3GPP TSG-RAN WG1 Meeting #104bis-e Tdoc R1-21xxxxx

e-Meeting, 19th – 28th May, 2021

Agenda Item: 7.2.2

Source: Moderator (Ericsson)

Title: FL Summary #1 for [105-e-NR-NRU-02] Email discussion/approval

Document for: Discussion, Decision

# 1 Introduction

Based on the conclusion of the e-meeting preparation phase [1], the following e-mail discussion has been kicked-off:

//This one is to use NWM – please use *RAN1-105-e-NWM-NR-NRU-02* as the document name

[105-e-NR-NRU-02] Email discussion/approval on clarification of size of initial UL BWP (UL-01) until May 24 – Steve (Ericsson)

Company proposals regarding issue UL-01 are listed in the following table discussed in the preparation phase:

|  |  |  |
| --- | --- | --- |
| **#** | **Issue** | **Contribution(s)** |
| UL-01 | Clarification of size of initial UL BWP | [1]: R1-2105805 |

# 2 Issue UL-01: Clarification of size of initial UL BWP

The following description of the issue is provided in [1],

"As agreed at RAN1#101 e-meeting, the initial UL BWP size should be 20 MHz. Unless the specification ensures the above, there is a possibility of interlaced PUCCH more than 20 MHz bandwidth. For example, when the initial UL BWP is of size 100 MHz, a cell-specific PUCCH (i.e., a PUCCH configured by SIB1) is mapped in entire 100 MHz, which is not an expected behavior. Further, in TS37.213, and further clarified in the agreed CR (R1-2104070) at RAN1#104bis e-meeting, it is clearly stated that a PUCCH should be mapped to single RB-set."

A CR to 38.213 Section 12 is proposed in [1] and is copied in the Appendix below for convenience.

It is the moderator's understanding that the problem highlighted above occurs only for PUCCH resources prior to RRC configuration, i.e., on a PCell during initial access when the UE is provided only with cell-specific PUCCH resources by SIB1 for which the RB set is not indicated.

The cell-specific PUCCH resources are configured by the parameter *pucch-ResourceCommon* under *BWPUplinkCommon 🡺 PUCCH-ConfigCommon* as follows:

PUCCH-ConfigCommon ::= SEQUENCE {

pucch-ResourceCommon NTEGER (0..15) OPTIONAL, -- Cond InitialBWP-Only

pucch-GroupHopping ENUMERATED { neither, enable, disable },

hoppingId INTEGER (0..1023) OPTIONAL, -- Need R

p0-nominal INTEGER (-202..24) OPTIONAL, -- Need R

...

}

The PUCCH configuration parameter *pucch-ResoureCommon* is only present for the initial BWP configuration provided by SIB1, i.e., for the PCell, according to the condition -- Cond InitialBWP-Only:

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *InitialBWP-Only* | The field is mandatory present in the *PUCCH-ConfigCommon* of the initial BWP (BWP#0) in SIB1. It is absent in other BWPs. |

In contrast, for an SCell or PSCell, the UE is provided by dedicated (UE-specific) PUCCH resources, in which case the RB set index is indicated as specified in 38.213 Section 9.2.1 (see highlight below).

If a UE has dedicated PUCCH resource configuration, the UE is provided by higher layers with one or more PUCCH resources.

A PUCCH resource includes the following parameters:

- a PUCCH resource index provided by *pucch-ResourceId*

- an index of the first PRB prior to frequency hopping or for no frequency hopping by *startingPRB*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of the first PRB after frequency hopping by *secondHopPRB*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an indication for intra-slot frequency hopping by *intraSlotFrequencyHopping*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of a first interlace by *interlace0*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- if provided, an index of a second interlace by *interlace1*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of an RB set by *rb-SetIndex*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- a configuration for a PUCCH format provided by *format*

Furthermore, it is the moderator's understanding that the agreement on the initial UL BWP being restricted to a single RB set (~20 MHz) was made in the context of initial access, i.e., for a PCell. It seems that there is no reason for such a restriction for an SCell/PSCell for which the parameter *initialUplinkBWP* is provided by dedicated signaling under *ServingCellConfig* 🡺 *UplinkConfig* 🡺 *BWPUplinkDedicated*. Ideally, this distinction should have been captured by RAN2 based on the LS that RAN1 sent to RAN2 in RAN1#101-e (see [2]); however, RAN2 chose to only note this LS without taking action.

