Smarter technology for all

3GPP TSG RAN#93-e
Electronic Meeting, September 13 – 17, 2021

RP-212454

Agenda Item:	9.0.2
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Study on NR extension from 71-114.25 GHz in Rel-18

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Motivation & Use-cases

- Availability of large contiguous bands is a key motivation to extend NR operation from 71 – 114.25 GHz
  - Licensed bands 71 – 76 GHz and 81 – 86 GHz in ITU regions 1, 2 and 3
  - Support for ultra-wideband spectrum operation in licensed bands

Short-term Needs	Long-term Needs
Requirements of ultrawide bandwidth to support high-precision and low-power positioning techniques	New waveform candidates considered for 71-114.25 GHz will be essential for further extension in the sub-THz bands as a first step towards 6G
Requirements of ultrawide bandwidth for flexible duplexing with non-overlapping sub-bands for UL and DL	Additionally, channel models, PA models. PN models considered for 71-114.25 GHz would be applicable as well for sub-THz
High-capacity fixed wireless access including backhaul	

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Key Aspects for NR operation from 71 – 114.25 GHz in Rel-18

- **Evaluation Methodology**
  - Study if modifications to channel model (TR38.901) needed for operating between 100 – 114.25 GHz
  - Identify HW limitations, antenna models, PN models, and reference PA models for FR beyond 71GHz
- **New waveform candidates**
  - Identify and evaluate new waveform candidates to deal with high PAPR issue
    - Identify required enhancements with selected waveform for DL and/or UL including:
      - Impact to initial access procedures, control channel design, reference signals such as DM-RS, PT-RS, etc.
      - Low modulation schemes such as pi/2 BPSK for DL
      - Support of multiplexing different/mixed waveforms across different physical channels/signals

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Proposal for NR operation from 71 – 114.25 GHz in NR Rel-18 *

- Study item for NR operation from 71 – 114.25 GHz with following objectives:
  - Identify the evaluation methodology including channel models for above 100GHz, antenna models, PN models, reference PA models for waveform and new numerology analysis [RAN1, RAN4]
  - Identify and evaluate the candidate waveforms for both downlink and uplink [RAN1]

** Our accompanying contribution with draft SID in RP-212457*

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Proposal for TU Allocation in Rel-18

- Considering a very compact scope for SI on NR extension beyond 71GHz in Rel-18, following two alternatives for TU allocation are proposed
  - Assuming 18 months as tentative Rel-18 timeline (Jan 2022 – June 2023)
- Alternative 1: Early start of the SI in Rel-18

Topic	RAN1 TU Allocation					
SI: Extension of NR operation from 71-114.25GHz	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2
	0	0.5	0.5	1	2	2

- Alternative 2: Late start of the SI in Rel-18

Topic	RAN1 TU Allocation					
SI: Extension of NR operation from 71-114.25GHz	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2
	0	0	0	2	2	2

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thanks.

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