**3GPP TSG-RAN WG2 Meeting #114e R2-21xx**

**Electronic, 19 – 27 May 2021**

**Agenda item: 6.1.4.4**

**Source: Qualcomm Incorporated**

**Title: [AT114-e][024][NR16] Idle Inactive (QC)**

**Document for: Discussion and decision**

# Introduction

RAN2 Chair decided to use the following offline to treat the Rel-16 corrections for Idle and Inactive procedures.

* [AT114-e][024][NR16] Idle Inactive (QC)

Scope: Treat R2-2105651, R2-2106275, R2-2106291, R2-2106294, R2-2106421, R2-2106209, R2-2106210

Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

Intended outcome: Report and Agreed CRs.

Deadline: Schedule A

The list of the contributions submitted to the Agenda Item “6.1.4.4 Idle/inactive mode procedures” is as follows:

IFRI

[R2-2105651](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2105651.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2105651.zip) Clarification for IFRI handling Ericsson CR Rel-16 38.304 16.4.0 0207 - F NG\_RAN\_PRN-Core, NR\_unlic-Core

[R2-2106275](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106275.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106275.zip) Clarification of Cell Barring when SIB1 is missing Qualcomm Incorporated CR Rel-16 38.304 16.4.0 0210 - F NR\_newRAT-Core

[R2-2106291](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106291.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106291.zip) Correction of IFRI-related conditions LG Electronics, Samsung CR Rel-16 38.304 16.4.0 0211 - F NR\_newRAT-Core

[R2-2106294](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106294.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106294.zip) Discussion on IFRI-related condition LG Electronics, Samgsung discussion Rel-16

[R2-2106421](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106421.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106421.zip) Discussion on IFRI-related condition LG Electronics, Samsung discussion Rel-16 NR\_newRAT-Core

IAB

[R2-2106209](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106209.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106209.zip) Correction for TS38.304 on power class for cell selection of IAB Huawei, HiSilicon CR Rel-16 38.304 16.4.0 0209 - F NR\_IAB-Core

[R2-2106210](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106210.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106210.zip) Correction for TS36.304 on power class for cell selection of IAB Huawei, HiSilicon CR Rel-16 36.304 16.3.0 0828 - F NR\_IAB-Core

This document will capture feedback from companies on these contributions in order to determine agreeable CRs or parts.

|  |  |
| --- | --- |
| Company | Contact Name, Email |
| vivo | Zhangyanxia, yanxia.zhang@vivo.com |
| MediaTek | Felix Tsai (chun-fan.tsai@mediatek.com) |
| Ericsson | martin.van.der.zee@ericsson.com |
| ZTE | [gao.yuan66@zte.com.cn](mailto:gao.yuan66@zte.com.cn) |
| Intel | Sudeep.k.palat@intel.com |
| CATT | liangjing@catt.cn |
| Huawei, HiSilicon | tangxun@huawei.com |

# Discussion

**[R2-2105651](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2105651.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2105651.zip) Clarification for IFRI handling Ericsson CR**

The Reason for change is as follows:

For unlicensed spectrum, when the UE has considered the cell as barred because it is not equivalent to the selected PLMN of the UE, then the UE shall exclude the cell for 300 seconds.

The summary of changes is as follows:

"or the selected PLMN of the UE" is added to the paragraph where the UE for unlicensed spectrum excludes the barred cell for 300 seconds when it is not equivalent to the selected PLMN of the UE.

Rapporteur comment: The intention seems correct as the UE behavior for barring should be same for registered and selected PLMN. However, also see the CR in R2-2106421 by LG which solves this in a different way.

