

3GPP TSG RAN Meeting #102

Edinburgh, UK, December 11-15, 2023

RP-233688

Views on Rel-19 RAN4 cross-area topics

Agenda Item:

9.1.4.4

Source:

Intel Corporation

Document for:

Discussion & Decision

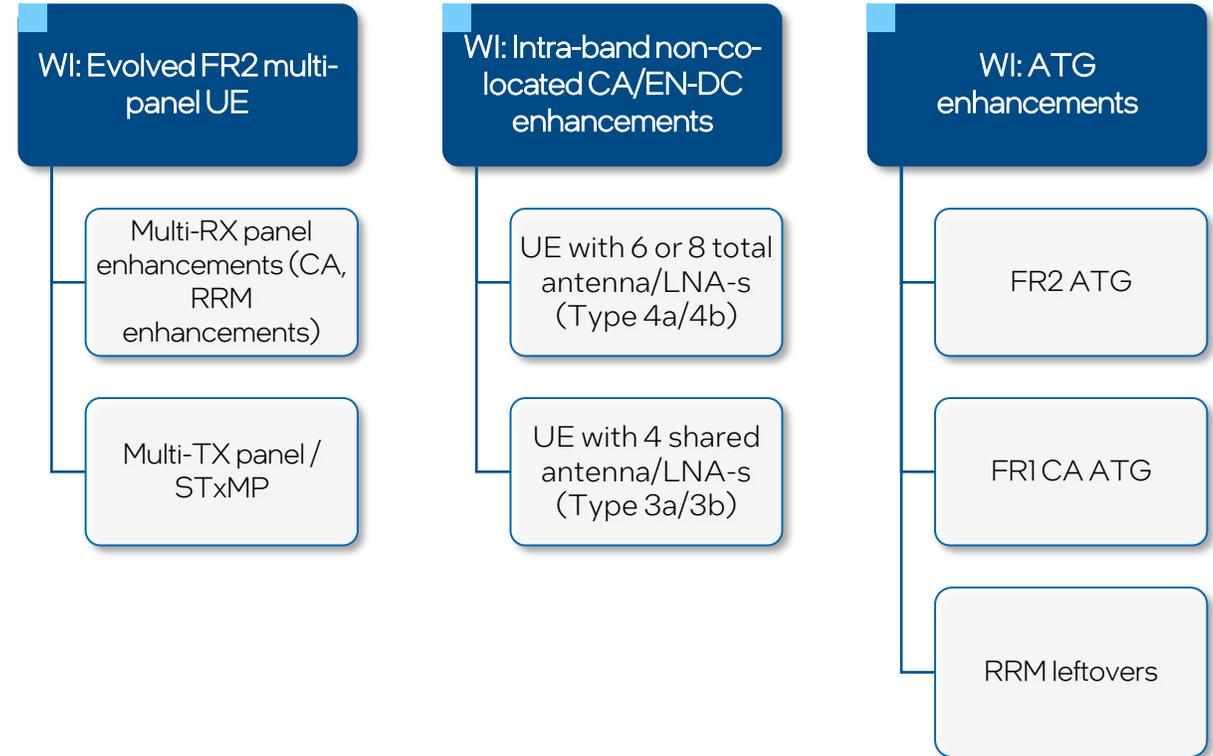


Introduction

The general views on RAN4 Rel-19 SI/WI package is provided in RP-233685

The following SI/WIs are recommended to be considered for cross-area topics:

- WI: Evolved FR2 multi-panel UE
- WI: Intra-band non-co-located CA/EN-DC enhancements
- WI: ATG enhancements



Intel's priorities for RAN4 Rel-19 Cross-area topics

	Prioritized objectives/scope	Comments
Evolved FR2 multi-panel UE	<p>Multi-RX panel enhancements</p> <ul style="list-style-type: none"> • CA extension • RRM enhancements (L3 enhancements, inter-cell mTRP TCI state switch and beam management.) <p>Multi-TX panel / STxMP</p> <ul style="list-style-type: none"> • RF and RRM requirements 	<p>A standalone WI to continue the work on RF/RRM enhancements for multi-panel simultaneous RX and support of simultaneous TX. [2/1] RF/RD TUs per meeting.</p>
Intra-band non-co-located CA/EN-DC enhancements	<ul style="list-style-type: none"> • UEs with 6 or 8 total antenna/LNA-s (Type 4a/4b) • UEs with 4 shared antenna/LNA-s (Type 3a/3b) 	<p>Continuation of Rel-18 work to enable non-collocated operation for additional UE types. [0.5/0.5] RF/RD TUs per meeting.</p>
ATG enhancements	<ul style="list-style-type: none"> • FR2 support • FR1 CA support • RRM leftovers and improvements 	<p>Continuation of Rel-18 work to enable ATG with focus on exploration study for FR2 use case. [1/1] RF/RD TUs per meeting.</p>

