**3GPP TSG RAN WG1 Meeting #107-e R1-211xxxx**

**e-Meeting, November 11 – 19, 2021**

**Title: [Draft] LS on sensing beam selection**

**Response to:**

**Release:** Rel-17

**Work Item:** NR\_ext\_to\_71GHz

**Source:** Qualcomm [RAN1]

**To:** RAN4

**Cc:**

**Contact Person:**

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**Attachments:**

**1. Overall Description:**

For LBT operation in FR2-2, RAN1 discussed the relationship between the transmission beam and the sensing beam used for LBT for the transmission, and has the following agreements:

Agreement:

* When UE indicates a capability for beam correspondence with beamCorrespondenceWithoutUL-BeamSweeping ={1}, support the following behaviors
* If the UE is indicated to transmit with a beam corresponding to a certain SRI, the UE can use the same beam for sensing
* Assuming Rel.17 unified TCI framework, if the UE is indicated to transmit with a beam corresponding to a certain unified TCI, the UE can use the reception beam corresponding to the TCI for sensing
* FFS: The case when UE does not indicate a capability for beam correspondence
* Note: The UE should meet local regulatory requirements

**Agreement**

For the following situations

* Selecting sensing beam at the gNB
* Selecting sensing beam at the UE when UE does not indicate a capability for beam correspondence with beamCorrespondenceWithoutUL-BeamSweeping ={1}
* Selecting sensing beam at the UE when UE uses a different beam for sensing than the beam used for transmission,

Specify necessary requirement/test procedure to guarantee sensing beam(s) “covers” the transmission beam(s)

* Some methods to define “cover” have been discussed in RAN1
	+ Alt-1A: the angle included in the [3] dB beamwidth of the transmission beam is included in the [X, FFS] dB beamwidth of the sensing beam.
	+ Alt-1B: the sensing beam gain measured along the direction of peak transmission direction is at least X [FFS] dB of the transmission beam gain
	+ Alt-1C: The sensing beam gain is measured in one or more directions where the transmission beam EIRP is within A [FFS] dB of the peak EIRP. The sensing beam gain measured along the chosen directions is at least X [FFS] dB of the transmission beam gain in those directions.
	+ Alt-1D: The sensing beam gain is measured in one or more directions where the transmission beam EIRP is within A [FFS] dB of the peak EIRP and the sensing beam gain measured along the chosen directions is at least X [FFS] dB of the peak sensing beam gain
	+ Alt-1E: Sensing beam has the minimum [3] dB beamwidth which at least contains all beam peak directions of transmission beams.
	+ Alt-1F:
		- Selecting sensing beam at the gNB is up to gNB’s implementation
		- Sensing beam at the UE may use a wider beam for sensing than the beam used for transmission, when the UE does not indicate a capability for beam correspondence with beamCorrespondenceWithoutUL-BeamSweeping ={1}
* Sending LS to RAN4 and inform them the above and request them to make the final choice
	+ RAN4 choice may not be limited by the list above
	+ RAN4 can further decide for gNB or UE separately if such test or requirement is not needed or not practical and leave it to gNB or UE implementation

RAN1 would like to kindly ask RAN4 to take the above agreements into consideration for ensuring that a sensing beam for LBT operation “covers” the transmission beam.

**2. Actions:**

**To RAN4:** RAN1 would like to kindly ask RAN4 to take the above agreements into consideration for ensuring that a sensing beam for LBT operation “covers” the transmission beam.

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

TSG-RAN WG1 Meeting #107-bis-e 17 – 25 Jan 2022 Online

TSG-RAN WG1 Meeting #108-e 21 Feb – 04 Mar 2022 Online