**Q1: Do you agree with the changes in the CR? If not, please provide comments/justification.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | Yes | In RAN2#109 meeting, RAN2 has agreed the following agreements:  - For the SNPN case, UE only follows the IFRI in MIB of a barred cell if the cell belongs to a SNPN which matches the registered SNPN of the UE. Otherwise the UE may select other cell in the same frequency  We think it is reasonable to capture the agreement in the spec correctly. |
| Nokia | Yes but prefer wording in R2-2106421 | This captures agreement correctly and current specification is bit unclear on this aspect. But we prefer R2-2106421 style. |
| Ericsson (proponents) | Yes, but | CRs [R2-2105651](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_114-e/Docs/R2-2105651.zip) and [R2-2106421](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_114-e/Docs/R2-2106421.zip) overlap and should be merged in our view. Please see [R2-2106421](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_114-e/Docs/R2-2106421.zip) for our suggestion how to merge. |
| ZTE | Yes | We agree with the intention and we understand it overlaps with R2-2106421. We are fine with either way. |
| Intel | Yes, with comments | Agree with the intention. But it is not clear to us why “registered SNPN or the selected SNPN” is also not included. |
| CATT | The intention is OK | This selected PLMN case should be described for unlicensed spectrum explicitly. |
| Huawei, HiSilicon | No | This CR treats the same issue as [R2-2106421](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106421.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106421.zip) & [R2-2106291](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106291.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106291.zip) under the discussion of Q3&4. We prefere the solution in [R2-2106421](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106421.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106421.zip)& [R2-2106291](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106291.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106291.zip) which propose a more proper way of change from our perspective. |

**Summary:**

**Proposal:**

**[R2-2106275](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106275.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106275.zip) Clarification of Cell Barring when SIB1 is missing Qualcomm CR**

The Reason for change is as follows:

In RRC specification, the UE actions for cell barring when MIB or SIB1 is missing is captured as follows:

1. if in RRC\_IDLE or in RRC\_INACTIVE or in RRC\_CONNECTED while T311 is running:

2> if the UE is unable to acquire the *MIB*:

3> consider the cell as barred in accordance with TS 38.304 [20]; and

3> perform barring as if *intraFreqReselection* is set to allowed;

2> else if the UE is unable to acquire the *SIB1*:

3> consider the cell as barred in accordance with TS 38.304 [20].

As it is seen in the above text, RRC refers to 38.304 for the barring action. For missing MIB case, this is explicitly captured in 38.304 5.3.1 as follows:

If the cell is to be treated as if the cell status is “barred” due to being unable to acquire the *MIB*:

- the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.

- the UE may select another cell on the same frequency if the selection criteria are fulfilled.

However, there is no similar text for SIB1 in Rel-16. There was a text previously for missing SIB1 in Rel-15, similar to the one found in 36.304 for E-UTRAN. Not having a procedural text for missing SIB1 in Rel-16 creates the confusion whether the UE should have a different action in Rel-16 compared to Rel-15.

We note that this procedure has seen several revisions in the past and, as mentioned, Rel-15 and Rel-16 specifications are different. In particular, the explicit procedural text for missing SIB1 in Rel-15 was removed by the CR in R2-2006437 for Rel-16. The motivation for this CR was to align the UE behavior when the cell is barred due to the barring indications in the MIB. However, this deletion also made it ambiguous what the UE should do when SIB1 is missing.

The summary of changes is as follows:

Add text that the cell is considered as barred when the UE is unable to acquire SIB1.

Rapporteur comment: We are the proponent. The issue came up due to the mismatch between Rel-15 and Rel-16 specifications and confusion in whether UE implementation should be different. It would also be good to get feedback, especially from the UE vendors, on their existing Rel-15/Rel-16 implementations. There should be uniform UE behavior for Rel-15 and Rel-16.

**Q2: Do you agree with the changes in the CR? If not, please provide comments/justification.**

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| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | Yes | We are fine to align the description of missing SIB1 in the TS 38.331 and TS 38.304. |
| MediaTek | Not sure | It seems already clear from 331 that the UE will bar a cell if SIB1 is missing. So, we are not sure this is needed. And why the change is apply to Rel-16 only while the intention is to align behavior for Rel-15 and Rel-16 UE ? |
| Nokia | OK (but not critical to have) | As explained by MTK this is rather clear in 38.331 already. But there is nothing wrong with the CR either so if people see need to clarify we are fine. |
| Ericsson | No | We do not think this clarification is needed.  In 38.331 is says to consider the cell as barred when the UE cannot acquire SIB1:  2> else if the UE is unable to acquire the SIB1:  3> consider the cell as barred in accordance with TS 38.304 [20].  And in 38.304 it is already explicitly captured how to handle a cell that is considered as barred:  When cell status "barred" is indicated or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  …  We do not see why it needs to be repeated in 38.304 that when UE cannot acquire SIB1 the UE should consider the cell as barred:  When the UE is unable to acquire the SIB1,  - The UE shall treat this cell as if cell status is "barred". |
| ZTE | Acceptable | Agree with MTK and Nokia that this is rather clear in 38.331 already. But change in this CR is also correct. If companies see the need to clarify, we are also fine. |
| Intel | No with comments | Firstly, the CR R2-2006437 that removed the text regarding SIB1 handling was a Cat A CR. The corresponding Cat F Rel-15 CR R2-2006437 has SIB1 handling text. It is not clear to us from the offline discussion 024 of R2-110e summary why there is a different text for Cat F and A.  In any case, the text is only about “may exclue the barred cell..” which is not the same as the change proposed in this CR. As mentioned by MediaTek, it is already clear that the cell is barred if SIB1 is missing from 331.  So we don’t think this CR is needed. But whether a fix is needed to introduce the text that was deleted from Rel-16 needs further discussion. |
| CATT | Yes |  |
| Huawei, HiSilicon | No | Related procedures in TS 38.331 is already clear, and we don’t see the necessity to duplicate the same description againin TS 38.304, as it does not have additional information. |