## 2.1 <First Round Discussion>

Based on the description of the issue above, the modertor's recommendation is to discuss the following two alternative wordings for the CR. Note that the wording of both alternatives have been changed to the positive sense, i.e., "the UE expects" rather than the negative sense "the UE does not expect," as per recommended spec drafting rules.

Important: Please provide feedback on this proposal in the NWM tool (document name ***RAN1-105-e-NWM-NR-NRU-02***)

**Proposal 1 Discuss the following two alternatives wordings for a new paragraph to be added in 38.213 Section 12**

* Alt-1:

For operation with shared spectrum channel access, a UE expects that the BWP configured by parameter *initialUplinkBWP* provided in *BWP-UplinkCommon* by SIB1 is mapped to only a single RB set.

* Alt-2:

For operation with shared spectrum channel access, a UE expects that the BWP configured by the parameter *initialUplinkBWP* is mapped to only a single RB set.

## 2.2 <Summary of 1st Round>

The following input from companies was received in the first round:

|  |
| --- |
| **1 – SHARP Corporation**  We are OK with either, in principle. Sharp’s intention to provide it in this meeting is to solve the spec. issue. That is, in TS37.213, as agreed in R1-2104070 at the last meeting, the PUCCH should be mapped to single RB-set, which should be the common understanding in RAN1. However, current specification allows multiple RB-set allocation for a cell-specific PUCCH provided by SIB1. To adopt either can solve the issue.  For both options, we prefer to use negative expressions like ”a UE does not expect that ...”. |
| **2 – ZTE Corporation**  We are fine with the intention of the TP, and either alternative is ok. |
| **3 – HUAWEI TECHNOLOGIES Co. Ltd.**  We agree with the intention to confine the initial UL BWP configured in SIB1 to be 20MHz. Alt 1 reflects the intention more accurately. |
| **4 – Samsung R&D Institute UK**  We agree with the intention of the TP. Either alternative is ok. |
| **5 – Nokia Corporation**  We agree with the intention of the change and prefer Alt-1 |

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|  |
| --- |
| **6 – Intel Belgium SA/NV**  We agree with the intention and slightly prefer Alt 1 |
| **7 – Ericsson Inc.**  We support the correction and prefer Alt-1. |

Based on the input during the first round there is consensus on supporting a correction. Of the 7 companies providing input, 3 companies are okay with either Alt-1 or Alt-2, and 4 companies have a preference for Alt-1. One company prefers the wording "…the UE does not expect" instead of "…the UE expects …" However, it is the moderator's understanding that according to MCC guidance on specification drafting, it is preferable to use the latter whenever possible (i.e., the positive sense).

Based on this, it is the Moderator's recommendation to adopt Alt-1

**Proposal 1a Support the following text proposal to 38.213 Section 12 (Full CR to be drafted):**

----------------------------------------------------- TP to 38.213, Section 12 ---------------------------------------------------

12 Bandwidth part operation

If the UE is configured with a SCG, the UE shall apply the procedures described in this clause for both MCG and SCG

- When the procedures are applied for MCG, the terms 'secondary cell', 'secondary cells' , 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells, serving cell, serving cells belonging to the MCG respectively.

- When the procedures are applied for SCG, the terms 'secondary cell', 'secondary cells', 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells (not including PSCell), serving cell, serving cells belonging to the SCG respectively. The term 'primary cell' in this clause refers to the PSCell of the SCG.

A UE configured for operation in bandwidth parts (BWPs) of a serving cell, is configured by higher layers for the serving cell a set of at most four bandwidth parts (BWPs) for receptions by the UE (DL BWP set) in a DL bandwidth by parameter *BWP-Downlink* or by parameter *initialDownlinkBWP* with a set of parameters configured by *BWP-DownlinkCommon* and *BWP-DownlinkDedicated*, and a set of at most four BWPs for transmissions by the UE (UL BWP set) in an UL bandwidth by parameter *BWP-Uplink* or by parameter *initialUplinkBWP* with a set of parameters configured by *BWP-UplinkCommon* and *BWP-UplinkDedicated*.

For operation with shared spectrum channel access, a UE expects that the BWP configured by parameter *initialUplinkBWP* provided in *BWP-UplinkCommon* by SIB1 is mapped to only a single RB set.

