LPWUS Comments file

Template:

# Xnnn

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| Xnnn |  |  |  |  |  |  | vnnn | ToDo |

**[Description]**:

**[Proposed Change]**:

**[Comments]**:

Instructions:

1. Copy the template RIL comments fields above (including the Heading Xnnn)
2. Paste the RIL comments fields at its position while **respecting the order of the RILs in the Review file (i.e. keep the order of the spec).**
3. Fill in the fields, see R19 ASN.1 Guideline.
4. Companies may comment whether they agree or disagree.
5. Can copy spec text and use Word “Track changes”, etc.
6. Do not delete text added by other companies.

# E007

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E007 | LPWUS | 2 | Move *lpwus-Config-r19* in *SpCellConfig* |  | Ericsson (Martin) |  | V002 | ToDo |

**[Description]**: LP-WUS is supported on PCell and/or PSCell and therefore *lpwus-Config-r19* should be put in *SpCellConfig*.

**[Proposed Change]**:

PhysicalCellGroupConfig ::= SEQUENCE {

…

[[

dcp-Config-r16 SetupRelease { DCP-Config-r16 } OPTIONAL, -- Need M

…

]] }

…

CellGroupConfig ::= SEQUENCE {

…

spCellConfig SpCellConfig OPTIONAL, -- Need M

…

}

-- Serving cell specific MAC and PHY parameters for a SpCell:

SpCellConfig ::= SEQUENCE {

…

]],

[[

lpwus-Config-r19 SetupRelease { LPWUS-Config-r19 } OPTIONAL -- Need M

]]

}

**[Comments]**: *dcp-Config-r16* should also have been put there.

# E008

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E008 | LPWUS | 1 | Restrictions to configure *s-SearchThresholdP5* and *P6*. |  | Ericsson (Martin) |  | V002 | ToDo |

**[Description]**: In case the NW does not configure Rel-19 RRM relaxation with LP-WUS, then the NW should be allowed to configure MR serving cell offloading in the complete LP-WUS coverage area. Currently it says: The network configures both *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*. See [R2-2505857](http://www.3gpp.org/ftp//tsg_ran/WG2_RL2/TSGR2_131/Docs//R2-2505857.zip) for more details.

**[Proposed Change]**:



|  |
| --- |
| ***s-SearchThresholdP, s-SearchThresholdP2, s-SearchThresholdP3, s-SearchThresholdP4, s-SearchThresholdP5, s-SearchThresholdP6***  Parameters "SSearchThresholdP", "SSearchThresholdP2", "SSearchThresholdP3", "SSearchThresholdP4", "SSearchThresholdP5", and "SSearchThresholdP6" in TS 38.304 [20]. The network configures *s-SearchThresholdP* and *s-SearchThresholdP2* to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*. If the network configures both RRM serving cell relaxation (*relaxedMeasurementForServingAndNeighboringCell*) and RRM serving cell offloading (*offloadMeasurementForServingCell*) then the network configures both *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*, if there is such configuration(s). The network configures *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-SearchThresholdP3* and *s-SearchThresholdP4*, respectively, if there is such configuration(s). |

**[Comments]**:

A screenshot of a computer

AI-generated content may be incorrect.

This is a critical issue, i.e. if the NW only configures RRM offloading without RRM relaxation, then the UE can only use LP-WUS when it is above SintraSearch. This means that the use of LP-WUS is (artificially) restricted to less than at least half of the cell. This is not acceptable and there is also no technical motivation for such restriction. The serving cell restrictions were introduced because similar restrictions were captured for Rel-16 RRM relaxation. However the Rel-16 RRM relaxation is only for **neighbour** cell measurements, and here we talk about **serving** cell measurements.

As a compromise we can agree to keep the restriction, but it is only applicable when both RRM serving cell offloading and relaxation are configured, see above.

# E009

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E009 | LPWUS | 1 | Empty UAI message for LP-WUS time offset (RRC-5, MAX-X3) |  | Ericsson (Martin) |  | V002 | ToDo |

**[Description]**: The legacy rules should apply for the preferred time offset signalled via UAI. This means that when *timeOffset-r19* is absent in *LPWUS-OffsetPreference-r19*, aka the UE sends an “empty” UAI message, that the UE does not have a preference for the LP-WUS time offset. PS: when the UE does not include *LPWUS-OffsetPreference-r19* this means that the previous signalled preferred LP-WUS time offset remains valid:

UEAssistanceInformation-v19xx-IEs ::= SEQUENCE {

lpwus-OffsetPreference-r19 LPWUS-OffsetPreference-r19 OPTIONAL,

nonCriticalExtension SEQUENCE {} OPTIONAL

}

LPWUS-OffsetPreference-r19 ::= SEQUENCE {

timeOffset-r19 ENUMERATED {ms5, ms13, ms37} OPTIONAL

}

**[Proposed Change]**: The brackets can be removed, i.e. when the UE does not have a preference for the LP-WUS time offset, then that is also considered a preference, and this preference can be different from an actual preferred LP-WUS time offset previously:

2> if the UE has a preference on time offset for LP-WUS monitoring of the cell group and the UE did not transmit a *UEAssistanceInformation* message with *lpwus-OffsetPreference* for the cell group since it was configured to provide its preference on time offset for LP-WUS monitoring of the cell group for power saving; or

**[Comments]**:

# H050

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H050 | LPWUS | 1 | UAI for disabling LP-WUS | R2-25xxxxx | Kuang Yiru (Huawei) |  | V003 | ToDo |

**[Description]**: The NW only knows the MR measurement results based on existing RRC measurement report. Sometimes even when the MR measurement result is good, the LR can be bad due to the weaker tolerance for adjacent-channel interference. To avoid the LP-WUS missing and data loss in this case, it is beneficial to assist network for proper configuration since the UE is aware of the situation of LR. The UE can inform the network to stop using LP-WUS, or indicate whether the LP-WUS can be used again. It was discussed and postponed in the last RAN2 meeting.

