

Overview on RAN4 R19

OPPO

General view

- Scope for each work/study item should be concise enough to give enough discussion time opportunities in RAN4. Each individual WI/SI should **not exceed 3 objectives**.
- Avoid the situation of one item with many objectives. It has been shown many times that some of these objectives will be given up even from the very beginning with RAN4 time be wasted.

Overview of RAN4 R19 items

UE RF

- **FR1 enh**
 - 6Rx for handheld UE
 - PC1.5 for intra contig/non-contig UL CA
 - Power boosting with relaxed requirements and/or enhanced PAPR reduction schemes
- **3Tx enh:**
 - 3Layer UL MIMO/3TxD
 - Introduce handheld UE for 3Tx CA
 - New power combinations for inter band CA with 3Tx
 - Increase higher power limit for 3Tx, e.g. PC3+PC2+PC2

RF+RRM

- **SL enhancements in RAN4**
 - SL-U lefts/enh:
 - SL-U PC3
 - SL-U MIMO/TxD
 - SL-U leftover AMPR
 - SL CA
 - intra-band non-contiguous CA
 - SL CA PC2

RRM only

- RRM Enh
- Measurement Gap

OTA

- **OTA SISO**
 - Rel-18 left overs if any, e.g. RC/2Tx...
 - Focus on defining TRP/TRS requirements for demanded bands:
 - R18 left bands, new bands, CA band combinations
- **OTA MIMO**
 - Define requirements for demanded FR1/FR2 bands
- **FR2 test Enh**
 - RC method as a candidate for FR2 tests like spurious emission (TRP metric)

UE RF: FR1 Enh



- **6Rx**

- Motivation: Useful for system, and lefts of Rel-18 proposals
- Scope:
 - Enable 6Rx on higher frequency bands (e.g. n41/n77/n78) with **smartphone**
 - Introduce **6Layer DL MIMO** requirements, and **SRS antenna switching** ILs

- **PC1.5 intra-band CA with 2Tx**

- Motivation: It has been demanded by operators for long time
- Scope:
 - Intra-band **contiguous** CA w/ or w/o UL MIMO
 - Intra-band **non-contiguous** CA

- **Power boosting**

- Motivation: Improve UL coverage with current PA ability by relaxing RF requirements or enhanced PAPR reduction schemes on the condition of no/limited impact to current system.
- Scope:
 - Study and specify requirements for **power boosting** with schemes like **ACLR/EVM relaxing approaches or enhanced PAPR reduction** schemes considering different modulation impacts

UE RF: 3Tx enh in Rel-19

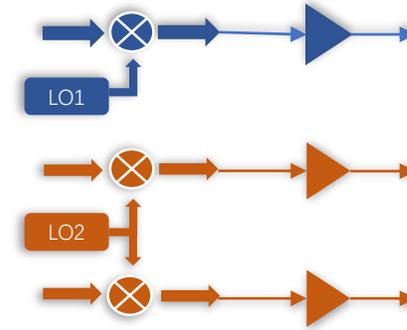


Background:

3Tx for inter-band CA/ENDC has been introduced and commercialized in Rel-18. Further enhancements in Rel-19 are demanded.

Enhancements:

- For single CC
 - Introduce **3Layer** UL MIMO (codebook based) /3TxD
 - **Increase high power limit** can be supported, e.g. 3xPC3
- For inter-band UL CA/EN-DC
 - **Handheld** UE with 3Tx
 - ✓ Motivation: Only FWA was supported in Rel-18, and Handheld UE is with high interests from industry.
 - **New power combinations** requested by operators
 - ✓ Motivation: In Rel-18, only part of power combinations are supported which cannot meet operator deployment demands.
 - **Increase high power limit** can be supported, e.g. PC3+PC2+PC2
 - ✓ Motivation: 3Tx UE can support much higher power capabilities.



PC2 in total		band A 1Tx			
		FDD PC3	FDD PC2	TDD PC3	TDD PC2
band B 2Tx	FDD PC3				
	FDD PC2	R19	R19	R19	R19
	TDD PC3	R18			
	TDD PC2	R18	R19	R18	

PC1.5 in total		band A 1Tx			
		FDD PC3	FDD PC2	TDD PC3	TDD PC2
band B 2Tx	FDD PC2	x		x	
	TDD PC2	x		x	
	TDD PC1.5	R18	R19	R19	R19

RF+RRM: SL continuation and Enh in RAN4



Background:

Some of RAN4 Rel-18 SL evolution contents were deprioritized due to work load which needs to be completed in Rel-19 by RAN4 lead work item.

New **RAN4 centric** enhancements.

RAN4 centric Enh:

• SL-U Enh:

- SL-U with **PC3**
 - Motivation: Only power class 5 was specified in Rel-18, but actually for commercial use case PC3 is more useful
- SL-U **MIMO/TxD**
 - Motivation: RAN4 decided to focus on 1Tx first in Rel-18, and MIMO/TxD was postponed to Rel-19.
- SL-U **AMPR** for more NS values
 - Motivation: Due to work load, RAN4 can only complete part of the AMPR evaluations in Rel-18, and postpone other NS values to Rel-19.

• SL CA

- intra-band **non-contiguous** CA
 - Motivation: Non-contiguous is demanded in EU vehicular industry, however, in Rel-18 due to limited time only support contiguous CA.
- SL contiguous CA with **PC2** and non-contiguous CA with PC2/PC3

TEST: TRP/TRS

- Background:
 - SISO OTA (TRP/TRS) has been discussed a lot for several releases with vast scope including core part and performance part.
 - Although many meeting time have been spent on it (including one adhoc in every meeting), still some of the objectives cannot get enough time of discussion or lack of inputs due to too many contents.
 - In Rel-19, the scope needs to be **concise and focus** on real demands.
- Scope:
 - Rel-18 leftovers if any, e.g. RC/2Tx/CA...
 - Focus on **complete TRP TRS requirements** for operator demanded bands and band combinations
 - R18 left bands, new bands, CA band combinations

RRM priorities

RRM enhancement evolution

- FR2 L3 delay reduction
- TCI state switching delay enhancement
- Enhancement of FR2 multi-Rx, e.g., unified TCI state switch, requirements for intra-band CA scenario

MG enhancement Evolution

- Pre-configured NCSG
- Support Pre-configured MG for Redcap UE
- Handling multiple types of MGs