**3GPP TSG-RAN WG4 Meeting #98-Bis-e R4-2105412**

**Online, 12 – 21 May, 2021**

**Source:** Intel Corporation

**Title:** NR on 52.6 – 71 GHz workplan

**Agenda item:** 8.12.1

**Document for:** Approval

# Background

A new WI on NR 52.6 – 71 GHz was approved [1] which involves RAN4 scope. According to the WID, RF and RRM core specification works will begin from RAN4#98-Bis-e (April 2021). The core part of the WI is planned to be completed by RAN4#112 (February 2022).

In this contribution, we propose the scope and workplan for this WI.

# Scope of Rel-17 WI

The revised WID [1] specifies RAN4 scope as follow –

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| * Core specifications for UE, gNB and RRM requirements [RAN4]:
	+ Specify new band(s) for the frequency range from 52.6GHz-71GHz. The band(s) definition should include UL/DL operation and excludes ITS spectrum in this frequency range.
	+ Specify gNB and UE RF core requirements for the band(s) in the above frequency range, including a limited set of example band combinations (see Note 1).
	+ Specify RRM/RLM/BM core requirements.
* Note 1: The WI can be completed provided requirements for at least one band combination involving a new NR-U band is specified as long as it is in line with country-specific regulatory directives.
* Note 2: UEs supporting a band in the range of 52.6GHz-71GHz are not required to support 480kHz SCS and 960kHz SCS.
* Note 3: The maximum FFT size required to operate the system in 52.6GHz-71GHz frequency is 4096, and the maximum of RBs per carrier is 275 RBs.
* Note 4: the system is designed to support both single-carrier and multi-carrier operation.
* Note 5: RAN plenary will decide whether new FR (e.g. FR3) shall be defined for the frequency range from 52.6GHz-71GHz or the existing FR2 shall be extended to cover frequency range from 52.6GHz-71GHz.

Similar to regular NR and NR-U operations below 52.6GHz, NR/NR-U operation in the 52.6GHz to 71GHz can be in stand-alone or aggregated via CA or DC with an anchor carrier.  |

According to the WID, the following are in the scope of this WI:

* Stand-alone mode
* Aggregated via CA
* DC with an anchor carrier

To be able to specify further detail operation scenario, it is important to identify whether a band is being operated as licensed or unlicensed.

***Observation #1:*** *To specify further detail operation scenario, i.e., stand-alone, CA, or DC, it is necessary to identify whether a band is a licensed or unlicensed.*

# Workplan for RF and RRM core part

We propose the following workplan for RF and RRM work in RAN4. Since there is no RRM time budget in this meeting, RAN4 might want to focus on RF plan in this time and continue on RRM plan in the next meeting (RAN4#99-e).

**Workplan for RF core parts**

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| --- | --- |
| Meeting | RF |
| RAN4#98-Bis-eApr’21 | Discussions on* RF requirements and spec impact for BS and UE
* Bandplan and Channelization (incl. sync raster), Spectrum utilization
* Frequency range definition, i.e., FR2 vs. FRx
* Operation scenarios
* Response to RAN1 on beam switching time LS
* Response to RAN1 on channel bandwidth and channelization LS
* List of BS and UE RF requirements that will be impacted compared to Rel-16 FR2.
* Agree on operation scenario(s), i.e., standalone, CA, or DC. Also agree on how to handle the band combinations for different scenario(s).
* Agree on specification structures for the following spec. – TS 38.101-2 (or new spec), TS 38.101-3 (or new spec), TS 38.104, TS 37.106, TS 37.107, TS 38.141-2

Agreements on* Workplan
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| RAN4#99-eMay’21 | Discussions on* (continued) Bandplan and channelization
* (continued) Frequency range definition, i.e., FR2 vs. FRx
* BS and UE transmitter requirements
* Propose band combinations for operation scenario(s), i.e., standalone, CA, or DC

Agreements on* Detailed bandplan and channelization
* List of BS and UE RF requirements that will be impacted compared to Rel-16 FR2.
* Agree on operation scenario(s), i.e., standalone, CA, or DC. Also agree on how to handle the band combinations for different scenario(s).
* Agree on specification structures for the following spec. – TS 38.101-2 (or new spec), TS 38.101-3 (or new spec), TS 38.104, TS 37.106, TS 37.107, TS 38.141-2
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| RAN4#100-eAug’21 | Discussions on * (continued) bandplan and channelization
* (continued) BS and UE transmitter requirements
* BS and UE receiver requirements
* Requirements for specific band combinations for the scenario(s)