**[Proposed Change]**: UE can send UAI to the network indicating to disable the LP-WUS functionality or whether the LP-WUS can be enabled again. The field of “preference on disabling LP-WUS” is added in UE assistance information message, e.g., use BOOLEAN. If the UE has a preference for disabling LP-WUS, set the field to *true*; otherwise (UE does not have a preference for disabling LP-WUS anymore), set the field to *false*.

**[Comments]:**

# H051

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H051 | LPWUS | 1 | Need code for “lpss-OverlaidSeqRoot-r19” parameter | R2-25xxxxx | Kuang Yiru (Huawei) |  | V003 | ToDo |

**[Description]**: Based on the description for “OOK4-Only” conditional presence, the parameter “lpss-OverlaidSeqRoot-r19” is optional if M = 1. So, this needs to be Need R.

**[Proposed Change]**: Change to Need R for “lpss-OverlaidSeqRoot-r19” if M = 1.

**[Comments]:**

# H052

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H052 | LPWUS | 1 | Missing need code for “startSymbol2-r19” in “lpss-StartSymbol-r19” | R2-25xxxxx | Rama Kumar Mopidevi (Huawei) |  | V003 | ToDo |

**[Description]**: Need code missing for “startSymbol2-r19”.

**[Proposed Change]**: Add “Need R”.

**[Comments]:** if the startSymbol2-r19 is not present, the startSymbol2-r19 should be released.

# H053

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H053 | LPWUS | 1 | Impact on thresholds entry condition due to RAN4 definition on LR types | R2-25xxxxx | Rama Kumar Mopidevi (Huawei) |  | V003 | ToDo |

**[Description]**: RAN4 defined two LR types (i.e., Type 1 and Type 2) in RAN4#114bis and agreed two different requirements for these. Due to different requirements, the current thresholds for entry condition for LP-WUS monitoring and RRM measurement relaxation/serving cell measurement offloading should be extended to ensure that the NW can configure appropriate thresholds for different LR types.

**[Proposed Change]**: Create separate set of entry thresholds for each type of LR.

**[Comments]:**

# H054

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H054 | LPWUS | 1 | Impact on thresholds exit condition due to RAN4 definition on LR types | R2-25xxxxx | Rama Kumar Mopidevi (Huawei) |  | V003 | ToDo |

**[Description]**: For the same reason given to H053, the current thresholds for exit condition for LP-WUS monitoring and RRM measurement relaxation/serving cell measurement offloading should be extended to ensure that the NW can configure appropriate thresholds for different LR types.

**[Proposed Change]**: Create separate set of exit thresholds for each type of LR.

**[Comments]:**

# H055

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H055 | LPWUS | 1 | Replace “option 1-1” and “option 1-2” terminology with description | R2-25xxxxx | Kuang Yiru (Huawei) |  | V003 | ToDo |

**[Description]**: It’s not clear what option 1-1 and option 1-2 mean in RRC spec. These are already removed from MAC CR. Better to replace them with description.

**[Proposed Change]**:

Describe option 1-1 as “LP-WUS operation in CONNECTED without lpwus-PDCCH-MonitoringTimer configured” and option 1-2 as “LP-WUS operation in CONNECTED with lpwus-PDCCH-MonitoringTimer configured”

There are a few places in the spec where this needs to be changed. If RAN2 agrees to remove this, RAN1 spec(s) need to do the same thing.

**[Comments]:**

# C026

|  |  |  |  |  |  |  |  |  |
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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C026 | NES, LPWUS | 2 | Co-existence of LP-WUS in idle/inactive and paging adaptation | R2-25xxxxx | Da Wang (CATT) |  | V004 | ToDo |

**[Description]**: It is not clear whether LP-WUS in idle/inactive can be co-exist with Rel-19 paging adaptation mechanism in NES.

**[Proposed Change]**: R2 discuss whether and how LP-WUS in idle/inactive can be co-exist with Rel-19 paging adaptation mechanism in NES.

**[Comments]**:

V000

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V000 | LPWUS | 1 | lpwus-OffsetPreferenceConfig should be captured as per cell group configuration |  | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: As *lpwus-OffsetPreferenceConfig* is configured per CG and the offset preference is reported per CG, while the current specification didn’t reflect it in several places.

**[Proposed Change]**: The corresponding clarification in 5.3.5.9, 5.3.5.10, 5.3.7.2, 5.3.7.3, 5.3.13.2 should be added.

**[Comments]**:

V001

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V001 | LPWUS | 1 | Empty UAI on offset for LP-WUS monitoring (RRC-5) | R2-25xxx | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: **]**: We don’t have the conclusion on the open issue [RRC-5], i.e. whether empty UAI on offset for LP-WUS monitoring is allowed. The legacy rules should apply for the preferred time offset signalled via UAI, similar as *DRX-Preference*.

