with Softbank’s comments.  Also, RAN2 agreed that *altFreqPriorities-r16* and dedicated priority should not be configured together in release message, one example is as follows:   1. if the *RRCConnectionRelease* message includes the *idleModeMobilityControlInfo*:   2> store the cell reselection priority information provided by the *idleModeMobilityControlInfo*;  2> if the *t320* is included:  3> start timer T320, with the timer value set according to the value of *t320*;   1. else if the *RRCConnectionRelease* message includes the *altFreqPriorities*:   2> store the received *alterFreqPriorities*;  …   1. else:   2> apply the cell reselection priority information broadcast in the system information; |
| vivo | See the comments | Further discussion is needed. We do not think that all can be inherited from T320. |
| Huawei | See comments | we think the timer should be stopped in the relevant procedural sections, however as this is a common priority we should not discard the corresponding priorities and *altFreqPriorities*. |
| Ericsson |  | One small comment on the change in the procedural text. We believe the proposed change is inserted at the following placeÖ  1> if the *RRCRelease* message includes the *cellReselectionPriorities*:  2> store the cell reselection priority information provided by the *cellReselectionPriorities*;  2> if the *t320* is included:  3> start timer T320, with the timer value set according to the value of *t320*;   1. else if the *RRCConnectionRelease* message includes the *altFreqPriorities*:   2> apply the alternative cell reselection priority information broadcast in the system information, when available;  2> if the *t3xx* is included:  3> start timer T3xx, with the timer value set according to the value of *t3xx*;  1> else:  2> apply the cell reselection priority information broadcast in the system information;  For the timer related informative text, we agree with Softbank’s comments. Regarding the timer expiry behaviour, we think that the UE can keep the alternative cell reselection priorities until the next cell reselection to avoid re-reading of the SIBs. As the UE might spend more time in this cell where it is currently camping, it is good if the UE continues to camp here as per alternative priorities. This increases the possibility to configure EN-DC if this UE performs state transition in this cell itself. However, the price to pay is that there might be successive cell reselections (with one second gap) at the next reselection instance wherein the first reselection is based on alternative priorities as stored by the UE and the next is based on normal priorities of the new cell. But as mentioned before, we believe there is a larger gain in keeping the alternative priorities at the timer expiry and until next state transition or reselection. |
| OPPO | See answer to Q1 | The timer is not necessary. |

Another question is what’s the UE behaviour if the new timer T3xx is not configured. If the above red font description is agreed. The UE behavior for T3xx will be the same as T320, i.e. the alternative priority will be valid until state transition. And add the following behavior description (red font) in 36.331 chapter 5.3.3.4/5.3.3.4a/5.3.3.4b Reception of the *RRCConnectionSetup/RRCConnectionResume/RRCEarlyDataComplete* by the UE.

1> if stored, discard the cell reselection priority information provided by the *idleModeMobilityControlInfo* or inherited from another RAT;

1> if stored, discard the *altFreqPriorities* provided by the *RRCConnectionRelease* and discard the alternative cell reselection priority information;

**Q3: Do you agree that if T3xx is not configured, the alternative priority will be valid until UE state transition? And do you agree with the above description for 36.331CR in red font?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| CMCC | Yes |  |
| SoftBank | No | See Q2, it is not needed to discard the alternative cell reselection priority to avoid SIB re-reading.  1> if stored, discard the *altFreqPriorities* provided by the *RRCConnectionRelease* ~~and discard the alternative cell reselection priority information~~; |
| MediaTek | Yes | See comment in Q2, we think the sentence on discard the alternative priority is OK. However, if majorities prefer to delete it, it is also acceptable to us. |
| Samsung | See comments | Agree with Softbank i.e. the UE does not need to store the alternative cell reselection priority information broadcast in the system information. |
| vivo | See the comments | Further discussion is needed. We do not think that all can be inherited from T320. |
| Huawei |  | We do not have strong view here, either way is OK for us. |
| Ericsson |  | Agree with the first part, second part can be rmoved for reasons as explained in Q2. |
| OPPO | See answer to Q1 | The timer handling is same as current T320. |

1 company commented that valid area can be applied for *altFreqPriorities-r16*, i.e. the UE does not apply the alternative frequency priority while camping on a cell which is not included in the validity area.

**Q4: Do we need to introduce valid area for *altFreqPriorities-r16*?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| CMCC | No | We don’t see the need to introduce valid area for *altFreqPriorities*.  Any LTE cell can broadcast the alternative priorities. And the UEs (which are EN-DC capable Ues) that is configured with *altFreqPriorities* are always intended to camp on the EN-DC frequencies, if there is EN-DC coverage.  To be honest, it would be really hard for operators to configure a sufficient EN-DC cell PCI list inside the valid area list, if we assume the valid area works similar as R16 Idle Mode Measurement.  So we prefer not to have it. |
| SoftBank | No | Agree with CMCC |
| MediaTek | No |  |
| Samsung | No | Agree with CMCC i.e. frequency-granularity seems sufficient. So we prefer to avoid further optimization at this late stage. |
| Vivo |  | Can be further discussed. |
| Huawei | No | Agree with CMCC. |
| Ericsson | No | Agree with CMCC |
| OPPO | No | Can not see the necessary. |

One more question is how to reflect the agreement “altFreqPriorities-r16 and dedicated priority should not be configured together in release message” in the spec. Do we need to capture a note in 36.331?

**Q5: How to reflect the agreement “altFreqPriorities-r16 and dedicated priority should not be configured together in release message” in the spec?** **Do we need to capture a note in 36.331?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| SoftBank | No strong opinion. It may be useful to capture it e.g. in field descriptions. |
| MediaTek | We could simply mention in the field description of *altFreqPriorities-r16*, saying that “This field is not configured together with *idleModeMobilityControlInfo*” |
| Samsung | We would add constraint on network for the contents of the Release message. I.e. normally we specify something like 'Network does not signal a and b together. So, field description is fine. |
| vivo | Agree with Samsung. |
| Huawei | Agree with previous comments. We can clarify in the corresponding fields. |
| Ericsson | We can provide it in field description and also the procedural text as indicated by us in Q1 should also handle it indirectly. |
| OPPO | Capture this point in field description of freqPriorityListEUTRA/ freqPriorityListNR.  If endorse the OPPO’s suggestion in Q1, it is easy to capture it in field description.  CellReselectionPriorities ::= SEQUENCE {  freqPriorityListEUTRA FreqPriorityListEUTRA OPTIONAL, -- Need M  freqPriorityListNR FreqPriorityListNR OPTIONAL, -- Need M  t320 ENUMERATED {min5, min10, min20, min30, min60, min120, min180, spare1} OPTIONAL, -- Need R  ...  } |

In case any other important open point is missing, please provide it here.

**Q6: Is there any other open points we need to discuss, before check the 36.331 CR?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Open Points & Comments** | **Comments from other companies** |
| MediaTek | We think there should be a capability bit define for this feature. |  |
| OPPO | I wonder if the dedicated priority is inherited form NR or the dedicated priority are configured in a non EN-DC cell or R15 LTE Cell, how to make the UE to use the *altFreqPriorities-r16* timely? |  |
|  |  |  |
|  |  |  |

# 3 Phase-2 Check the Agreeable CR

The updated draft 36.331CR will be provided in the same folder ASAP.

If update for 36.304 CR is needed, it will also be provided to the folder for check.

Companies are welcome to provide comments directly inside the draft CRs. If the issue need further discussion, it can be discussed here.

# 4 Summary

# 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
11. R2-2004237 Summary for EN-DC cell reselection issue CMCC