

# Views on the NR 52.6-71 GHz frequency range definition

Agenda Item: 9.7.2  
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Document for: Discussion/Decision



# Background

## The definition and notations of the frequency range 52.6-71GHz was discussed in RAN #90-e

- E-mail discussion summary (RP-202926)
  - Introduce FR3: Nokia, Charter Communications, Samsung, OPPO, InterDigital, Lenovo, Motorola Mobility, Qualcomm, Apple, Sony, AT&T (11)
  - Reuse FR2: CATT, Ericsson (2)
  - Leave it to RAN4 decision: Intel, FUTUREWEI, ZTE, LG Electronics, Huawei, HiSilicon (6)
  - Moderator's proposal: Considering the RAN4's workload, RAN plenary makes decision to introduce FR3 for frequency range 52.6-71GHz to save time in RAN4
- The latest approved WID (RP-202925) captured the plenary guidance as follow:
  - *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.*

# Intel's Views (1)

- A new notation to designate 52.6 – 71 GHz frequency range will provide a better external visibility of the 3GPP NR evolution to support the new frequency range and relevant use cases.
- The decision on the new notation should also take into account the possible 3GPP specification impacts across all WGs.
- **RAN1 specifications**
  - In RAN1 spec., subcarrier spacing restrictions, timing, SSB pattern, SSB offset, power control, MR-DC operation, SRS configuration, and other aspects are dependent on FR1 and FR2.
  - RAN1 will need to review all instances of FR1 and FR2 usage and if needed update the specification appropriately. Note, this review will be needed regardless of how new frequency range is defined.
- **RAN2 specifications**
  - In RAN2 spec, FR1/FR2 Measurement gap, UE assistance information for overheating and UE capability signaling includes some different handling for FR1 and FR2. There are also many references to FR1/FR2 in field description of physical layer parameters.
  - RAN2 will need to review all instances of FR1 and FR2 usage and this applies regardless of how new frequency range is defined.
  - Nevertheless, from RAN2 protocol pov, no showstopper with either approach as signaling can be extended with non-critical extension if needed.

# Intel's Views (2)

- **RAN3 specifications:**
  - There are a few references to FR2 in TS 38.473, while the effort appears to be low.
- **RAN4 specifications**
  - Due to an early stage of the RAN4 work, the exact set of UE RF, BS RF and RRM requirements impacts is not fully identified.
    - New specific requirements for the new FR might be introduced (e.g., UE PC, CBW, spectrum utilization, channel raster, new RRM scaling factors, etc).
    - Selected FR2 requirements can be reused.
    - The exact notation solution should be flexible enough to minimize spec impacts for both cases.
  - A dedicated specification is currently used for FR2 UE RF (TS 38.101-2). If a new notation is introduced, it is still desirable to integrate the functionality into the existing spec instead of creating a new specification to minimize the RAN4 workload.
- **Summary**
  - Prefer to introduce a new notation for the NR 52.6 – 71 GHz range
  - Recommend that no new separate RAN4 RF specifications shall be introduced for the new range
  - The new notation shall be flexible enough to allow:
    - Specifying dedicated functionality/requirements for the new frequency range.
    - Reusing the existing FR2 functionality/requirements with minimum impact on specification.

# Summary

- Proposal #1: No new separate specifications shall be introduced to capture the NR 52.6 – 71 GHz and the existing specifications shall be reused.
- Proposal #2: Introduce a new notation for the 52.6 – 71 GHz frequency range, selecting between the following options:
  - Option 1: Use FR2 notation to designate the full 24.25 – 71 GHz range
    - Use a new FR2a notation for 24.25 – 52.6 GHz range
    - Use a new FR2b notation for 52.6 – 71 GHz range
    - By default, any existing references to FR2 will automatically apply to the new FR2b bands.
  - Option 2: Keep FR2 notation for 24.25 – 52.6 GHz and use a new FR2a notation for 52.6 – 71 GHz range
    - By default, any existing references to FR2 will not automatically apply to the new FR2a bands.

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