**[Proposed Change]**: In section 5.7.4.3, add the scenario that when UE initiates the *UEAssistanceInformation* message and UE has no preference on offset for LP-WUS monitoring of the cell group, the UE doesn’t include offset as follows:

1> if transmission of the *UEAssistanceInformation* message is initiated to provide *lpwus-OffsetPreference* of a cell group according to 5.7.4.2 or 5.3.5.3:

2> include *lpwus-OffsetPreference* in the *UEAssistanceInformation* message;

2> if the UE has a preference on time offset for LP-WUS monitoring:

3> set the *timeOffset* to the preferred offset value.

2> else (if the UE has no preference on offset for LP-WUS monitoring of the cell group):

3> do not include *offset* in the *Offset-Preference* IE;

**[Comments]**:

V002

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V002 | LPWUS | 1 | The relationship on MR based entry conditions between RRM relaxation and LP-WUS monitoring | R2-25xxx | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: The MR-based threshold for RRM relaxation condition should be lower than or equal to the threshold of entry condition for LP-WUS monitoring. Otherwise, there is no power saving gain for LP-WUS monitoring.

**[Proposed Change]**: This restriction should be captured in the field description of RRM relaxation condition as below:

|  |
| --- |
| ***s-SearchThresholdP, s-SearchThresholdP2, s-SearchThresholdP3, s-SearchThresholdP4, s-SearchThresholdP5, s-SearchThresholdP6***  Parameters "SSearchThresholdP", "SSearchThresholdP2", "SSearchThresholdP3", "SSearchThresholdP4", "SSearchThresholdP5", and "SSearchThresholdP6" in TS 38.304 [20]. The network configures *s-SearchThresholdP* and *s-SearchThresholdP2* to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*. The network configures both *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*, if there is such configuration(s). [RIL]: E008 LPWUS The network configures *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-SearchThresholdP3* and *s-SearchThresholdP4*, respectively, if there is such configuration(s). The network configures *s-SearchThresholdP3* and *s-SearchThresholdP4* to be smaller than or equal to *thresholdP2* and *thresholdP1*, respectively, if there is such configuration(s). |
| ***s-SearchThresholdQ, s-SearchThresholdQ2, s-SearchThresholdQ3, s-SearchThresholdQ4, s-SearchThresholdQ5, s-SearchThresholdQ6***  Parameters "SSearchThresholdQ" "SSearchThresholdQ2", "SSearchThresholdQ3", "SSearchThresholdQ4", "SSearchThresholdQ5", and "SSearchThresholdQ6" in TS 38.304 [20]. The network configures *s-SearchThresholdQ* and *s-SearchThresholdQ2* to be less than or equal to *s-IntraSearchQ* and *s-NonIntraSearchQ*. The network configures both *s-SearchThresholdQ5* and *s-SearchThresholdQ6* to be larger than or equal to *s-IntraSearchQ* and *s-NonIntraSearchQ*, if there is such configuration(s). The network configures *s-SearchThresholdQ5* and *s-SearchThresholdQ6* to be larger than or equal to *s-SearchThresholdQ3* and *s-SearchThresholdQ4*, respectively, if there is such configuration(s). The network configures *s-SearchThresholdQ3* and *s-SearchThresholdQ4* to be smaller than or equal to *thresholdQ2* and *thresholdQ1*, respectively, if there is such configuration(s). |

**[Comments]**:

V003

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V003 | LPWUS | 1 | The relationship on LR based entry conditions between RRM relaxation and LP-WUS monitoring | R2-25xxx | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: The LR-based threshold for RRM relaxation condition should be lower than or equal to the threshold of entry condition for LP-WUS monitoring. Otherwise, there is no power saving gain for LP-WUS monitoring.

**[Proposed Change]**: This restriction should be captured in the field description of RRM relaxation condition as below:

|  |
| --- |
| ***rsrpThresholdLR, rsrpThresholdLR2, rsrpThresholdLR3, rsrpThresholdLR4, rsrpThresholdLR5***, ***rsrpThresholdLR6***  Parameters "*SRSRPThresholdLR*", "*SRSRPThresholdLR2*", "*SRSRPThresholdLR3*", "*SRSRPThresholdLR4*", "*SRSRPThresholdLR5*", and "*SRSRPThresholdLR6*" in TS 38.304 [20]. The network configures *rsrpThresholdLR3* and *rsrpThresholdLR4* to be larger than or equal to *rsrpThresholdLR* and *rsrpThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrpThresholdLR* and *rsrpThresholdLR2* to be smaller than or equal to *thresholdP3*-*LR* and *thresholdP1*-*LR*, respectively, if there is such configuration(s). |
| ***rsrqThresholdLR, rsrqThresholdLR2, rsrThresholdLR3, rsrqThresholdLR4, rsrqThresholdLR5***, ***rsrqThresholdLR6***  Parameters "*SRSRQThresholdLR*", "*SRSRQThresholdLR2*", "*SRSRQThresholdLR3*", "*SRSRQThresholdLR4*", "*SRSRQThresholdLR5*", and "*SRSRQThresholdLR6*" in TS 38.304 [20]. The network configures *rsrqThresholdLR3* and *rsrqThresholdLR4* to be larger than or equal to *rsrqThresholdLR* and *rsrqThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrqThresholdLR* and *rsrqThresholdLR2* to be smaller than or equal to *thresholdQ3*-*LR* and *thresholdQ1*-*LR*, respectively, if there is such configuration(s). |

**[Comments]**:

V004

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V004 | LPWUS | 1 | The relationship on MR based entry conditions between RRM offloading and LP-WUS monitoring | R2-25xxx | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: Considering the entry conditions of LP-WUS monitoring include at least serving cell quality via MR, serving cell measurement via MR cannot be offloaded to LR before UE starts the LP-WUS monitoring. Thus, the threshold of the entry condition for serving cell RRM offloading should be higher than or equal to the threshold of the entry condition for LP-WUS monitoring.

