**3GPP TSG RAN WG1 Meeting #104-e R1-210xxxx**

**Jan 25th – Feb 5th, 2021**

**Agenda item: 7.2.2**

**Source: Moderator (Qualcomm Incorporated)**

**Title: FL summary for initial access signals and channels for NR-U**

**Document for: Discussion and Decision**

# Introduction

This paper summarizes the CR proposals for initial access signals and channels for NR-U.

To summarize:

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| --- | --- | --- |
| Issue # | Area of proposal | Contributions |
| Init-1 | Invalid SSB by SSB positions in burst for FBE | [1] |
| Init-2 | Clarification on usage of subCarrierSpacingCommon for unlicensed  | [2] |
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# Issue Init-1. Invalid SSB by SSB positions in burst for FBE

In [1], it is proposed to add clarification to capture earlier conclusion on invalid SSB for FBE.

Conclusion:

For semi-static channel access, SSBs that (partially) fall in the idle region of a fixed frame period should be considered as invalid. No PDSCH rate matching and no RLM/RRM measurement will be done for those candidate SSB positions.

The proposed solution is to add in 37.213 that the SSBs partially overlap with idle periods are not expected to be included in *ssb-PositionInBurst*.

TP for TS 37.213

==============Start of TP 1=====================

4.3 Channel access procedures for semi-static channel occupancy

Channel assess procedures based on semi-static channel occupancy as described in this Clause, are intended for environments where the absence of other technologies is guaranteed e.g., by level of regulations, private premises policies, etc. If a gNB provides UE(s) with higher layer parameters *ChannelAccessMode-r16 ='semistatic'* by SIB1 or dedicated configuration, a periodic channel occupancy can be initiated by the gNB every within every two consecutive radio frames, starting from the even indexed radio frame at with a maximum channel occupancy time , where *period* in , is a higher layer parameter provided in *SemiStaticChannelAccessConfig* and *.*

In the following procedures in this clause, when a gNB or UE performs sensing for evaluating a channel availability, the sensing is performed at least during a sensing slot duration . The corresponding adjustment for performing sensing by a gNB or a UE is described in clauses 4.1.5 and 4.2.3, respectively.

A channel occupancy initiated by a gNB and shared with UE(s) shall satisfy thefollowing:

- The gNB shall transmit a DL transmission burst starting at the beginning of the channel occupancy time immediately after sensing the channel to be idle for at least a sensing slot duration . If the channel is sensed to be busy, the gNB shall not perform any transmission during the current period.

- The gNB may transmit a DL transmission burst(s) within the channel occupancy time immediately after sensing the channel to be idle for at least a sensing slot duration if the gap between the DL transmission burst(s) and any previous transmission burst is more than .

- The gNB may transmit DL transmission burst(s) after UL transmission burst(s) within the channel occupancy time without sensing the channel if the gap between the DL and UL transmission bursts is at most

- A UE may transmit UL transmission burst(s) after detection of a DL transmission burst(s) within the channel occupancy time as follows:

- If the gap between the UL and DL transmission bursts is at most , the UE may transmit UL transmission burst(s) after a DL transmission burst(s) within the channel occupancy time without sensing the channel.

- If the gap between the UL and DL transmission bursts is more than , the UE may transmit UL transmission burst(s) after a DL transmission burst(s) within the channel occupancy time after sensing the channel to be idle for at least a sensing slot duration within a interval ending immediately before transmission.

- The gNB and UEs shall not transmit any transmissions in a set of consecutive symbols for a duration of at least before the start of the next period. A UE does not expect *ssb-PositionInBurst* indicates a candidate SS/PBCH block may be transmitted if the candidate SS/PBCH block partially overlap with the duration of at least before the start of the next period.

If a UE fails to access the channel(s) prior to an intended UL transmission to a gNB, Layer 1 notifies higher layers about the channel access failure.

===============End of TP 1======================

# Issue Init-2. Clarification on usage of subCarrierSpacingCommon for unlicensed

In [2], it is proposed to clarify the usage of subCarrierSpacingCommon, to avoid using the term when it is not defined.

============================== Start of TP1 for TS 38.211 ==================================

#### 4.4.4.2 Point A

Point A serves as a common reference point for resource block grids and is obtained from:

- *offsetToPointA* for a PCell downlink where *offsetToPointA* represents the frequency offset between point A and the lowest subcarrier of the lowest resource block, which overlaps with the SS/PBCH block used by the UE for initial cell selection, expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2;

 - for operation without shared spectrum channel access, the lowest resource block has the subcarrier spacing provided by the higher layer parameter *subCarrierSpacingCommon*;

 - for operation with shared spectrum channel access, the lowest resource block has the subcarrier spacing same as the SS/PBCH block used by the UE for initial cell selection;

- *absoluteFrequencyPointA* for all other cases where *absoluteFrequencyPointA* represents the frequency-location of point A expressed as in ARFCN.

============================== End of TP1 for TS 38.211 ==================================

============================== Start of TP2 for TS 38.211 ==================================

#### 7.4.3.1 Time-frequency structure of an SS/PBCH block

============================== Unchanged Text Omitted ==================================

For an SS/PBCH block, the UE shall assume

- antenna port  is used for transmission of PSS, SSS, PBCH and DM-RS for PBCH,

- the same cyclic prefix length and subcarrier spacing for the PSS, SSS, PBCH and DM-RS for PBCH,

- for SS/PBCH block type A,  and  with the quantities , and expressed in terms of 15 kHz subcarrier spacing, and

- for SS/PBCH block type B,  and  with the quantity  expressed in terms of the subcarrier spacing provided by the higher-layer parameter *subCarrierSpacingCommon* and expressed in terms of 60 kHz subcarrier spacing;

- the centre of subcarrier 0 of resource block coincides with the centre of subcarrier 0 of a common resource block with the subcarrier spacing provided by the higher-layer parameter *subCarrierSpacingCommon* for operation without shared spectrum channel access and same as the subcarrier spacing of the SS/PBCH block for operation with shared spectrum channel access. This common resource block overlaps with subcarrier 0 of the first resource block of the SS/PBCH block.

============================== End of TP2 for TS 38.211 ==================================

# Reference

[1]. R1-2101435, Invalid SSB in FBE for PDSCH rate matching, Qualcomm Incorporated

[2]. R1-2101173, Correction on the use of subCarrierSpacingCommon in NR-U, Samsung