If a UE is not provided *initialDownlinkBWP*, an initial DL BWP is defined by a location and number of contiguous PRBs, starting from a PRB with the lowest index and ending at a PRB with the highest index among PRBs of a CORESET for Type0-PDCCH CSS set, and a SCS and a cyclic prefix for PDCCH reception in the CORESET for Type0-PDCCH CSS set; otherwise, the initial DL BWP is provided by *initialDownlinkBWP*. For operation on the primary cell or on a secondary cell, a UE is provided an initial UL BWP by *initialUplinkBWP*. If the UE is configured with a supplementary UL carrier, the UE can be provided an initial UL BWP on the supplementary UL carrier by *initialUplinkBWP*.

-------------------------------------------------------------- End TP -------------------------------------------------------------

## 2.3 <Summary of 2nd Round>

The following input from companies was received in the second round:

**Feedback Form 2:**

|  |
| --- |
| **1 – LG Electronics Inc.**  Sorry for answering late.  According to majority’s view, we are also fine with Alt-1.  In addition, we are OK with Proposal 1a. |
| **2 – SHARP Corporation**  ”parameter *initialUplinkBWP* provided in *BWP-UplinkCommon* by SIB1” should be corrected to ”parameter *initialUplinkBWP* provided in *UplinkConfigCommonSIB*”. With the current RRC structure, it’s not clear that *initialUplinkBWP* is provided in *BWP-UplinkCommon.* Rather, *initialUplinkBWP* is provided in *UplinkConfigCommonSIB.*  UplinkConfigCommonSIB ::= SEQUENCE {  frequencyInfoUL FrequencyInfoUL-SIB, initialUplinkBWP BWP-UplinkCommon, timeAlignmentTimerCommon TimeAlignmentTimer } |

# References

1. R1-2105805, "Initial UL BWP size restriction for NR-U," Sharp, LGE, RAN1#105-e, May 2021.
2. R1-2005016, " LS to RAN2 on initial BWP for NR-U," RAN1, RAN1#101-e, May 2020.

# Appendix: CR to 38.213 proposed in [1]

----------------------------------------------------- CR to 38.213, Section 12 ---------------------------------------------------

12 Bandwidth part operation

If the UE is configured with a SCG, the UE shall apply the procedures described in this clause for both MCG and SCG

- When the procedures are applied for MCG, the terms 'secondary cell', 'secondary cells' , 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells, serving cell, serving cells belonging to the MCG respectively.

- When the procedures are applied for SCG, the terms 'secondary cell', 'secondary cells', 'serving cell', 'serving cells' in this clause refer to secondary cell, secondary cells (not including PSCell), serving cell, serving cells belonging to the SCG respectively. The term 'primary cell' in this clause refers to the PSCell of the SCG.

A UE configured for operation in bandwidth parts (BWPs) of a serving cell, is configured by higher layers for the serving cell a set of at most four bandwidth parts (BWPs) for receptions by the UE (DL BWP set) in a DL bandwidth by parameter *BWP-Downlink* or by parameter *initialDownlinkBWP* with a set of parameters configured by *BWP-DownlinkCommon* and *BWP-DownlinkDedicated*, and a set of at most four BWPs for transmissions by the UE (UL BWP set) in an UL bandwidth by parameter *BWP-Uplink* or by parameter *initialUplinkBWP* with a set of parameters configured by *BWP-UplinkCommon* and *BWP-UplinkDedicated*.

For operation with shared spectrum channel access, a UE does not expect a BWP configured by parameter *initialUplinkBWP* is mapped to more than one RB set.

If a UE is not provided *initialDownlinkBWP*, an initial DL BWP is defined by a location and number of contiguous PRBs, starting from a PRB with the lowest index and ending at a PRB with the highest index among PRBs of a CORESET for Type0-PDCCH CSS set, and a SCS and a cyclic prefix for PDCCH reception in the CORESET for Type0-PDCCH CSS set; otherwise, the initial DL BWP is provided by *initialDownlinkBWP*. For operation on the primary cell or on a secondary cell, a UE is provided an initial UL BWP by *initialUplinkBWP*. If the UE is configured with a supplementary UL carrier, the UE can be provided an initial UL BWP on the supplementary UL carrier by *initialUplinkBWP*.

-------------------------------------------------------------- End CR --------------------------------------------------------------