3GPP TSG-RAN WG4 Meeting #102-e R4- 220xxxx

E-meeting, February 21 – March 03, 2022

**Agenda item:** **10.16.8**

**Source: Intel Corporation**

**Title: WF on NR extension to 71 GHz RRM requirements (Part 2)**

**Document for:** **Approval**

# Introduction

In this contribution we capture the agreements achieved during the email discussion on the topic Rel-17 NR ext. to 71GHz RRM core requirements (AI 10.16.8) in RAN4#102-e under email thread [102-e][225] NR\_ext\_to\_71GHz\_RRM\_2. This email thread covers following sub-agenda items:

* AI 10.16.8.3 Interruption requirements
* AI 10.16.8.4 Active BWP switching delay requirements
* AI 10.16.8.5 Measurement gap interruption requirements
* AI 10.16.8.6 LBT impacts on RRM requirements

The details on the discussion can be found at the [225] thread discussion summary [1].

# Way forward

## Interruption requirements

* Interruption requirements of CBW change for NR-CA can apply to NR-DC

## LBT impacts on RRM requirements

### General

* RAN4 will define the LBT requirements for all scenarios which were agreed for FR2-2
* Updated Draft CR Work split

|  |  |
| --- | --- |
| Draft CR | Company |
| DraftCR for FR2-2 LBT support in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED state mobility requirements | **Intel** |
| DraftCR for FR2-2 LBT support in Radio Link Monitoring and Link recovery procedures | **Huawei** |
| DraftCR for FR2-2 LBT support in SCell Activation and Deactivation Delay requirements and Active TCI state switching delay requirements | **MTK** |
| DraftCR for FR2-2 LBT support in Intra-Frequency measurements | **Nokia** |
| DraftCR for FR2-2 LBT support in Inter-Frequency measurements | **Ericsson** |
| DraftCR for FR2-2 LBT support in L1-RSRP measurements for reporting. | **Qualcomm** |
| DraftCR for FR2-2 LBT support in requirements for PSCell addition and release delay, PSCell change and Conditional PSCell change | **vivo** |

* Use “FR2-2” term for all CCA related requirements in the spec since currently there is no CCA operation in FR2-1
* The step of FR2-2 RRM requirements extension due to missed SMTC/SSB occasions is equal to N SMTC/SSB occasions, where N is RX beam sweeping scaling factor
* Issue 2-2-2: How to take into account the LBT failures on the RRM requirements
	+ Option 1 (Nokia, Qualcomm, Huawei, Intel, vivo, Apple, CATT): The time is extended by the number of SSB/SMTC occasions groups not available at UE. An SSB/SMTC group consists of N SSB/SMTC occasions, and it is not available when at least one SSB/SMTC occasions is not available in the group.
	+ Option 2 (Nokia, Intel, vivo, CATT): Number of additional Rx beam sweeping rounds is equal to the number of SMTC/SSB occasions not available at the UE and consecutively spaced by N SMTC/SSB occasions during the measurement period. If there are no SMTC/SSB occasions not available at the UE and consecutively spaced by N SMTC/SSB occasions during the measurement period, then only one additional Rx beam sweeping round is needed for measurement.
	+ Option 3 (CATT): Number of additional Rx beam sweeping rounds is equal to the number of SMTC/SSB occasions not available at the UE and based on the measurement of the same beam during the measurement period. If there are no SMTC/SSB occasions not available at the UE and based on the measurement of the same beam during the measurement period, then only one additional Rx beam sweeping round is needed for measurement.
* Issue 2-2-3: Maximum number of SMTC occasions not available at the UE
	+ Option 1: RAN4 will reuse the FR1 value of maximum number of SMTC occasions not available at the UE considering that for FR2-2 it is **the maximum number of SMTC/SSB groups** with at least one SMTC/SSB occasion not available at the UE.
	+ Option 2: RAN4 will reuse the FR1 value of maximum number of SMTC occasions not available at the UE considering that for FR2-2 it is **the total maximum number of SMTC/SSB occasion** not available at the UE
* Issue 2-2-4: Time gap between two successful measurement samples
	+ Option 1: Within the set of measurements any two measurements shall not be separated in time by more than X ms.
	+ Option 2: No need to set the limit on the time gap between two successful measurement samples since it is already implicitly set by defining maximum numbers of SMTC occasions not available at the UE
* Issue 2-2-5: Name for RX beam sweeping scaling factor in TS38.133
	+ Option 1: The 1st round agreement applies to all FR2-2 RRM requirements which refer to RX beam sweeping scaling factor.
	+ Option 2: The 1st round agreement applies to all FR2-2 CCA related RRM requirements which refer to RX beam sweeping scaling factor.
	+ Option 3: The 1st round agreement applies to Section 9.2A in TS38.133 to avoid confusion with N - number of candidate positions within an SMTC/SSB occasion.

