**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214469**

**Electronic Meeting, 15 ‒ 26 August 2022**

**Title: WF on HST FR2 RRM Core Requirement Maintenance**

**Agenda Item:** 9.7.5

**Source:** Nokia, Nokia Shanghai Bell

**Document for:** Approval

# UL timing

## Large one-step UL timing adjustment

**Way forward on large one-step UL timing adjustment**

Open issue needs further discussion:

* Option 1: Clarify the requirement if target TCI state is not in the active TCI state list and the DL timing difference is larger than [CP/4]
	+ Option 1a: If target TCI state is not in the active TCI state list and the DL timing difference is larger than [CP/4], limit the time needed for the UE to follow again clause 7.1.2.1 requirements and to adjust its UL timing within ±Te. It should happen not later than Trs + 2ms after the TCI state switch.
	+ Option 1b: Same as above, but Tssb is used instead of Trs
	+ Option 1c: Tq requirement in 7.1.2.1 applicable to UL slots except the first after TCI state switch.
	+ Option 1d: The gradual timing adjustment step of Tq shall be applied after the one shot uplink timing adjustment after TCI state switch.
	+ Option 1e: The gradual timing adjustment in 7.1.2.1 with reference timing T\_new - (N\_TA + N\_TA\_offset) + 2\*(T\_old - T\_new) is applicable to UL slots except the first after TCI state switch.
	+ Other options are not precluded
* Option 2: Keep current specification as it is.

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**Way forward on the value of relaxed UL transmit timing accuracy**

Open issue needs further discussion:

* Option 1: Remove square brackets and use ±7Ts as relaxed UL transmit timing accuracy in the current requirement.
* Option 1a: Remove square brackets and use ±7\*64\*Tc as relaxed UL transmit timing accuracy in the current requirement.
* Option 2: Do not distinguish the case “new target TCI state is not in the active TCI state list” and “in the active TCI state” and use ±7Ts accuracy for both.

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## Other remaining UL transmit timing issues

**Way forward on UL timing requirement when large one-step mechanism is disabled**:

Open issue needs further discussion:

* Option 2: No impact on UE behavior (no additional requirements)
* Option 4: After the TCI state switch, the UE shall not transmit except for RACH preamble in the new target TCI before one of the following conditions is fulfilled:
	+ the new timing advance is acquired and applied in the target TCI state according to the requirements in clause 7.3;
	+ the UL transmission is scheduled by the gNB.
	In this case, the requirements in clause 7.1.2.1 apply.
* Option 6: Power Class 6 UE initial transmission timing error after the TCI state switch shall be less than or equal to ±Te. Enhance the requirement in 7.1.2.
* Option 7: Introduce a DL timing difference threshold when highSpeedLargeOneStepUL-TimingFR2 is disabled.
* Other options are not precluded

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# Other remaining issues in RRM CORE maintenance

**Way forward on L1-SINR reporting with CSI-RS based CMR and no dedicated IMR configured**

Open issue needs further discussion:

* Option 1: For L1-SINR measurements with SSB-based CMR and dedicated IMR configured for FR2 HST, the same enhancements as SSB-based L1-RSRP measurements should be applied.
* Option 2: Do not define enhancement for L1-SINR measurements with SSB-based CMR and dedicated IMR
* Option 2a: For FR2 PC6 UE which support Rel-16 L1-SINR measurement, it can rely on legacy Rel-16 test cases to verify the performance.

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**Way forward on SMTC length in HST FR2 enhanced requirements**:

For UE supporting power class 6 with highSpeedMeasFlagFR2-r17 configured, if SMTC <= 40ms, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-11; [otherwise, TPSS/SSS\_sync\_intra is given in Table 9.2.5.1-2.]

For UE supporting power class 6 with highSpeedMeasFlagFR2-r17 configured, if SMTC <= 40ms, TSSB\_measurement\_period\_intra is given in Table 9.2.5.2-7; [otherwise, TSSB\_measurement\_period\_intra is given in Table 9.2.5.2-2.]

The addition of the clarification note needs further discussion:

* Option 2: Add Notes in the TS:
Note: Operation with TPSS/SSS\_sync\_intra in Table 9.2.5.1-2 may not be guaranteed under high-speed deployment scenarios.

Note: Operation with TSSB\_measurement\_period\_intra in Table 9.2.5.2-2 may not be guaranteed under high-speed deployment scenarios.

* Option 3: Add Notes from Option 2 in the WF.
* Option 4: Do not add any notes.

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**Agreement on Mpss/sss\_sync\_w/o\_gaps and Mmeas\_period\_w/o\_gaps for power class 6 UEs**:

Define Mpss/sss\_sync\_w/o\_gaps = 24 and Mmeas\_period\_w/o\_gaps = 24 for PC 6 UEs in Clause 9.2.5.

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**Way forward on applicability of enhanced requirements for other PCs**:

Open issue needs further discussion:

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When HST FR2 flags are configured for other power classes other than PC6, whether legacy requirements should be used.