**3GPP TSG RAN WG1 #105-e R1-210xxxx**

**e-Meeting, May 10th – 27th, 2021**

**Agenda Item: 6.2.2**

**Source: Moderator (Huawei)**

**Title: Feature lead summary #1 on [105-e-LTE-NB\_IoTenh3-01]**

**Document for: Discussion and Decision**

# Introduction

This contribution provides discussion on the following issue:

[105-e-LTE-NB\_IoTenh3-01] Correction on DMRS cyclic shift for PUR in NB-IoT – Xiang (Huawei)

* Discussion and decision by May 24, TPs by May 27

# Discussions

## Issue

**Description**: Regarding NB-IoT PUR, contribution [1] points out that the parameter *npusch-CyclicShift* is only used for the DMRS in PUR transmission. However, the current spec does not limit the use case of this parameter. Therefore, [1] proposes to adopt the following TP#1 to specify that the parameter *npusch-CyclicShift* for DMRS cyclic shift is only for PUR transmission. Otherwise, the *npusch-CyclicShift* for DMRS cyclic shift dedicated for PUR may be wrongly used in some non-PUR scenarios (e.g., msg3).

**TP#1**: The following TP#1 for TS 36.211 is proposed by [1]:

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| --------------------------- Text starts (TS 36.211 clause 10.1.4.1.2)-----------------------------  10.1.4.1.2 Reference signal sequence for  **<Unchanged parts are omitted>**  The reference signal sequences for is defined by a cyclic shift  of a base sequence according to  ,  where  is given by Table 10.1.4.1.2-1 for , Table 10.1.4.1.2-2 for  and Table 5.5.1.2-1 for .  If group hopping is not enabled, the base sequence index  is given by higher layer parameters *threeTone-BaseSequence*, *sixTone-BaseSequence*, and *twelveTone-BaseSequence* for , , and , respectively. If not signalled by higher layers, the base sequence is given by    If group hopping is enabled, the base sequence index  is given by clause 10.1.4.1.3.  The cyclic shift  for  and  is derived from higher layer parameters *threeTone-CyclicShift* and *sixTone-CyclicShift*, respectively, as defined in Table 10.1.4.1.2-3. For , if *npusch-CyclicShift* is configured it provides the value of and the cyclic shift in a slot  is given as for NPUSCH (re)transmission corresponding to preconfigured uplink resource, otherwise .  **<Unchanged parts are omitted>**  --------------------------- Text ends (TS 36.211 clause 10.1.4.1.2)----------------------------- |

## Question

**Question: Do you agree with TP#1 above?**

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| **Company** | **Agree?** | **Comments** |
| Lenovo,MotoM | Agree | *npusch-CyclicShift* is configured in *pur-PhysicalConfig,* and the two parameters are only used for PUR other than non-PUR case. So the CR clarification is needed. |
| Qualcomm |  | Technically speaking, *npusch-CyclicShift* is configured only for PUR, so in all other cases “if *npusch-CyclicShift* is configured” will be false, and therefore we will use alpha = 0. But if a clear majority of companies feel this clarification would lead to better readability, we will not object. |
| Ericsson | See comment | We have a similar view as Qualcomm. We would be ok with the clarification, but perhaps the issue can be simply solved by appending “*PUR-Config-NB*” to “*npusch-CyclicShift*”. That is:  **<Unchanged parts are omitted>**  If group hopping is enabled, the base sequence index  is given by clause 10.1.4.1.3.  The cyclic shift  for  and  is derived from higher layer parameters *threeTone-CyclicShift* and *sixTone-CyclicShift*, respectively, as defined in Table 10.1.4.1.2-3. For , if *npusch-CyclicShift* in *PUR-Config-NB* is configured it provides the value of and the cyclic shift in a slot  is given as , otherwise .  **<Unchanged parts are omitted>** |
| ZTE, Sanechips | Agree | From our understanding, the current specification indicates this parameter *npusch-CyclicShift* is assumed for all the NPUSCH transmission (e.g. the PUSCH in connected mode or msg3), before this parameter released or reconfiguration.  It seems that the revision from Ericsson can not resolve the above issue. |
| Ericsson | To ZTE | Actually when PUR was added to the specs, the original statement was “For , if *pur-NPUSCH-cyclic-shift* is configured it provides the value of and the cyclic shift in a slot  is given as , otherwise.” When RAN2 confirmed the parameter names “*pur-NPUSCH-cyclic-shift*” was replaced by “*npusch-CyclicShift*” which may justify the reason behind this CR. But as we said appending “*PUR-Config-NB*” to “*npusch-CyclicShift*” seems to be sufficient, and we do not see why it can not be resolved this way since “*PUR-Config-NB*” would be incorporated to the new statement added in Rel-16. |
| Huawei, HiSilicon | Agree | To our understanding, the TP#1 is intended to handle the following case:  Assume a UE has been configured with PUR, i.e. *npusch-CyclicShift* is configured. Later on, the UE may choose to perform conventional RACH and transmit Msg3. Since PUR configuration is not released yet, the UE still has *npusch-CyclicShift* been configured during Msg3 transmission. So the current spec needs update in this case.  We are ok with the current TP#1 to solve this issue.  In Ericsson’s TP, this issue seems still unresolved since the UE still has *npusch-CyclicShift (or PUR-Config-NB)* been configured during Msg3 transmission. |
| Ericsson v008 |  | We do not have a strong opinion on whether to go for the simplified solution or the approach in TP#1, but if it is going to be TP#1 at least the new sentence should be added in a different place to improve the readability and if this CR is about avoiding misunderstandings then “*PUR-Config-NB*” can also be kept. That is:  **<Unchanged parts are omitted>**  If group hopping is enabled, the base sequence index  is given by clause 10.1.4.1.3.  The cyclic shift  for  and  is derived from higher layer parameters *threeTone-CyclicShift* and *sixTone-CyclicShift*, respectively, as defined in Table 10.1.4.1.2-3. For , if *npusch-CyclicShift* in *PUR-Config-NB* is configured for NPUSCH (re)transmission corresponding to preconfigured uplink resource it provides the value of and the cyclic shift in a slot  is given as , otherwise .  **<Unchanged parts are omitted>** |

# 1st round summary

Based on the 1st round discussions, the following TP for TS 36.211 is proposed. The changes compared to TP#1 is: added “*in PUR-Config-NB*” and moved “for NPUSCH (re)transmission corresponding to preconfigured uplink resource” to a new place for better readability.

**Potential Agreement: The following TP for TS 36.211 clause 10.1.4.1.2 is endorsed.**

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| --------------------------- Text starts (TS 36.211 clause 10.1.4.1.2)-----------------------------  **<Unchanged parts are omitted>**  10.1.4.1.2 Reference signal sequence for  **<Unchanged parts are omitted>**  If group hopping is enabled, the base sequence index  is given by clause 10.1.4.1.3.  The cyclic shift  for  and  is derived from higher layer parameters *threeTone-CyclicShift* and *sixTone-CyclicShift*, respectively, as defined in Table 10.1.4.1.2-3. For , if *npusch-CyclicShift* in *PUR-Config-NB* is configured for NPUSCH (re)transmission corresponding to preconfigured uplink resource it provides the value of and the cyclic shift in a slot  is given as , otherwise .  **<Unchanged parts are omitted>**  --------------------------- Text ends (TS 36.211 clause 10.1.4.1.2)----------------------------- |

# Reference

1. R1-2105269 Correction on DMRS cyclic shift for PUR in NB-IoT ZTE