### RRC\_IDLE and RRC\_CONNECTED state mobility requirements

* Do not consider any changes for 10s time period before cell selection in Idle mode until there will be corresponding agreements in the other threads
* RAN4 will scale up the parameters Mn, Mp, Mq and the periodicity of the cell selection criterion evaluation by Rx beam scaling factor
* RAN4 will reuse legacy FR2 margins for reselection criteria for inter-frequency and intra-frequency measurements in RRC\_IDLE state mobility
* RAN4 will develop new handover requirements for FR2-2 with CCA, at least for the following scenarios: NR FR2-2 – NR FR2-2 Handover and NR FR1 – NR FR2-2 Handover
* RAN4 will extend the applicability of the requirements in clause 6.1.1.3 in TS 38.133 to support handover from NR FR2-2 with CCA to NR FR1 (without CCA)
* Issue 2-3-8: TIU extension for Type 3 channel access
	+ Proposal 1: For handover to cells in FR2-2 with LBT, no extension of TIU is needed for Type 3 channel access, defined in TS 37.213: L3 = 0
* The requirements for Nserv\_CCA, Tdetect, Tmeasure and Tevaluate are discussed directly in the corresponding draft CR and will not be captured in this WF document

### Signalling characteristics

* FR2-2 LBT-based requirements for SCell activation, TCI state switch, RLM and link recovery, PSCell addition and release delay, PSCell change, Conditional PSCell change are discussed directly in the corresponding draft CRs and will not be captured in this WF document

### Measurement procedure

* RAN4 to postpone the definition of requirements for intra-frequency time index detection in FR2-2 unlicensed, until there is an agreement for intra-frequency time index detection in FR2-2 licensed
* For FR2-2 intra-frequency measurement requirements with LBT, reuse the FR2 requirements on the minimum number of cells and number of SSBs that the UE shall be capable of performing measurements in each intra-frequency
* For FR2-2 inter-frequency measurement requirements with LBT, reuse the FR2 requirements on the minimum number of cells and number of SSBs that the UE shall be capable of performing measurements in each inter-frequency layer.
* Wait for decision on the power classes to be supported in FR2-2 before agreeing on the number of samples Mpss/sss\_sync\_w/o\_gaps\_CCA , Mmeas\_period\_w/o\_gaps\_CCA, Mpss/sss\_sync\_with\_gaps\_CCA, Mmeas\_period\_ with\_gaps\_CCA, Mpss/sss\_sync\_inter\_CCA, MSSB\_index\_inter\_CCA, Mmeas\_period\_inter\_CCA for unlicensed operation in FR2-2
* The requirements for TPSS/SSS\_sync\_intra\_CCA are discussed directly in the corresponding draft CR and will not be captured in this WF document

# References

1. R4-220xxxx, Email discussion summary for [102-e][225] NR\_ext\_to\_71GHz\_RRM\_2, Intel, RAN4 #102-e, February 21 – March 03, 2022