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

Online, 24 February – 6 March 2020

**Agenda item: 4.1**

**Source: Huawei (offline email discussion rapporteur)**

**Title: Report of [AT109e][303][NBIOT R15] System support for Wake Up Signal (Huawei)**

**Document for: Report**

# 1 Scope of the offline email discussion

This document contains the summary of the offline email discussion “[AT109e][303][NBIOT R15] System support for Wake Up Signal (Huawei)”, as indicated below:

* [AT109e][303][NBIOT R15] System support for Wake Up Signal (Huawei)

Scope: Discuss and review the CRs

Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

Deadline: 06-03-2020, 12:00 CET

Timeline:

* + - Companies input: Wednesday, Mar 04th 12:00 CET
    - Rapporteur summary and updated CRs (if needed): Wednesday, Mar 04th 17:00 CET
    - Wording comment, if any, on updated CRs: Thursday, Mar 05th 12:00 CET
    - Final check, including shadow CR, e-mail discussion stops, Mar 06th 12:00 CET

# 2 Offline email discussion

[R2-2000809](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000809.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.300 F

Companies are requested to provide comments in the table below (one row for each new comment to better keep track of the discussion – please don’t edit the previous comments).

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree with the intent of the CR?** | **Detailed comments** |
| Qualcom | **Yes** | Think this CR should be checked by RAN3 before agreeing as it has impact on RAN3 specifications too. |
| Apple | **Yes** |  |
| Nokia | **Yes** |  |
| NTT DOCOMO, Inc. | **Yes** | SA2 asked both RAN2 and RAN3 to take the information in the LS In into account, so we have the same view as Qualcomm.  However, RAN3 is likely already aware of this, since there’s a 36.413 CR under “Other specs” in this CR (the CR number for the 36.413 CR is xxxx, though). We assume that on that 36.413 CR, R2-2000809 is properly referenced. |
| Thales | **Yes** | We agree on the principle, i.e. if UE’s last used cell ID is known and indicated in the S1-AP message from MME, the eNB shall use WUS only in said last used cell.  The absence of cell ID in the S1-AP message should occur in error case only, which is our interpretation of, information is included whenever the MME has this information available. As this leads to multi-cell WUS usage.  However, in the CR it should be clarified, that a UE re-selecting to another cell, camping, monitoring, etc can, after another re-selection to the “last used cell”, resume monitoring WUS only. But in case it restarts monitoring in the time between WUS and the paging occasion (PO) the UE needs to monitor said coming POs directly.  - The UE only monitors WUS in the cell where it was last released; unless it missed monitoring WUS and the UE needs to **monitor POs** untill start of next WUS or PTW ends, whichever is earlier. |
| Mediatek | **Yes** |  |
| Lenovo | **Yes** | Generally, we agree the intent of CR, but we think it should be discussed in RAN3. |
| ZTE | **TBD** | We think most of the changes in this 36.300 CR should be decided by RAN3. We also learn that RAN3 has not had clear agreements on this topic and may send LS back to SA2. Therefore, RAN2 can wait for RAN3 progress. |
| Ericsson | **No** | There are 2 different aspects to consider regarding this discussion. The first one is about reducing the impact on power consumption for stationary UEs due to WUS aiming to reach a mobile UE following a paging request from the MME to the eNB. This is something Vodafone brought up during the previous RAN2 meeting. In this context mobile means not camping in the same cell where the UE was last in connected mode.  The second aspect is something QC and DoCoMo brought up during the previous RAN2 meeting and earlier. This is about making MME aware whether a particular UE supports WUS. Here the motivation is to make sure that MME sends the paging request to the eNB early enough so that the occasion for sending WUS is not missed or MME adjusts its paging strategy accordingly to avoid any escalation etc. Note that this was discussed earlier in RAN2 and SA2 and the outcome was that there is no need to do anything, i.e. up to implementation. However, RAN2 decided to bring this up again during the previous meeting since there was support from some companies.  We agree with the intention regarding the first aspect which is motivated by reducing the impact on power consumption for stationary UEs as explained above.  Regarding the second aspect; we do not support this in principle as explained in RAN2 previously. We are aware that in SA2 a CR has been agreed recently, but there is impact in RAN3 and in RAN3 the discussion is ongoing since there has been no consensus yet. This has been reflected in an LS from RAN3 which was approved recently. Please see R2-2002251. We suggest RAN2 to wait until that discussion is concluded. |

Conclusion: TBC

Proposal: TBC

[R2-2000638](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000638.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.304 F

Companies are requested to provide comments in the table below (one row for each new comment to better keep track of the discussion – please don’t edit the previous comments).