**Summary:**

**Proposal:**

**[R2-2106421](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106421.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106421.zip) Discussion on IFRI-related condition LG Electronics, Samsung Discussion**

The paper discusses the following text in 38.304:

|  |
| --- |
| -         If the field *intraFreqReselection* in *MIB* message is set to “not allowed”:    -    If the cell operates in licensed spectrum, or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or the selected PLMN of the UE, or if this cell belongs to the registered SNPN or the selected SNPN of the UE:  -     the UE shall not re-select a cell on the same frequency as the barred cell;  -     else:  -     the UE may select to another cell on the same frequency if reselection criteria are fulfilled.  -     The UE shall exclude the barred cell and, if the cell operates in licensed spectrum or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN, also the cells on the same frequency as a candidate for cell selection/reselection for 300 seconds. |

The observations and proposals are as follows:

* **Observation 0**: In the text on IFRI-handling in 38.304, same conditions are present in both yellow- and green-highlighted parts, except for the following:
* **Observation 1**: SNPN-related conditions are present in the yellow part but missing in the green part
* **Observation 2**: Selected PLMN-related condition is present in the yellow part but missing in the green part

Then, it is proposed:

**Proposal 1: To discuss if discrepancy of the conditions in the green- and yellow-highlighted parts is intentional or needs to be corrected.**

**Proposal 2: If the discrepancy needs to be eliminated, take the approach of removing redundancy to remove the root cause of the problem.**

Rapporteur comment: The missing parts for SNPN-related conditions and “selected PLMN” conditions are errors and should be corrected.

**Q3: Do you agree that there is a discrepancy in the existing texts for the handling of barring for PLMN vs SNPN and registered vs selected PLMN? If not, please provide comments/justification.**

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| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | Yes |  |
| Nokia | Yes | In fact we prefer this to R2- |
| Ericsson | Yes |  |
| ZTE | Yes |  |
| Intel | Yes |  |
| CATT | Yes |  |
| Huawei, HiSilicon | Yes | Share the intention. |

**Summary:**

**Proposal:**

**[R2-2106291](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106291.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106291.zip) Correction of IFRI-related conditions LG Electronics, Samsung CR**

The Reason for change is as follows:

The following is the text on IntraFreqReselection handling:

-         If the field *intraFreqReselection* in *MIB* message is set to “not allowed”:

-    If the cell operates in licensed spectrum, or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or the selected PLMN of the UE, or if this cell belongs to the registered SNPN or the selected SNPN of the UE:

-     the UE shall not re-select a cell on the same frequency as the barred cell;

-     else:

-     the UE may select to another cell on the same frequency if reselection criteria are fulfilled.

-     The UE shall exclude the barred cell and, if the cell operates in licensed spectrum or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN, also the cells on the same frequency as a candidate for cell selection/reselection for 300 seconds.

The yellow-highlighted part above is to specify the conditions for not reselecting intra-frequency neighbour cells on the same frequency as the barred cell. The green-highlighted part is to specify the conditions for excluding, from cell (re)selection candidates, intra-frequency neighbour cells on the same frequency as the barred cell for 300 seconds.

Then, the desired behaviors would be that if UE is refrained from reselecting any intra-frequency neighbor cells by the yellow-highlighted part, 300s barring should be applied to all those neighbour cells.

