**3GPP TSG RAN WG1 #101 R1-200xxxx**

**e-Meeting, May 25th – June 5th, 2020**

**Agenda Item:** 7.2.2.2.5

**Source:** Moderator (LG Electronics)

**Title:** Text proposal as outcome of email discussions [101-e-NR-unlic-NRU-WB-01] and [101-e-NR-unlic-NRU-WB-02]

**Document for:** Discussion and decision

# Introduction

This document is to capture the following agreements in specification.

Agreement: (RAN1#100bis-e)

To support UL bandwidth part wider than 20 MHz with no intra-cell guard band, UE can be configured with zero GBs by setting GB width to 0 when configuring intraCellGuardBandUL-r16 (e.g., such gNB creates 4 RB-sets in 80MHz UL carrier).

* Inform RAN2 of this agreement

Agreement: (RAN1#100bis-e)

For an UL carrier without intra-cell guard bands when the parameter *useInterlacePUCCH-PUCCH* is configured in any of *BWP-UplinkCommon* and *BWP-UplinkDedicated*:

* The UL carrier can be configured with non-overlapping RB set(s)
* For each RB set except for RB set 0, the starting CRB index is given by *startCRB-r16*
  + For RB set 0, the starting CRB index is given by 
* The UE expects *nrofCRBs-r16* set to 0 for all GBs between two adjacent RB sets within the UL carrier.
* The UE expects N RBs contained in each interlace of each RB set, wherein 10 <= N <= 11.
  + For 30 kHz SCS, the number of RBs within any RB set is between 50 and 55, and for 15 kHz SCS, the number of RBs within any RB set is between 100 and 110
* Note: This configuration may be used for the case where transmission only occurs in a BWP if LBT is successful in all RB sets within the BWP (from RAN1#99 agreement)
* Note: It’s up to gNB’s configuration to fulfill RAN4 requirement with  e.g., on maximum transmission bandwidth configuration, spectral emission mask, and so on.
* Note: In order to reuse existing PUCCH/PUSCH resource allocation mechanisms, this proposal applies to all supported carrier bandwidths except 10 MHz
* FFS: Whether BWP can be configured to be partially overlapping with a RB set

Agreement: (RAN1#101-e [101-e-NR-unlic-NRU-WB-01])

For a DL carrier where no intra-cell guard bands are configured with *intraCellGuardBandDL-r16*,

* The DL carrier can be configured with non-overlapping RB set(s).
* For each RB set except for RB set 0, the starting CRB index is given by *startCRB-r16* and
  + For RB set 0, the starting CRB index is given by
* The UE expects *nrofCRBs-r16* set to 0 for all GBs between two adjacent RB sets within the DL carrier.
* For 30 kHz SCS, the number of RBs within any RB set is between 50 and 55, and for 15 kHz SCS, the number of RBs within any RB set is between 100 and 110
  + For 30 kHz SCS, the UE may be configured with *intraCellGuardBandDL-r16* such that one of the RB sets contain 56 PRBs

Agreement: (RAN1#101-e [101-e-NR-unlic-NRU-WB-01])

For an UL carrier without intra-cell guard bands when the parameter *useInterlacePUCCH-PUCCH* is configured in any of *BWP-UplinkCommon* and *BWP-UplinkDedicated*,

* The UE does not expect that UL BWP within the UL carrier is configured to include parts of a RB set.
* For 30 kHz SCS, the UE may be configured with *intraCellGuardBandUL-r16* such that one of the RB sets contain 56 PRBs
  + Note: the number of RBs for the other RB sets is between 50 and 55 as previously agreed
* The UL carrier can be configured with non-overlapping RB set(s) if *intraCellGuardBandUL-r16* is provided.
* This agreement and the corresponding agreement from RAN1#100bis-e also apply to the case when *useInterlacePUCCH-PUCCH* is not configured in either of *BWP-UplinkCommon* and *BWP-UplinkDedicated*

Agreement: (RAN1#101-e [101-e-NR-unlic-NRU-WB-02])

For *GuardBand-r16*, the value range of *startCRB-r16* is from 0 to 274.

* Note: This requires the change from and to and , respectively, in TS 38.214 Section 7.

Agreement: (RAN1#101-e [101-e-NR-unlic-NRU-WB-02])

For *GuardBand-r16*, the value range of *nrofCRBs-r16* is from 0 to 15.

* UE does not expect that *nrofCRBs-r16* is configured with non-zero value smaller than the default guard band size defined in RAN4 specifications.

