3GPP TSG RAN WG1 Meeting #101-e R1-200xxxx

e-Meeting, May 25th – Jun 5th, 2020

**Agenda item:** 6.2.4

**Source:** Moderator (Qualcomm Incorporated)

**Title:** Summary of 101-e-LTE\_TerrBcast-01

**Document for:** Discussion and Decision

# Summary of issues

[101-e-LTE\_TerrBcast-01] Email discussion/approval on issues related to control region and CFI (including TP 2.1, 2.2, 3.1, 3.2 in [R1-2004687](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_101%5CDocs%5CR1-2004687.zip)) until 5/29 – Alberto (Qualcomm)

* Moderator to provide consolidated TPs based on the input to the meeting.

# Issue #1: Control region length related issues

In x4667 and x4163 it is proposed to modify Table 6.7-1 to specify that the new numerologies have 0 symbols for control. The TPs are slightly different but have the same intention. FL selected the TP from x4163 since it captures “MBSFN slots” for the new numerology.

**<TP 1.1, TS36.211>**

**6.7 Physical control format indicator channel**

The physical control format indicator channel carries information about the number of OFDM symbols used for transmission of PDCCHs in a subframe. The set of OFDM symbols possible to use for PDCCH in a subframe is given by Table 6.7-1.

**Table 6.7-1: Number of OFDM symbols used for PDCCH**

|  |  |  |
| --- | --- | --- |
| **Subframe** | **Number of OFDM symbols for PDCCH when**  | **Number of OFDM symbols for PDCCH when**  |
| Subframe 1 and 6 for frame structure type 2 or a subframe for frame structure type 3 with the same duration as the DwPTS duration of a special subframe configuration | 1, 2 | 2 |
| MBSFN subframes with  and configured with 1 or 2 cell-specific antenna ports | 1, 2 | 2 |
| MBSFN subframes with  and configured with 4 cell-specific antenna ports | 2 | 2 |
| MBSFN subframes with , ,  or MBSFN slots with  | 0 | 0 |
| Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals | 1, 2, 3 | 2, 3 |
| All other cases | 1, 2, 3 | 2, 3, 4 |

The UE may assume the PCFICH is transmitted when the number of OFDM symbols for PDCCH is greater than zero unless stated otherwise in [4, clause 12].

**</TP 1.1>**

**Proposal 1: Endorse TP 1.1**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Support the change. |
| ZTE | Ok with the change. |
| Huawei, HiSilicon | Support the change.  |

Additionally, x3535 proposes the following TP to correct the determination of starting symbol:

**<TP 1.2, TS36.211>**

1.
2.
3.
4.

**6.5 Physical multicast channel**

The physical multicast channel shall be processed and mapped to resource elements as described in clause 6.3 with the following exceptions:

- No transmit diversity scheme is specified.

- Layer mapping and precoding shall be done assuming a single antenna port and the transmission shall use antenna port 4.

- The PMCH can only be transmitted in the MBSFN region.

 - For PMCH with  other than , the index  in the first slot in the MBSFN subframe fulfils,

 - For PMCH with , the index  in the slot of the MBSFN region fulfils .

 - where is equal to the value given by the higher layer parameter *non-MBSFNregionLength* [9].

- The PMCH shall use extended cyclic prefix.

- The PMCH is not mapped to resource elements used for transmission of MBSFN reference signals.

- In clause 6.3.1, for Δ*f* = 1.25 kHz and Δ*f* ≈ 0.37 kHz, the scrambling generator shall be initialised at the start of each slot.

- For  the following exception applies to clause 6.3.5:

- The text “which meet all of the following criteria in the current subframe” shall be replaced by “which meet all of the following criteria in the current slot”

- The mapping to resource elements on antenna port not reserved for other purposes shall be in increasing order of first the index over the assigned physical resource blocks and then the index .

**</TP 1.2>**

**Proposal 2: Endorse TP 1.2**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | The text seems too convoluted. The starting symbol applies ONLY to 15kHz SCS, for the other SCS we start from the beginning. Maybe we can change the Rel-14 text to something like:For PMCH with = 15kHz, the index  in the first slot in the MBSFN subframe fulfils where  is equal to the value given by the higher layer parameter *non-MBSFNregionLength* [9].(We can revisit later depending on the progress of the Rel-14 CR). |
| ZTE | The issue raised by this TP is valid. However, the change seems to be a little cumbersome.We proposed a slightly different wording from Qualcomm’s. Between our wording and Qualcomm’s wording, we can go with the majority’s view.- The PMCH can only be transmitted in the MBSFN region. For subframes using Δ*f* = 15 kHz, the index  in the first slot in the MBSFN subframe fulfils where is equal to the value given by the higher layer parameter *non-MBSFNregionLength* [9]. |
| Qualcomm | We would be OK with either option, based on majority view. Anyway, if there is consensus to solve this issue this way, there is no need to agree on a TP here (the Rel-14 CR will contain this change). |
| Huawei, HiSilicon | We could be ok with this change with Rel-14. If this change is agreed for Rel-14, I agree no change is needed for here.  |

# Issue #2: Semistatic CFI

In x3786 and x4667, two following TPs are proposed:

* “Shall” vs “may” (x3786) for applicability of semistatic CFI
* Alignment with RAN2 specs (x4667)

The following TP merges both inputs.