**[Proposed Change]**: This restriction should be captured in the field description of RRM offloading condition as below:

|  |
| --- |
| ***s-SearchThresholdP, s-SearchThresholdP2, s-SearchThresholdP3, s-SearchThresholdP4, s-SearchThresholdP5, s-SearchThresholdP6***  Parameters "SSearchThresholdP", "SSearchThresholdP2", "SSearchThresholdP3", "SSearchThresholdP4", "SSearchThresholdP5", and "SSearchThresholdP6" in TS 38.304 [20]. The network configures *s-SearchThresholdP* and *s-SearchThresholdP2* to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*. The network configures both *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-IntraSearchP* and *s-NonIntraSearchP*, if there is such configuration(s). [RIL]: E008 LPWUS The network configures *s-SearchThresholdP5* and *s-SearchThresholdP6* to be larger than or equal to *s-SearchThresholdP3* and *s-SearchThresholdP4*, respectively, if there is such configuration(s). The network configures *s-SearchThresholdP5*and *s-SearchThresholdP6* to be larger than or equal to *thresholdP2* and *thresholdP1*, respectively, if there is such configuration(s). |
| ***s-SearchThresholdQ, s-SearchThresholdQ2, s-SearchThresholdQ3, s-SearchThresholdQ4, s-SearchThresholdQ5, s-SearchThresholdQ6***  Parameters "SSearchThresholdQ" "SSearchThresholdQ2", "SSearchThresholdQ3", "SSearchThresholdQ4", "SSearchThresholdQ5", and "SSearchThresholdQ6" in TS 38.304 [20]. The network configures *s-SearchThresholdQ* and *s-SearchThresholdQ2* to be less than or equal to *s-IntraSearchQ* and *s-NonIntraSearchQ*. The network configures both *s-SearchThresholdQ5* and *s-SearchThresholdQ6* to be larger than or equal to *s-IntraSearchQ* and *s-NonIntraSearchQ*, if there is such configuration(s). The network configures *s-SearchThresholdQ5* and *s-SearchThresholdQ6* to be larger than or equal to *s-SearchThresholdQ3* and *s-SearchThresholdQ4*, respectively, if there is such configuration(s). The network configures *s-SearchThresholdQ5* and *s-SearchThresholdQ6* to be larger than or equal to *thresholdQ2* and *thresholdQ1*, respectively, if there is such configuration(s). |

**[Comments]**:

V005

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V005 | LPWUS | 1 | The relationship on LR based entry conditions between RRM offloading and LP-WUS monitoring | R2-25xxx | Vivo(Chenli) |  | V005 | ToDo |

**[Description]**: Considering the entry conditions of LP-WUS monitoring include at least serving cell quality via LR, serving cell measurement via MR cannot be offloaded to LR before UE starts the LP-WUS monitoring. Thus, the threshold of the entry condition for serving cell RRM offloading should be higher than or equal to the threshold of the entry condition for LP-WUS monitoring.

**[Proposed Change]**: This restriction should be captured in the field description of RRM offloading condition as below:

|  |
| --- |
| ***rsrpThresholdLR, rsrpThresholdLR2, rsrpThresholdLR3, rsrpThresholdLR4, rsrpThresholdLR5***, ***rsrpThresholdLR6***  Parameters "*SRSRPThresholdLR*", "*SRSRPThresholdLR2*", "*SRSRPThresholdLR3*", "*SRSRPThresholdLR4*", "*SRSRPThresholdLR5*", and "*SRSRPThresholdLR6*" in TS 38.304 [20]. The network configures *rsrpThresholdLR3* and *rsrpThresholdLR4* to be larger than or equal to *rsrpThresholdLR* and *rsrpThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrpThresholdLR3* and *rsrpThresholdLR4* to be larger than or equal to *thresholdP3-LR* and *thresholdP1*-*LR*, respectively, if there is such configuration(s). |
| ***rsrqThresholdLR, rsrqThresholdLR2, rsrThresholdLR3, rsrqThresholdLR4, rsrqThresholdLR5***, ***rsrqThresholdLR6***  Parameters "*SRSRQThresholdLR*", "*SRSRQThresholdLR2*", "*SRSRQThresholdLR3*", "*SRSRQThresholdLR4*", "*SRSRQThresholdLR5*", and "*SRSRQThresholdLR6*" in TS 38.304 [20]. The network configures *rsrqThresholdLR3* and *rsrqThresholdLR4* to be larger than or equal to *rsrqThresholdLR* and *rsrqThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrqThresholdLR3* and *rsrqThresholdLR4* to be larger than or equal to *thresholdQ3*-*LR* and *thresholdQ1*-*LR*, respectively, if there is such configuration(s). |

**[Comments]**:

# E034

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E034 | LPWUS | 2 | LP-WUS *lastUsedCellOnly* | R2-25xxx | Ericsson (Martin) |  | V006 | ToDo |

**[Description]**: RAN3 agreed to introduce *lastUsedCellOnly* for LP-WUS. RAN2 specifications need to be aligned with RAN3.