However, according to the current specification, for intra-frequency neighbor cells on the same frequency as the barred cell, there are some discrepancy of the conditions in the yellow- and green-highlighted part.

* SNPN-related conditions are present in the yellow part but missing in the green part
* Selected PLMN-related condition is present in the yellow part but missing in the green part

Due to the discrepancy, the 300s barring requirement does not apply to the cases orresponding to the missing conditions.

The summary of changes is as follows:

The text is reformulated such that 300s barring requirement is applied to intra-frequency neighbor cells, if UE is refrained from reselecting those cells.

Rapporteur comment:

This CR is intended to solve the error in the specification as discussed in the contribution above in R2-2106421. Another approach could have been not to remove the existing text but add to it (see Ericsson CR in R2-21005651). Either option should be fine.

**Q4: Do you agree with the changes in the CR? If not, please provide comments/justification.**

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| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | No | For the proposed change as follow, we are confused that what the “such cell(s)” refers to. Not sure if it means the other cells on the same frequency  If the field *intraFreqReselection* in *MIB* message is set to “not allowed”:    -    If the cell operates in licensed spectrum, or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or the selected PLMN of the UE, or if this cell belongs to the registered SNPN or the selected SNPN of the UE:  -     the UE shall not re-select a cell on the same frequency as the barred cell and treat such cell(s) as barred;  -     else:  -     the UE may select to another cell on the same frequency if reselection criteria are fulfilled.  -     The UE shall exclude the barred cell(s) as a candidate for cell selection/reselection for 300 seconds. |
| MediaTek | Agree |  |
| Ericsson | Partially | We agree with vivo that "such cell(s)" is ambiguous, and also not correct, i.e. in our understanding there is only a single cell to be considered as barred.  Anyways, we have the following suggestion:  - The UE shall exclude the barred cell and, if the cell operates in licensed spectrum or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or the selected PLMN of the UE or if this cell belongs to the registered SNPN or the selected SNPN of the UE, also the cells on the same frequency as a candidate for cell selection/reselection for 300 seconds.  PS: This sentence, which is not changed in the CR, does not have the correct style "B2":  - If the field intraFreqReselection in MIB message is set to "not allowed": |
| ZTE |  | We understand it overlaps with [R2-2105651](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2105651.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2105651.zip), we are fine with either way. |
| Intel | No | The original text was to not consider the other cells for cells selection/reselection for 300s. We don’t think we should change that to barred. |
| CATT | Agree | Can be merge with R2-2105651. |
| Huawei, HiSilicon | Yes | As commented in Q1, we prefer the change of this CR than that in Q1. |

**Summary:**

**Proposal:**

**[R2-2106209](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106209.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106209.zip) Correction for TS38.304 on power class for cell selection of IAB Huawei, HiSilicon CR**

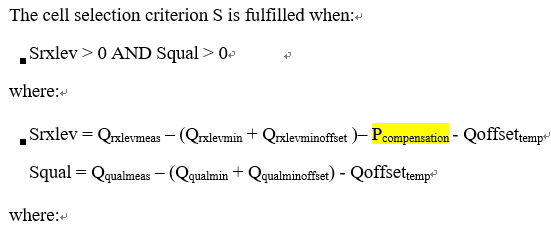
The Reason for change is as follows:

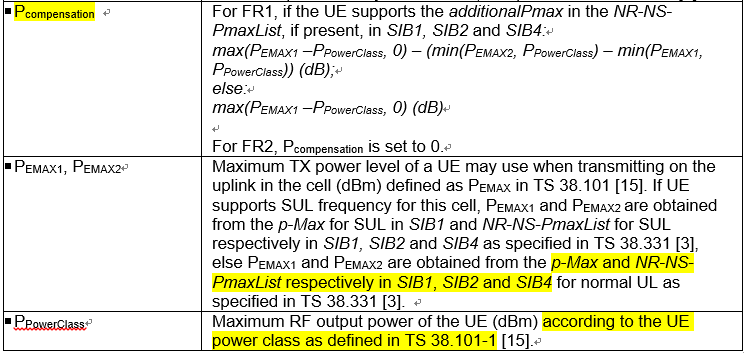
According to RAN4 LS (R2-2008444) on IAB-MT feature list in RAN2#111e meeting, the following agreements were feedback to RAN2:

1. Power class is not applicable to the IAB-MT.
2. The IAB-MT can ignore the advertised NS values to perform initial access, because the regulatory requirements imposed by the advertised NS values would be already known by the IAB-MT.
3. P-max is ignored by the IAB-MT.

