**3GPP TSG RAN WG1 Meeting #104-e R1-2102247**

**e-Meeting, January 25th – February 5th, 2021**

**Title: DRAFT** LS on Timing Assumption for Inter-Cell DL Measurement

**Response to:**

**Release:** Rel-17

**Work Item:** NR\_feMIMO-Core

**Source:** Samsung

**To:** RAN4

**Cc:**

**Contact Person:**

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**1. Overall Description:**

RAN1 has agreed to support L1-RSRP reporting (and its respective SSB measurement) for L1/L2-centric inter-cell mobility. Pertinent to this aspect, the following agreement has been made.

**Agreement**

On Rel.17 multi beam measurement/reporting enhancements for L1/L2-centric inter-cell mobility and inter-cell mTRP:

* Rel.15 L1-RSRP is used as reporting quantity for measurement and reporting of non-serving-cell(s)
	+ Support SSB as a measurement RS for L1/L2-centric inter-cell mobility and inter-cell mTRP, and Rel.15 SS-RSRP calculated from SSB of non-serving cell(s)
		- FFS: Whether the measurement for SS-RSRP is limited within SMTC
		- FFS: Detailed reporting method, e.g. via including existing L1-RSRP report, UE-initiated report etc.
	+ FFS: Whether or not to support CSI-RS (for e.g. mobility and/or tracking) of non-serving cell(s) as a measurement RS for L1/L2-centric inter-cell mobility and inter-cell mTRP. If the support of CSI-RS (for e.g. mobility and/or tracking) of non-serving cell(s) as a measurement RS for L1/L2-centric inter-cell mobility and inter-cell mTRP is confirmed, Rel.15 CSI-RSRP is also supported
		- Whether the support applies to CSI-RS with or without QCL source, or both
	+ FFS: The number of non-serving cell(s) for measurement/reporting
	+ FFS: time behavior of the reporting, i.e. periodic, semi-persistent, aperiodic, or UE-initiated
* FFS: If other reporting quantities are supported, e.g. L3-RSRP, hybrid L1/L3-RSRP
* FFS: Dynamic activation/deactivation/selection of the beam measurement on the RS(s) associated with non-serving cell(s) via MAC CE
* FFS: Timing assumption (e.g. time of arrival and time of the measurement) for measurement of non-serving cell RS measurement

**Agreement**

On Rel.17 multi-beam measurement/reporting enhancements for L1/L2-centric inter-cell mobility and inter-cell mTRP,

* In one reporting instance, depending on NW configuration, beam(s) associated with a non-serving cell can be mixed with that associated with serving-cell
	+ FFS: whether this applies to periodic, semi-persistent, and/or aperiodic
	+ FFS: How to report the K beams and corresponding qualities if the Tx power among the non-serving cell and with serving-cell is not the same
	+ Note: The supported numbers of non-serving cells (in terms of measurement/reporting) have not yet been decided. The above description doesn’t imply only one non-serving cell is allowed to be configured for measurement. Nor does this imply that only one non-serving cell is allowed in one reporting instance.

Related to the timing assumption for SSB measurement, the following issues were discussed and no consensus was reached. It was reckoned that RAN4 guidance will be beneficial:

* Whether the measurement for SS-RSRP is limited within SMTC
* Whether the receive timing of the SSB from the non-serving cell can be different from the receive timing of the signals from the serving cell

For the aforementioned purpose (in the context of L1/L2-centric inter-cell mobility operations), RAN1 seeks a few answers from RAN4 on the following questions in order to proceed further. Note that thus far (cf. R1-2102008, R1-2102248):

* Only SSB has been agreed to be used for non-serving cell measurement RS. CSI-RS is still TBD
* Only intra-frequency measurement has been agreed and inter-frequency measurement is still TBD

**Question 1**: What are the implications (from RAN4 perspective) of limiting the measurement for L1-RSRP on measurement RS of a non-serving cell within SMTC for the aforementioned extended L1-RSRP reporting framework? Conversely, what are the implications of not limiting the measurement for L1-RSRP within SMTC?

**Question 2**: For measurement on measurement RS of a non-serving cell, with the aforementioned extended L1-RSRP reporting framework, if the receive timing of the measurement RS from the non-serving cell can be different from the receive timing of the signals from the serving cell for both the cases within SMTC and outside SMTC, what are the implications from RAN4 perspective?

**2. Actions:**

**To: RAN4**

**ACTION:** RAN1 respectfully asks RAN4 to provide answers for the above questions related to timing assumption for inter-cell DL measurement with additional details that RAN1 shall further consider.

**3. Date of Next TSG-RAN WG1 Meetings:**

TSG RAN WG1 Meeting #105-e 12th – 20th April, 2021 E-meeting