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Source: Samsung

Motivation for new WI on enhanced NR support for high speed train scenario in frequency range 2 (FR2)

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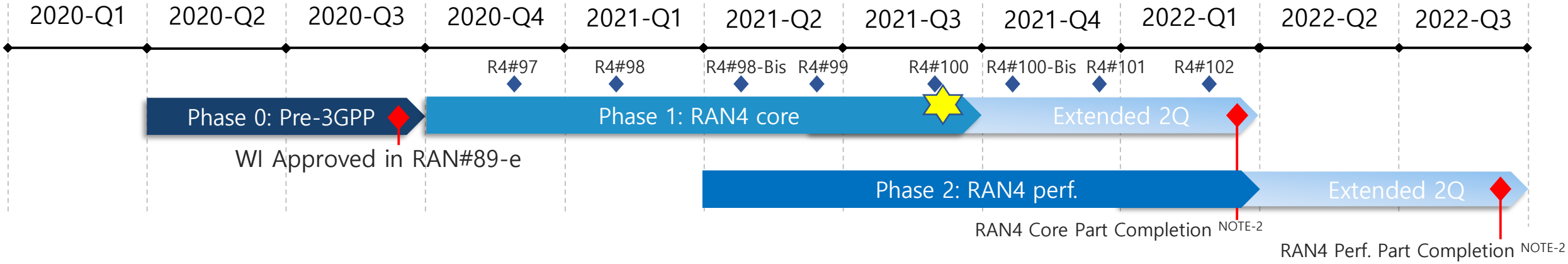
Background for Rel-17 NR Support for HST in FR2

- NR support for HST in Frequency Range 2 (FR2)
  - Rel-17 RAN4-led Work Item NOTE-1
  - Highlights from the scope in WID:
    - NR SA single carrier scenario in FR2
    - Focused on train roof-mounted high-power devices
    - Single panel, *i.e.,* only one active antenna panel at a time, as baseline antenna assumption
    - Study on supporting speeds of up to a maximum of 350km/h, with Rel-15/16 NR design limitation.



- NOTE-1: RP-210800, the updated work item description.
- NOTE-2: 3GPP Rel-17 Overall Timeline is extended for 2Q due to the impact of COVID-19.

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Rel-18 Proposal for NR FR2 HST Enhancement

- Study and specify the requirements for the following deployment scenario [RAN4]:
  - Focused on train roof-mounted high power devices with target applicable carrier frequency up to 30GHz;
  - Study on reference tunnel deployment scenario for FR2 HST and specify the channel model and corresponding core requirements;
  - Specify the requirements for intra-band carrier aggregation (CA) scenario;
  - Specify the requirements to support the scenario with mixed near-to-track (*i.e.*, Scenario-A with D_s = 700m and D_{min} = 10m) and far-from-track (*i.e.*, Scenario-B with D_s = 700m and D_{min} = 150m) RRH deployment;
  - Study the feasibility of supporting HST velocity of up to a maximum of 500km/h, with carrier frequency up to 30GHz.

	Large-Scale Pathloss Model (for System-Level Evaluation)	**Channel Modeling for performance requirement**
Open Space, Scn.-A/B	TS38.901 RMa LoS Validated	DPS(Dynamic Point Selection)-based, Scn.-A/B, Uni/Bi-directional
Tunnel Scenario	*Not studied in Rel-17 WI (due to low priority and limited RAN4 TU)*	

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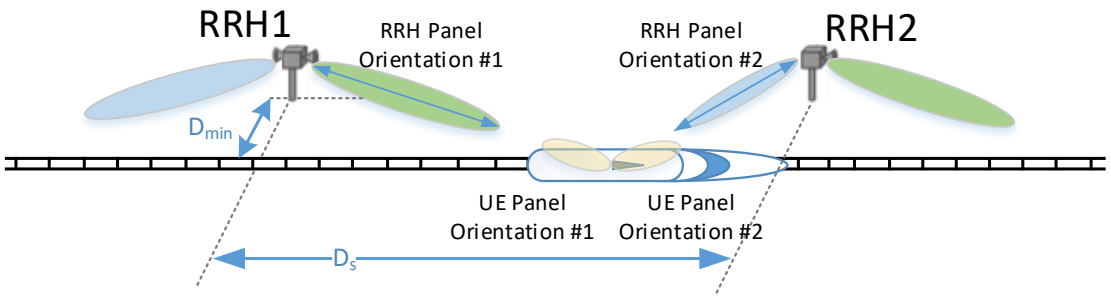
Rel-18 Proposal for NR FR2 HST Enhancement

- Specify the requirement for multi-panel operation for train roof-mounted FR2 high power devices [RAN4]
  - Maximum 2 active panels supporting the multi-panel simultaneous reception.



Multi-panel reception in Bi-directional RRH Deployment

- Specify the new uplink timing adjustment mechanism for FR2 HST scenario with large propagation delays from different TRPs to UE [RAN1, RAN4]

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Thank You

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