See draft minutes [draft\_RAN3 #129 Meeting Report\_TDoc\_Participants.zip](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_129/Report/draft_RAN3%20%23129%20Meeting%20Report_TDoc_Participants.zip) and [R3-255828](http://www.3gpp.org/ftp//tsg_ran/WG3_Iu/TSGR3_129/Docs//R3-255828.zip):

[Last Used Cell]

* **The anchor gNB provides the new LP-WUS paging subgrouping assistance information IE into the Xn RAN paging message including CN assigned subgroup ID.**

**[Proposed Change]**: The following changes need to be made:

Add *lastUsedCellOnly* to SIB1

Add *noLastCellUpdate* to *RRCRelease* message

Furthermore changes to 38.300 and 38.304 are needed. Further details are provided in Tdoc.

**[Comments]**:

# E035

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E035 | LPWUS | 2 | TimeToTrigger (TTT) for RRM relaxation entry | R2-25xxx | Ericsson (Martin) |  | V006 | ToDo |

**[Description]**: Similar as for SintraSearch/SnonIntraSearch there is no exit condition for Rel-19 RRM relaxation. There is a risk for ping-pong behavior which could increase the power consumption. Similar as for cell reselection, a TimeToTrigger (TTT) should be introduced to avoid this.

**[Proposed Change]**: Add the possibility to configure a TTT for the entry condition for Rel-19 RRM relaxation, similar as TreselectionRAT for cell reselection. For example a TTT to the RRM relaxation thresholds in SIB2.

SIB2 ::= SEQUENCE {

…

]],

[[

relaxedMeasurementForServingAndNeighboringCell-r19 SEQUENCE {

…

cellEdgeEvaluationOnLR-ForLR-OnSSB-r19 SEQUENCE {

rsrpThresholdLR2-r19 ThresholdP-LR-r19,

rsrqThresholdLR2-r19 ThresholdQ-LR-r19 OPTIONAL -- Need R

} OPTIONAL, -- Need R

TimeToTrigger-r19 T-Reselection OPTIONAL -- Need R

} OPTIONAL, -- Need R

offloadMeasurementForServingCell-r19 SEQUENCE {

cellEdgeEvaluationOnMR-ForLR-OnSSB-r19 SEQUENCE {

s-SearchThresholdP5-r19 ReselectionThreshold,

s-SearchThresholdQ5-r19 ReselectionThresholdQ OPTIONAL -- Need R

} OPTIONAL, -- Cond SupportLR-OnSSB

…

} OPTIONAL -- Cond SupportLR-OnSSB

} OPTIONAL -- Need R

]]

}

Further details/update are provided in Tdoc. The value range may require further discussion.

**[Comments]**:

# E036

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E036 | LPWUS | 2 | Type 1 and 2 LR | R2-25xxx | Ericsson (Martin) | See also H53 and H54. | V006 | ToDo |

**[Description]**: RAN4 agreed that the UE may implement two types of WUR, i.e. implementation supporting Noise Figure (NF) pluse Implementation Margin (IM) of 13.5 or 18 dB. See draft CR and LS [R4-2503003](http://www.3gpp.org/ftp//tsg_ran/WG4_Radio/TSGR4_114/Docs//R4-2503003.zip):

**Agreement:**

* For the FR1 requirements targeting at bands <2.5GHz
  + The IM+NF values are
    - Set 1: 18dB
    - Set 2: 13.5dB

**[Proposed Change]**:

In case LP-WUS is configured close the channel edge then LP-WUS UEs that only support IM+NF of 18 dB should not be allowed to use LP-WUS to prevent degradation in the paging performance. It should be possible to indicate in SIB1 that UE supporting only IM+NF of 18 dB is not supported in the cell.

Further details are provided in Tdoc.

**[Comments]**:

# E037

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E037 | LPWUS | 1 | Clarify when the UE is allowed to use LR-RSRP instead of RSRP | R2-25xxx | Ericsson (Martin) |  | V006 | ToDo |

**[Description]**:

RAN2 agreed:

* Confirm that SDT can be initiated while UE is monitoring LP-WUS, and there is no impact to the SDT procedure. Can check if any spec change is needed.

In 38.304 it is captured:

UE supporting LP-WUS may choose to perform serving cell measurement offloading (i.e., serving cell measurement is fully offloaded to LR and no serving cell measurement via MR is required) according to requirements specified in TS 38.133 [8] if the entry condition for serving cell measurement offloading in clause 5.2.4.x.4 is fulfilled.

UE supporting LP-WUS may choose to perform relaxed serving cell and neighbouring cell measurements on MR according to requirements specified in TS 38.133 [8] if the relaxed measurement criterion in clause 5.2.4.x.2 is fulfilled.

Possible spec changes:

The UE is allowed to initiate SDT while the UE is monitoring LP-WUS, but the UE has to use the MR for SDT, similar as a legacy UE using SDT. The UE is not allowed to use LR-RSRP measurements for SDT, if available, but has to use RSRP measurements from MR (*cg-SDT-RSRP-ThresholdSSB*). The same applies for Timing Advance, Resume trigged due to MBS multicast, EMR measurements, …But perhaps no further clarifications are needed, because the term “**LR-RSRP**” is used for RSRP measurements by LR.

When the UE is in Rel-19 serving cell relaxation state, then the UE is only required to measure the serving cell RSRP by MR every 16th DRX cycle:

After some time the MR RSRP measurements are outdated and should not be discarded e.g. after 5-10 seconds.

In legacy the UE performs serving cell measurements by MR every DRX cycle, and the UE is always has an updated RSRP value for serving cell.

It is FFS when the UE is in Rel-19 serving cell relaxation state, whether it needs to be clarified:

UE shall not use outdated MR RSRP measurement e.g. to intiatiate SDT. Either SDT is delayed, or the UE wakes-up the MR while it is in Rel-19 relaxation state. When the MR wakes-up the UE may remain in Rel-19 relaxation state.