Agreement: (RAN1#101-e [101-e-NR-unlic-NRU-WB-02])

When *intraCellGuardBandUL-r16/intraCellGuardBandDL-r16* is absent for an UL/DL carrier and the default configuration in 38.101-1 indicates that there are no intra-cell guard bands for the carrier (i.e., 20 MHz carrier), then the number of RB sets for the carrier is 1 with index 0. When interlacing is configured for the UL carrier, the BWP spans the whole carrier, and the RB set index is 0 within the UL BWP.

# Text proposal

Reason for changes

To capture the agreements for intra-cell guard band configuration and DL or UL carrier without intra-cell guard bands.

Summary of changes

1. Modified from and to and , respectively
2. Clarified that UE does not expect that *nrofCRBs-r16* is configured with non-zero value smaller than the default guard band size defined in RAN4 specifications
3. Removed the square brackets based on RAN1 agreements
4. Clarified that the number of RB set for a carrier where intra-cell guard band configuration is absent and default pattern contains no guard band, is equal to 1
5. Clarified that for a carrier regardless of with intra-cell guard band or without intra-cell guard band, UE does not expect that BWP within the carrier is configured to include parts of a RB set
6. Clarified that when a UE is provided with *nrofCRBs-r16=*0 for all intra-cell guard band(s) on a carrier, the UE is indicated that no intra-cell guard-bands are configured for the carrier
7. Clarified that when no intra-cell guard-bands are configured for a carrier, the UE expects more than 1 RB sets, 100-110 RBs for a RB set with 15 kHz SCS, and 50-55 RBs for a RB set with 30 kHz SCS (except for at most one RB set containing 56 RBs)

Specs/Sections impacted

TS 38.214 Clause 7

Consequences if not approved

The corresponding agreements are not reflected in specification.

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| 7 UE procedures for transmitting and receiving on a carrier with intra-cell guard bands  For operation with shared spectrum channel access, when the UE is configured with any of *intraCellGuardBandUL-r16* for UL carrier and *intraCellGuardBandDL-r16* for DL carrier, the UE is provided with intra-cell guard bands on a carrier, each defined by start CRB and size in number of CRBs, and , provided by higher layer parameters *startCRB-r16* and *nrofCRBs-r16*, respectively. The subscript *x* is set to DL and UL for the downlink and uplink, respectively. Where there is no risk of confusion, the subscript *x* can be dropped. The intra-cell guard bands separate RB sets, each defined by start and end CRB, and , respectively. UE does not expect that *nrofCRBs-r16* is configured with non-zero value smaller than the nominal intra-cell guard bands as specified in [8, TS 38.101-1] corresponding to and carrier size . UE determines , , and the remaining start and end CRBs as and . The RB set *s* consists of resource blocks where . When the UE is not configured with *intraCellGuardBandUL-r16,* the UE determines the CRB indices for the intra-cell guard band(s), if any, and corresponding RB set(s) according to the nominal intra-cell guard band and RB set pattern as specified in [8, TS 38.101-1] corresponding to and carrier size . When the UE is not configured with *intraCellGuardBandDL-r16,* the UE determines the CRB inidces for the intra-cell guard band(s), if any, and corresponding RB set(s) according to the nominal intra-cell guard band and RB set pattern as specified in [8, TS 38.101-1] corresponding to and carrier size . For either or both DL and UL, if the nominal intra-cell guard band and RB set pattern specified in [8, TS 38.101-1] contains no intra-cell guard bands, the number of RB sets for the carrier is .  For a carrier, the UE expects , and where for a BWP *i* configured by *higher layers*. Within the BWP *i*, RB sets are numbered in increasing order from 0 to where is the number of RB sets contained in the BWP *i* and RB set 0 within the BWP *i* corresponds to RB set in the carrier and RB set within the BWP *i* corresponds to RB set in the carrier.  [When a UE is provided with *nrofCRBs-r16=*0 for all intra-cell guard band(s) on a carrier, the UE is indicated that no intra-cell guard-bands are configured for the carrier, and expects . For , the UE expects the number of RBs within a RB set is between 100 and 110. For , the UE expects the number of RBs within a RB set is between 50 and 55 except for at most one RB set which may contain 56 RBs. |

For discussion only (Not part of TP):

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| SCS  (kHz) | 20 MHz | 40 MHz | 60 MHz | 80 MHz |
| 15 | 106  (106) | 105-6-105  (216) | N/A | N/A |
| 30 | 51  (51) | 50-6-50  (106) | 50-6-50-6-50  (162) | 50-6-50-5-50-6-50  (217) |
| 60 | TBD | TBD | TBD | TBD |