**<TP 2 36.213>**

**9.1.3 Control Format Indicator (CFI) assignment procedure**

For a serving cell, if a UE is configured with higher layer parameter *semiStaticCFI-SlotSubslotNonMBSFN*, the UE shall assume the CFI is equal to the value of the higher layer parameter *semiStaticCFI-SlotSubslotNonMBSFN* for non-MBSFN subframes for receiving physical downlink shared channel with slot/subslot duration.

-------------------------- Other parts are omitted -----------------------------

For a MBMS-dedicated cell, if a UE is configured with higher layer parameter *semiStaticCFI-MBMS* included in *MasterInformationBlock-MBMS*, the UE shall assume the CFI is equal to the value of the higher layer parameter *semiStaticCFI-MBMS* for non-MBSFN subframes if a non-zero value is indicated by *semiStaticCFI-MBMS*.

**</TP 2>**

**Proposal 3: Endorse TP 2**

|  |  |
| --- | --- |
| Company | Comment |
| Qualcomm | Support the change. |
| ZTE | Support the change except for changing “shall” to “may”.We are not sure whether we need to change “shall” to “may”. More clarification is appreciated.Based on our understanding, the optional support of semistatic CFI has already been reflected in the condition “if a UE is configured with higher layer parameter semiStaticCFI-MBMS”. If we change “shall” to “may”, the UE behaviours become unclear from our perspective.  |
| Qualcomm 2 | The “may” is to align also with RAN2 spec, where the following is written:***semiStaticCFI-MBMS***Indicates semi-static value of CFI as specified in TS 36.213 [23], clause 9.1.3. If value 0 is indicated, CFI is obtained from PCFICH, otherwise the UE may assume the CFI in CAS is given by this field. |
| Huawei, HiSilicon | We also have a bit concern about changing “shall” to “may”. Any specific reason for RAN2 taking “may” instead? |
| Qualcomm 3 | In most of the cases in 213, we use “may assume” for something that can be used by the UE to enhance performance, but the system wouldn’t break the system if the UE does not do that. For example:“The UE may assume that the same precoder applies on all scheduled PRBs within a PRG”“The UE may assume the antenna ports 0 – 3, 7 – 46 of a serving cell are quasi co-located”“the UE may assume the same transmit antenna port value is indicated in each PDCCH/EPDCCH with DCI format 0 in a given subframe.”The text “shall assume” is for cases where the system would be broken:“A UE configured with the carrier indicator field for a given serving cell shall assume that the carrier indicator field is not present in any PDCCH of the serving cell in the common search space that is described in Subclause 9.1”Even for the URLLC case, where the specification states:“For a serving cell, if a UE is configured with higher layer parameter semiStaticCFI-SubframeMBSFN, the UE **shall assume** the CFI is equal to the value of the higher layer parameter semiStaticCFI-SubframeMBSFN for MBSFN subframes **for receiving physical downlink shared channel with subframe duration**.”It is qualified that it is for receiving PDSCH, i.e., the UE follows the semistatic value for rate matching purposes, but the network may actually set PCFICH to a different value, so there will be a 100% BLER in those cases.We believe this case is of “performance enhancement”, i.e., if the UE chooses to ignore the MIB indication there will be a performance degradation, but the system will not break completely. Hence, we think “may” is more in line with previous specification. |
| Qualcomm | Removed the “may -> shall” change from TP2. |

# Conclusion

<To be filled after discussion is completed>

# References

|  |  |  |
| --- | --- | --- |
| [R1-2004667](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004667.zip) (revision of [R1-2003337](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2003337.zip)) | Control region for the new numerologies of LTE-based 5G terrestrial broadcast | ZTE, ABS |
| [R1-2003535](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2003535.zip) | Corrections to 36.211 for the 0.37 kHz subcarrier spacing MBSFN | Huawei, HiSilicon |
| [R1-2003786](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2003786.zip) | Corrections for CAS reception | Qualcomm Incorporated |
| [R1-2004163](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004163.zip) | Corrections to 36.211 for the 2.5 kHz subcarrier spacing MBSFN | Huawei, HiSilicon |