**[Proposed Change]**:

Further analysis is needed, and either Tdoc with proposed spec changes is provided, or the RIL is withdrawn.

**[Comments]**:

V006

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| V006 | LPWUS | 1 | The relationship on LR based exit conditions between RRM offloading and LP-WUS monitoring | R2-25xxx | Vivo(Chenli) |  | V006 | ToDo |

**[Description]**: With the same reason as RIL V004/005, the threshold of the exit condition for serving cell RRM offloading should be higher than or equal to the threshold of the exit condition for LP-WUS monitoring. Otherwise, LP-WUS cannot be used once the UE exits the LP-WUS monitoring, while doesn’t exit the serving cell RRM offloading, as the entry condition for LP-WUS monitoring includes at least MR measurement while there is no MR measurement when offloading.

**[Proposed Change]**: This restriction should be captured in the field description of RRM offloading condition as below:

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| --- |
| ***rsrpThresholdLR, rsrpThresholdLR2, rsrpThresholdLR3, rsrpThresholdLR4, rsrpThresholdLR5***, ***rsrpThresholdLR6***  Parameters "*SRSRPThresholdLR*", "*SRSRPThresholdLR2*", "*SRSRPThresholdLR3*", "*SRSRPThresholdLR4*", "*SRSRPThresholdLR5*", and "*SRSRPThresholdLR6*" in TS 38.304 [20]. The network configures *rsrpThresholdLR3* and *rsrpThresholdLR4* to be larger than or equal to *rsrpThresholdLR* and *rsrpThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrpThresholdLR5* and *rsrpThresholdLR6* to be larger than or equal to *thresholdP2*-*LR* and *thresholdP4*-*LR*, respectively, if there is such configuration(s). |
| ***rsrqThresholdLR, rsrqThresholdLR2, rsrThresholdLR3, rsrqThresholdLR4, rsrqThresholdLR5***, ***rsrqThresholdLR6***  Parameters "*SRSRQThresholdLR*", "*SRSRQThresholdLR2*", "*SRSRQThresholdLR3*", "*SRSRQThresholdLR4*", "*SRSRQThresholdLR5*", and "*SRSRQThresholdLR6*" in TS 38.304 [20]. The network configures *rsrqThresholdLR3* and *rsrqThresholdLR4* to be larger than or equal to *rsrqThresholdLR* and *rsrqThresholdLR2,* respectively, if there is such configuration(s). The network configures *rsrqThresholdLR5* and *rsrqThresholdLR6* to be larger than or equal to *thresholdQ2*-*LR* and *thresholdQ4*-*LR*, respectively, if there is such configuration(s). |

**[Comments]**:

# O700

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| O700 | LPWUS | 1 | The preference LP-WUS offset |  | Haocheng Wang (OPPO) |  | V007 | ToDo |

**[Description]**: The field description of *lpwus-OffsetPreference* should be for *timeOffest* instead of *lpwus-OffsetPreference*.

**[Proposed Change]**: Change the field name “*lpwus-OffsetPreference*” to “*timeOffest*”.

***timeOffset***

Indicates the UE's preferred time offset for PDCCH monitoring after LP-WUS monitoring. Value in ms (milliSecond). *ms5* corresponds to 5 ms, *ms13* corresponds to 13 ms, and *ms37* corresponds to 37 ms. The reported preferred time offset value is equal to or longer than the minimum time gap reported by UE capability for a UE. If the field is absent, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring.

**[Comments]**:

# O701

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| O701 | LPWUS | 1 | Whether UE can send report an empty preference offset is still FFS. | R2-25xxxxx | Haocheng Wang (OPPO) |  | V007 | ToDo |

**[Description]**: Since there is no conclusion on whether UE can report an empty preference offset, we should delete the description on *timeoffset* is absent. We can add the make the corresponding change upon we have the clear conclusion.

**[Proposed Change]**: Delete the sentence of “If the field is absent, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring.” at least now.

***lpwus-OffsetPreference***

Indicates the UE's preferred time offset for PDCCH monitoring after LP-WUS monitoring. Value in ms (milliSecond). *ms5* corresponds to 5 ms, *ms13* corresponds to 13 ms, and *ms37* corresponds to 37 ms. The reported preferred time offset value is equal to or longer than the minimum time gap reported by UE capability for a UE.

**[Comments]**:

# O702

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| O702 | LPWUS | 1 | Align the name of low power wake-up receiver. |  | Haocheng Wang (OPPO) |  | V007 | ToDo |

**[Description]**: we define the LR/LP-WUS for low power wake-up receiver. But in some field description, we use the low power reveiver. To avoid the confusion, align the name low power wake-up receiver.