Combined with the description in current TS 38.331, we can see that the IAB-MT ignores the P-max obtained through SIB2 and applies output power and emission requirements as specified in TS38.174. That means, both NS values and P-max used by the IAB-MT are not obtained through the received system information messages.

However, in current specification, the cell selection criterion are described as follows, and the above agreements are not reflected in these descriptions for IAB-MT.





Based on the above RAN4 LS, obtaining Pmax for IAB-MT is defined in the TS 38.174. Also, unlike UE, IAB-MT’s power class is not applicable to IAB-MT as capability reporting. So, option 1 is to clarify those in the description of TS 38.304, assuming there is still the Ppowerclass defined for IAB-MT.

As another alternative (option 2), for the IAB-MT cell selection, it may be possible to set the Pcompensation parameter set to 0 directly, so that all the descriptions related to the parameters of P-max, NS value and power class do not apply to IAB-MT. .

The summary of changes is as follows:

**Change Option 1**:

In section 2:

1. Add the protocol reference of TS 38.174.

In section 5.2.3.2:

1. Add “For IAB-MT, these parameters are as defined according to TS 38.174 [xy]” after the sentence of “else PEMAX1 and PEMAX2 are obtained from the *p-Max* and *NR-NS-PmaxList* respectively in *SIB1*, *SIB2* and *SIB4* for normal UL as specified in TS 38.331 [3]”.
2. Add the sentence of “For IAB-MT, this parameter is as defined according to TS 38.174 [xy]”.

**Change Option 2**:

In section 5.2.3.2:

1. Add the sentence of “For IAB-MT, Pcompensation is set to 0”.

Rapporteur comment: The two options do not seem to be equivalent. Option 1 can still give non-zero Pcompensation. Using Option 2, similar to FR2, can be simpler.

**Q5: Do you agree with the changes in the CR? If yes, which Option do you prefer? If not, please provide comments/justification.**

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| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | Option 1 | The intention of the CR is indeed correct. We think Option 1 is more reasonable, because even though the parameters can be obtained with prior knowledge, the Pcompensation derived by using the given equation is not necessarily equal to 0. |
| Nokia | Option 1 | We never know what type of handling will be done for IAB power handling later so it is more future proof just to refer to 38.174. But when checking 38.174 there does not seem to be so clear where the handling is defined. Maybe we should have more explicit reference to section and if possible parameter name in 38.174 (if different from 38.304). |
| Intel | Yes | Both changes are fine, slightly prefer option 2 as it’s more simpler. |
| Huawei, HiSilicon | yes | Both changes are fine. |
| ZTE | Option 2 | We prefer that Pcompensation is set to 0 for IAB-MT. In option 2, TS 38.174 is referred to calculate Pcompensation for IAB-MT. However, it is not clear how these parameters are actually defined for IAB-MT according to 38.174. So it is not appropriate to just refer to 38.174. In our understanding, IAB network is well-deployed network and there is no UL/DL imbalance issue thus Pcompensation could be simply set to 0 for IAB-MT. |
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**Summary:**

**Proposal:**

**[R2-2106210](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_114-e\\Docs\\R2-2106210.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_114-eDocsR2-2106210.zip) Correction for TS36.304 on power class for cell selection of IAB Huawei, HiSilicon CR**

Rapporteur comment: This CR is for 36.304 and has the same justification and options in the 38.304 version in R2-2106209. The conclusion of R2-2106209 should also be applicable to this CR.

**Q6: Do you agree with the changes in the CR? If yes, which Option do you prefer? If not, please provide comments/justification.**

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| --- | --- | --- |
| **Company** | **Response** | **Comments** |
| vivo | Same as Q5 | Same as Q5 |
| Nokia | see Q5 |  |
| Intel | Yes | Same as Q5. |
| Huawei, HiSilicon | Yes | Same as Q5. |
| ZTE | Same as Q5 | Same as Q5 |
|  |  |  |

**Summary:**

**Proposal:**

# Conclusion

This report captures the feedback from companies for the contributions submitted to Rel-16 corrections for Idle/Inactive mode procedures and proposes the following for conclusions: