**3GPP TSG-RAN WG4 Meeting #94-e R4-2002739**

Online, 24 Feb - 6 Mar 2020

**Source:** Huawei, HiSilicon

**Title:** TP for TR 37.823: Specific aspects for TDD

**Agenda Item:** 7.10.2

**Document for:** Approval

# 1 Introduction

In the RAN4#92 meeting, a WF for Rel-16 LTE-MTC coexistence with NR is agreed [1], where it specifies that the TDD specific issues should be captured in the TR. This paper proposes the TP for this topic.

# 2 References

[1] R4-1907849, WF for Rel-16 LTE-MTC coexistence with NR

# 3 Text Proposal

## **<Start of Text Proposal>**

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] RP-190770, “Revised WID for Additional MTC enhancements for LTE”

[3] 3GPP TS 36.211, Physical channels and modulation, v13.2.0

[4] R1-1903885, Coexistence of LTE-MTC with NR, Ericsson, RAN1#96bis

## **<Skip Unchanged Parts>**

## 8.4 Specific aspects for TDD

LTE-MTC supports all E-UTRA TDD configurations as specified in 3GPP TS 36.211 [3]. In the meantime, NR TDD configurations are very flexible. Not only slots but also individual symbols within a slot can be configured as either DL, UL or flexible (i.e. GP). For the sake of co-existence, the NR TDD configuration should be set up to match that of LTE-MTC.

More explicitly, two different patterns may be configured via the IE TDD-UL-DL-ConfigCommon in SIB1. Furthermore, the common settings may be overridden by UE specific configuration: TDD-UL-DL-ConfigDedicated. Table 8.4-1 shows the details of the RRC signalling.

Table 8.4-1: RRC Signaling for NR TDD Configuration

|  |  |
| --- | --- |
| **Field Name** | **Note** |
| **TDD-UL-DL-ConfigCommon**: | Signalled by SIB1 |
| referenceSubcarrierSpacing | Subcarrier spacing in kHz: 15, 30, 60, etc |
| dl-UL-TransmissionPeriodicity | Pattern periodicity in ms |
| nrofDownlinkSlots | Can be used to configure DL transmissions that matches the duration of DL subframes or forms part of the DwPTS in LTE-MTC |
| nrofDownlinkSymbols | Specifies a partial DL slot, together with other DL slots (if needed), can match the duration of DwPTS in LTE-MTC |
| nrofUplinkSymbols | Specifies a partial UL slot, together with other UL slots (if needed), can match the duration of UpPTS in LTE-MTC |
| nrofUplinkSlots | Can be used to configure UL transmissions that matches the duration of UL subframes or forms part of the UpPTS in LTE-MTC |
| **TDD-UL-DL-ConfigDedicated**: | UE specific RRC signalling |
| slotIndex | Depending on the SCS, the duration of a NR slot may be less (i.e. ½, ¼, etc) or equal to a subframe in LTE-MTC |
| allDownlink | The whole slot is for DL, more than one DL slot may be needed to match the duration of a DL subframe in LTE-MTC |
| allUplink | The whole slot is for UL, more than one UL slot may be needed to match the duration of a UL subframe in LTE-MTC |
| nrofDownlinkSymbols | Specifies a partial DL slot, together with other DL slots (if needed), can match the duration of DwPTS in LTE-MTC |
| nrofUplinkSymbols | Specifies a partial UL slot, together with other UL slots (if needed), can match the duration of UpPTS in LTE-MTC |

The main limitation of the NR TDD configuration is that the pattern has to be defined in the order of DL, GP and UL. A combination use of TDD-UL-DL-ConfigCommon and TDD-UL-DL-ConfigDedicated shall enable the NR TDD configuration to match that of any LTE UL-DL configuration. For example, Table 8.4-2 shows the NR TDD configuration that matches the LTE-MTC uplink/downlink configuration 1 with the special subframe configuration 7 (i.e. uplink/downlink subframe ratio is 1:1, DwPTS = 10 symbols, GP = 2 symbols, UpPTS = 2 symbols).

Table 8.4-2: Example of NR TDD configuration which matches with LTE TDD UL/DL configuration 1 and special subframe configuration 7

|  |  |  |
| --- | --- | --- |
| NR TDD | | LTE TDD |
| *Tdd-UL-DL-Configuration* | |  |
| referenceSubcarrierSpacing | 15 |  |
| dl-UL-TransmissionPeriodicity (ms) | 5 |  |
| nrofDownlinkSlots | 1 | Subframe 0 is DL |
| nrofDownlinkSymbols | 0 |  |
| nrofUplinkSlots | 0 |  |
| nrofUplinkSymbols | 0 |  |
| ***Tdd-UL-DL-ConfigDedicated*** | |  |
| slotIndex | 1 | Subframe 1 is a special subframe |
| nrofDownlinkSymbols | 10 | DwPTS=10 |
| nrofUplinkSymbols | 2 | UpPTS=2 |
| slotIndex | 2,3 | Subframe 2,3 is UL |
| symbols | allUplink |  |
| slotIndex | 4 | Subframe 4 is DL |
| symbols | allDownlink |  |

## **<End of Text Proposal>**