Agreements on* (continued) List of BS and UE RF requirements that will be impacted compared to Rel-16 FR2, if any.
* (continued) Agree on operation scenario(s), i.e., standalone, CA, or DC. Also agree on how to handle the band combinations for different scenario(s), if any.
* (continued) Agree on specification structures for the following spec. – TS 38.101-2 (or new spec), TS 38.101-3 (or new spec), TS 38.104, TS 37.106, TS 37.107, TS 38.141-2, if any.
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| RAN4#100-Bis-eOct’21 (TBC) | Discussions on* (continued) BS and UE transmitter requirements
* (continued) BS and UE receiver requirements
* (continued) Requirements for specific band combinations for the scenario(s)
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| RAN4#111Nov’21 | Discussions on* (continued) BS and UE transmitter requirements
* (continued) BS and UE receiver requirements
* (continued) Requirements for specific band combinations for the scenario(s)

Agreements on* BS and UE transmitter requirements
* Requirements related to band combinations for the scenario(s)
* Provide draft CRs for all related specs
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| RAN4#112Feb’22 | Discussions on* Remaining BS and UE transmitter requirements
* Remaining BS and UE receiver requirements
* Remaining Requirements for specific band combinations for the scenario(s)

Agreements on* BS and UE receiver requirements
* Any remaining requirements
* All related CRs
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**Workplan for RRM core parts**

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| Meeting | RRM |
| RAN4#98-Bis-eApr’21 | No plan |
| RAN4#99-eMay’21 | Discussions on * Identify RRM/RLM/BM requirements impacts for the support operation at frequencies between 52.6GHz and 71GHz

Agreements on * Initial RRM/RLM/BM requirements scope
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| RAN4#100-eAug’21 | Discussions on* Discussion on the identified RRM/RLM/BM requirements needed to support operation at frequencies between 52.6GHz and 71GHz

Agreements on * Final RRM/RLM/BM requirements scope
* Initial agreements on identified RRM core requirements
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| RAN4#100-Bis-eOct’21 (TBC) | Discussions on* (continued) Discussion on the identified RRM/RLM/BM requirements needed to support operation at frequencies between 52.6GHz and 71GHz

Agreements on* Agreements on identified RRM/RLM/BM core requirements core requirements
* CR Work Split
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| RAN4#111Nov’21 | Discussions on* (continued) Discussion on the identified RRM/RLM/BM requirements needed to support operation at frequencies between 52.6GHz and 71GHz

Agreements o* Agreements on identified RRM core requirement
* Draft CRs to TS 38.133 for identified RRM core requirements
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| RAN4#112Feb’22 | Discussions * (continued) Discussion on the identified RRM/RLM/BM requirements needed to support operation at frequencies between 52.6GHz and 71GHz
* Initial discussion on test cases design for agreed RRM core requirements.

Agreements on* Finalization of RRM/RLM/BM requirements requirements
* Final CR(s) on TS 38.133
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***Proposal #1: RAN4 to agree on the RF core parts of the workplan as presented in the above in this contribution.***

***Proposal #2: RAN4 continue discussion on RRM core parts in the May meeting.***

There are several operation scenarios in the WID, i.e., stand-alone, CA, or DC. It is important to identify whether this spectrum to be a licensed or an unlicensed, or both. Based on the current spectrum regulatory status, 52.6 – 71 GHz spectrum seems to be clear as unlicensed operation and no final decision for a licensed operation. There is a separate paper on spectrum situation and band plan [2].

# Summary

In this paper, we presented the RF and RRM work plan for NR 52.6 – 71 GHz and made the follwoing proposal.

***Proposal #1:*** *RAN4 to agree on the RF and RRM core parts of the workplan as presented in the above in this contribution.*

***Proposal #2: RAN4 continue discussion on RRM core parts in the May meeting.***

***Observation #1:*** *To specify further detail operation scenario, i.e., stand-alone, CA, or DC, it is necessary to identify whether a band is a licensed or unlicensed.*

# Reference

[1] RP-202925, Revised WID: Extending current NR operation to 71 GHz, RAN#90-e, Qualcomm, Intel

[2] R4-2106465, On spectrum situation and band plan for 52.6 – 71 GHz, RAN4#98Bis-e, Intel