Evolved FR2 UE Simultaneous Multi-Panel Operation

Evolved FR2 UE Simultaneous Multi-Panel Operation

Simultaneous Multi-panel RX

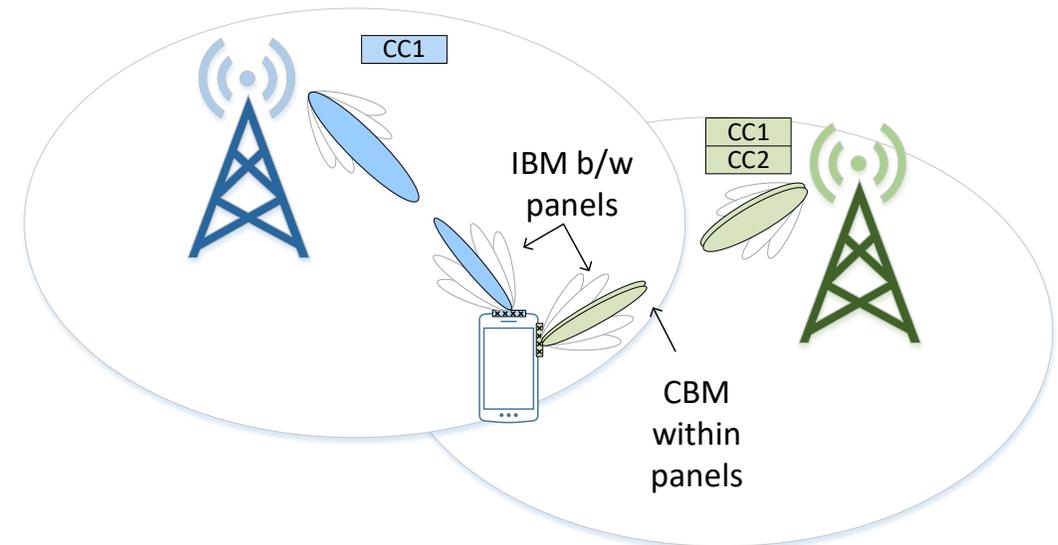
Motivation

- Support of FR2 simultaneous multi-Rx chain requirements is being introduced in Rel-18 NR_FR2_multiRX_DL WI. The Rel-18 requirements are limited to a single carrier scenario, and multiple potential enhancements were de-prioritized.
- Further evolution of Multi-Rx operation requirements is required to extract full benefits of advanced UE implementations

Candidate objectives/scope

- **DL CA multi-panel simultaneous RX:** Focus on intra-band CA and common beam management (CBM) within each panel. Introduce corresponding RF/RRM/Demod requirements and test methods.
- **Enhanced RRM requirements:** Rel-18 leftovers incl. L3 enhancements, inter-cell mTRP TCI state switch and beam management.
- **Enhanced demodulation requirements:** Joint processing of simultaneous mTRP signals.
- **Extension to FR2-2** (incl. RF/RRM/Demod requirements).
- **Extension to additional FR2 power classes** beyond PC3 including FWA/CPE devices.

Multi-RX CA operation framework



Evolved FR2 UE Simultaneous Multi-Panel Operation

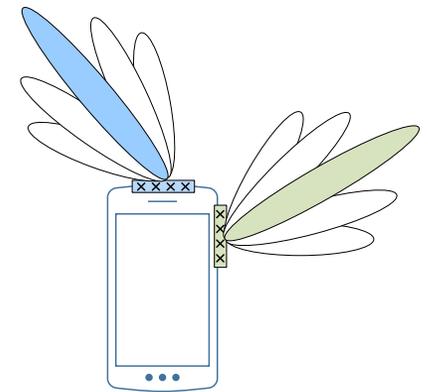
Simultaneous Multi-panel TX

Motivation

- Simultaneous FR2 multi-panel transmission (STxMP) feature can improve FR2 UL performance including data rate and connection robustness
- Support of STxMP is introduced in Rel-18 FeMIMO WI. However, it is expected that a limited set of RAN4 requirements is planned to be introduced in Rel-18 (Pcmax).
- Rel-18 scope does not include RF and FR2 Test Methods for STxMP. Extensive RAN4 studies work are needed to introduce the baseline requirements.

Candidate objectives/scope

- Focus on leftovers from Rel-18 work
- UE requirements to support single carrier STxMP operation including at least RF and RRM requirements.
- Limit to 2 Tx panels case, handheld and FWA/CPE UEs and single carrier STxMP operation.
- **SRS multi-panel simultaneous Tx**
- **RF requirements:** At least consider EIRP and new requirement concept based on spherical coverage
- **RRM requirements:** UL TCI state switch requirements, UL beam management procedures (e.g., beam selection)
- **OTA test methods** to enable STxMP testing



Other cross-area topics

Other Areas

The work on selected Rel-18 areas and use cases is recommended to continue to introduce a more complete set of functionality, but a relatively small work scope and load is anticipated

ATG enhancements

- Support of CA scenarios (RF/RRM requirements)
- Support of single carrier FR2 ATG operation (RF/RRM/Demod requirements)
- RRM leftovers and improvements (e.g., Location based CHO)

Intra-band non-collated CA/EN-DC

- Support of non-located scenarios for FR1 intra-band non-contiguous NR CA and inter-band EN-DC (with overlapped DL spectrum)
 - Support for UEs with 6 or 8 total antenna/LNA-s (Type 4a/4b)
 - Support for UEs with 4 shared antenna/LNA-s between carriers (Type 3a/3b)
 - Investigate and specify the tolerable power imbalance and required arrival time differences between carriers
 - Specify MRTD and MTTD requirements in non-located deployment

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