**[Proposed Change]**: change the “low power receiver” to “LP-WUR” or “low power wake-up receiver”

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| --- |
| ***cellEdgeEvaluationOnLR-ForLR-OnLPSS***  Indicates the criteria for a UE to detect that it is not at cell edge based on the serving cell measurement on LR for OOK based LP-WUR or OFDM based LP-WUR measuring on LP-SS, in order to relax serving cell and neighboring cell measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.x.2), or to offload serving cell measurement toLP-WUR (see TS 38.304 [20], clause 5.2.4.x.4). |
| ***cellEdgeEvaluationOnLR-ForLR-OnSSB***  Indicates the criteria for a UE to detect that it is not at cell edge based on the serving cell measurement on LR for OFDM based LP-WUR measuring on SSB, in order to relax serving cell and neighboring cell measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.x.2), or to offload serving cell measurement to LP-WUR (see TS 38.304 [20], clause 5.2.4.x.4). |
| ***cellEdgeEvaluationOnMR-ForLR-OnLPSS***  Indicates the criteria for a UE to detect that it is not at cell edge based on the serving cell measurement on main radio for OOK based LP-WUR or OFDM based LP-WUR measuring on LP-SS, in order to relax serving cell and neighboring cell measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.x.2), or to offload serving cell measurement to LP-WUR (see TS 38.304 [20], clause 5.2.4.x.4). |
| ***cellEdgeEvaluationOnLR-ForLR-OnLPSS-Exit***  Indicates the exit criteria for serving cell measurement offloading for a UE to detect that it is not at cell edge based on the serving cell measurement on LR for OOK based LP-WUR or OFDM based LP-WUR measuring on LP-SS. This field is optional present for the cell supporting OOK based LP-WUR or OFDM based LP-WUR measuring on LP-SS. |
| ***cellEdgeEvaluationOnMR-ForLR-OnSSB***  Indicates the criteria for a UE to detect that it is not at cell edge based on the serving cell measurement on main radio for OFDM based LP-WUR measuring on SSB, in order to relax serving cell cell and neighboring cell measurement requirements for cell reselection (see TS 38.304 [20], clause 5.2.4.x.2), or to offload serving cell measurement to LP-WUR (see TS 38.304 [20], clause 5.2.4.x.4). |

**[Comments]**:

# H056

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H056 | LPWUS | 1 | Missing “release *lpwus-OffsetPreferenceConfig*, if configured, and stop timer T346xx, if running;” from Section 5.3.7.3 | R2-25xxxxx | Rama Kumar Mopidevi (Huawei) |  | V010 | ToDo |

**[Description]**: Section 5.3.7.3 should also include “release *lpwus-OffsetPreferenceConfig*, if configured, and stop timer T346xx, if running;” As the section is not present in the Review file, I added RIL just after section 5.3.13.2

**[Proposed Change]**: Add “release *lpwus-OffsetPreferenceConfig*, if configured, and stop timer T346xx, if running;” to Section 5.3.7.3.

**[Comments]:**

# H057

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| H057 | LPWUS | 1 | Merge sentence “stop timer T346xx, if running” with “release *lpwus-OffsetPreferenceConfig* from the UE Inactive AS context, if stored” | R2-25xxxxx | Rama Kumar Mopidevi (Huawei) |  | V010 | ToDo |

**[Description]**: Following the existing description, merge the two sentences.

**[Proposed Change]**: “release *lpwus-OffsetPreferenceConfig* from the UE Inactive AS context, if stored, and stop timer T346xx, if running.”

**[Comments]:**

# E043

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| E043 | LPWUS | 2 | Exit condition for LP-WUS monitoring in connected mode | R2-25xxxxx | Ericsson (Martin) | See also H050 | V011 | ToDo |

**[Description]**: There is a possibility that the UE temporarily becomes unreachable when the LP-WUS quality rapidly changes and the gNB has deconfigured LP-WUS based on the measurement reporting of the UE. This can be avoided with an exit condition based on RLM/BFD measurements that the UE anyways has to perform. To use UAI signalling as proposed in H050 increases the signalling and is slower. When the exit condition is triggered and the UE stops using LP-WUS while the gNB continues using LP-WUS the UE remains reachable.

**[Proposed Change]**: The NW can configure an LP-WUS monitoring exit threshold based on RLM/BFD measurements via dedicated signalling.

**[Comments]:** Tdoc will be provided with the specification changes needed.

# C027

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C027 | LPWUS | 2 | Support of Option 1-2 with dual DRX group | R2-25xxxxx | Da Wang (CATT) |  | V012 | ToDo |

**[Description]**: It was agreed that *the lpwus-PDCCH-MonitoringTimer configuration for secondary DRX group is smaller than or equal to that for the default DRX group*. But this agreement has not been reflected in the running.

**[Proposed Change]**: R2 should capture the above agreement related to *lpwus-PDCCH-MonitoringTimer* and dual DRX group in RRC.

**[Comments]**:

# C028

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C028 | LPWUS | 1 | UAI reporting for UE’s preferred time offset for LP-WUS monitoring | No | Da Wang (CATT) |  | V012 | ToDo |

**[Description]**: UAI reporting for UE’s preferred time offset for LP-WUS monitoring is actually used to report the preferred time offset for RRC\_CONNECTED. But this is not reflected in RRC.

**[Proposed Change]**:

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| --- |
| ***lpwus-OffsetPreference***  Indicates the UE's preferred time offset for PDCCH monitoring after LP-WUS monitoring for RRC\_CONNECTED mode. Value in ms (milliSecond). *ms5* corresponds to 5 ms, *ms13* corresponds to 13 ms, and *ms37* corresponds to 37 ms. The reported preferred time offset value is equal to or longer than the minimum time gap reported by UE capability for a UE. If the field is absent, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring [RIL]: O701, LPWUS. |

**[Comments]**:

# C029

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C029 | LPWUS | 1 | UAI configuration for UE’s preferred time offset for LP-WUS monitoring | No | Da Wang (CATT) |  | V012 | ToDo |

**[Description]**: UAI configuration for UE’s preferred time offset for LP-WUS monitoring is actually used to configure the report of preferred time offset for RRC\_CONNECTED. But this is not reflected in RRC.