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree with the intent of the CR?** | **Detailed comments** |
| Qualcomm | **Yes** | We think the wording in the CR should be changed to  The SA2 mechanism requires network to use WUS only in the cell where core network had S1 connection for the UE. This implies this is the last cell where UE was in NAS CONNECTED mode. Therefore we propose the following changes.  Cover sheet changes:  “Specify that the UE monitors WUS ~~camping~~ only when **camping** in the cell it was last connected to **core network**.  CR changes:  “When the UE supports WUS and is camping on the cell where it last left EMM-CONNECTED mode (see TS 24.301 [16]) (NOTE) and WUS configuration is provided in system information, the UE shall monitor WUS using the WUS parameters provided in System Information. When DRX is used and the UE detects WUS the UE shall monitor the following PO. When extended DRX is used and the UE detects WUS the UE shall monitor the following *numPOs* POs or until a paging message including the UE's NAS identity is received, whichever is earlier. If the UE does not detect WUS the UE is not required to monitor the following PO(s). If the UE missed a WUS occasion (e.g. due to cell reselection), it monitors every PO until the start of next WUS or until the PTW ends, whichever is earlier.  NOTE: UE may have beenin EMM-CONNECTED mode because of RRC connection establishment, RRC connenction resumption or EDT  ” |
| Apple | **Yes** | Should the Cover sheet change be rephrased as  “Specify that the UE monitors WUS ~~camping~~ only when **camping back** in the cell **where** it was last connected to **a** **core network**. |
| Nokia | **Yes** | Same as above. |
| NTT DOCOMO, Inc. | **Yes** | The SA2 CR (S2-2002119) uses the following wording:  “…the use of WUS by the UE is restricted (in this release) to the cell in which the UE’s RRC connection was last released.”  That seems to imply just RRC\_CONNECTED mode. Shouldn’t the RAN2 CR and the SA2 CR use similar wording? If so, we could just swap out EMM-CONNECTED for RRC\_CONNECTED in Qualcomm’s suggestion above.  Combining Qualcomm’s and Apple’s suggestions, we think that the following might be more readable on the cover sheet:  “Specify that the UE monitors WUS ~~camping~~ only when **camping** in the cell **where** it was last connected to **a** **core network**.  We also thought about whether or not the note from Qualcomm is necessary, and in the end it could be useful for clarification. Tidying it up a little bit as follows:  NOTE: UE may have been in RRC\_CONNECTED mode because of RRC connection establishment, RRC connection resumption or EDT. |
| Thales | **Yes** | Monitoring WUS only in last connected cell is fine, but when monitoring is restarted in the time between WUS and the paging occasion (PO) the UE needs to monitor said coming POs till next WUs or PTW ends..  Cover sheet changes:  “Specify that the UE **can** monitor WUS ~~camping~~ only, when **camping** in the cell **where** it was last connected to **a** **core network.**  In case of **camping back** on said cell, **in the time between WUS and the paging occasion (PO)** the UE needs to **monitor POs** untill start of next WUS or PTW ends, whichever is earlier. |
| Mediatek | **Yes** | We agree with the intention, but we have a double of words “last connected to a core network”.  If a RRC connecion establishment is failed because of UE didn’t sucessfully send RRCConnectionSetupComplete to eNB, UE only has a connection with eNB, and no any NAS signalling/data has exchanged with core network.  Can we call it a connection to a core network in this case? |
| Lenovo | **Yes** | The same veiw as Qualcomm’s. We prefer the words on “last connected to core network” |
| ZTE | **TBD** | We are fine with QC’s suggestion.  For Thales’s comments, we are not so sure whether we need to explicitly mention the case of camping back. Per our understanding, “*when* ***camping*** *in the cell…*” can cover both the case of never leaving or the case of camping back.  For NTT DOCOMO’s comment, we think it may be not so correct to say “*UE may have been in RRC\_CONNECTED mode because…EDT*”. So to say EMM-CONNECTED may be better.  Anyway, this 36.304 CR may also need to be pending or conditionally agreed only when this feature can be supported by RAN3. |
| Ericsson | **No** | Please see our comments above for the 36.300 CR. |

Conclusion: TBC

Proposal: TBC

# 3 Conclusions

**Conclusions:**

TBC

**Agreed CRs:**

TBC –agreed Rel-15 CRs and shadow Rel-16 CR (with Tdoc numbers).

# 4 List of referenced documents

[1] [R2-2000638](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000638.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.304 15.5.0 0779 - F NB\_IOTenh2-Core, LTE\_eMTC4-Core

[2] [R2-2000809](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000809.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.300 15.8.0 1264 - F NB\_IOTenh2-Core, LTE\_eMTC4-Core

[3] [R2-2000810](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000810.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.300 16.0.0 1265 - A NB\_IOTenh2-Core, LTE\_eMTC4-Core