**[Proposed Change]**:

| ***lpwus-OffsetPreferenceConfig***  Configuration for the UE to report assistance information to inform the gNB about the UE’s preferred time offset for LP-WUS monitoring for RRC\_CONNECTED mode. |
| --- |

**[Comments]**:

# C030

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C030 | LPWUS | 1 | Configuration of Option 1-1 and Option 1-2 | No | Da Wang (CATT) |  | V012 | ToDo |

**[Description]**: For LP-WUS in RRC\_CONNECTED mode, Option 1-1 and Option 1-2 can’t be configured simultaneously. This can be captured in RRC.

**[Proposed Change]**:

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| --- |
| ***lpwus-PDCCH-MonitoringTimer***  Indicates the length of the timer for UE to monitor PDCCH after LP-WUS is detected for LP-WUS operation option 1-2 (see TS 38.321 [3], clause 5.7). LP-WUS operation option 1-1 and option 1-2 can’t be configured simultaneously. |

**[Comments]**:

Z051

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| Z051 | LPWUS | 1 | timer T346xx per cell group | R2-25xxxxx | Tao Qi  (ZTE) |  | V013 | ToDo |

**[Description]**: It has agreed that LP-WUS for RRC\_CONNECTED state can be configured per cell group, and the ***lpwus-OffsetPreference*** can be reported per cell group, the prohibit timer for ***lpwus-OffsetPreference*** can should also be per cell group.

**[Proposed Change]**: Clarify that the prohibit timer for ***lpwus-OffsetPreference*** is per cell group, such as:

5.7.4.2 Initiation

//OMITTED THE UNRELATED PART

1> if configured to provide its preference on time offset for LP-WUS monitoring of a cell group:

2> if [the UE has a preference on time offset for LP-WUS monitoring of the cell group and] [RIL]: E009 LPWUS the UE did not transmit a *UEAssistanceInformation* message with *lpwus-OffsetPreference* for the cell group since it was configured to provide its preference on time offset for LP-WUS monitoring of the cell group for power saving; or

2> if the current *lpwus-OffsetPreference* information for the cell group is different from the one indicated in the last transmission of the *UEAssistanceInformation* message including *lpwus-OffsetPreference* for the cell group and timer T346xx associated with the cell group is not running:

3> start the timer T346xx with the timer value for the cell group set to the *lpwus-OffsetPreferenceProhibitTimer* of the cell group;

3> initiate transmission of the *UEAssistanceInformation* message in accordance with 5.7.4.3 to provide the current *lpwus-OffsetPreference*.

**[Comments]**:

Z052

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| Z052 | LPWUS | 1 | Correction or empty UAI for LP-WUS time offset | R2-25xxxxx | Tao Qi  (ZTE) |  | V013 | ToDo |

**[Description]**: Based on the current field description, the absence of the ***lpwus-OffsetPreference*** field will be interpreted as the UE having no preference for the time offset for LP-WUS monitoring, it is not correct.

*UEAssistanceInformation*may be used for other assistance information reporting except LP-WUS time offset, in which case ***lpwus-OffsetPreference*** need not be included.

One understanding is, ***lpwus-OffsetPreference*** field is included, but *timeOffset-r19* field is absent, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring, i.e., as a release indication of previous preference.

One alternative is to add a separate field description of *timeOffset* to indicate network understanding of its absence, similar to *DRX-Preference* and IEs inside *DRX-Preference*.

**[Proposed Change]**:

|  |
| --- |
| ***UEAssistanceInformation* field descriptions** |
| ... |
| ***lpwus-OffsetPreference***  Indicates the UE's preferred time offset for PDCCH monitoring after LP-WUS monitoring. Value in ms (milliSecond). *ms5* corresponds to 5 ms, *ms13* corresponds to 13 ms, and *ms37* corresponds to 37 ms. The reported preferred time offset value is equal to or longer than the minimum time gap reported by UE capability for a UE. If the field *timeOffset-r19* is absent from *lpwus-OffsetPreference-r19*, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring. |

**[Comments]**:

# C031

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| RIL Id | WI | Class | Title | Tdoc | Delegate | Misc | File version | Status |
| C031 | LPWUS | 2 | Empty UAI report for LP-WUS time offset | R2-25xxxxx | Da Wang (CATT) |  | V014 | ToDo |

**[Description]**: We have no conclusion on the open issue [RRC-5], i.e. whether empty UAI on offset for LP-WUS monitoring is allowed. This should be discussed and corresponding procedures should be captured.

**[Proposed Change]**:

Change 1:

1> if transmission of the *UEAssistanceInformation* message is initiated to provide *lpwus-OffsetPreference* of a cell group according to 5.7.4.2 or 5.3.5.3:

2> include *lpwus-OffsetPreference* in the *UEAssistanceInformation* message;

2> if the UE has a preference on time offset for LP-WUS monitoring:

3> set the *timeOffset* to the preferred offset value.

2> else if the UE has no preference on time offset for LP-WUS monitoring of the cell group:

3> do not include *timeOffset* in the *lpwus-OffsetPreference*;

Change 2:

|  |
| --- |
| ***timeOffset***  Indicates the UE's preferred time offset for PDCCH monitoring after LP-WUS monitoring. Value in ms (milliSecond). *ms5* corresponds to 5 ms, *ms13* corresponds to 13 ms, and *ms37* corresponds to 37 ms. The value of *timeOffset* is equal to or longer than the minimum time gap reported by UE capability for a UE. If the field is absent, it is interpreted as the UE having no preference for the time offset for LP-WUS monitoring. |

**[Comments]**: