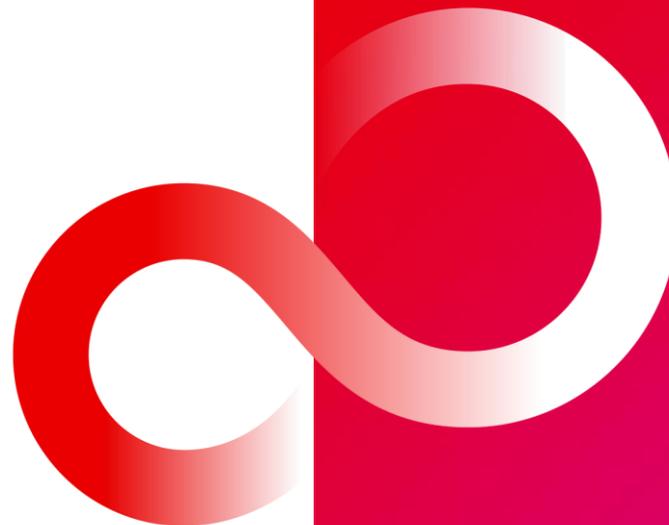


Taipei, June 15 - 16, 2023

Views on Rel-19

Agenda Item:	4
Source:	Fujitsu
Document for:	Discussion

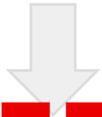


Directions for 3GPP 6G

5G



5G ADVANCED



6G

Ultra Low-Cost Network

- Simple specification but support many use cases
 - Just aim at low-cost network, which enables aggressive deployments/investments by operators
- This approach may yield unexpected new services

IMT-2030 Requirements

- Peak data range, spectrum efficiency, connection density, C/U-plane latency etc.???
- Spectrum support (\sim THz) ???

Note: mandatory requirements from ITU-R POV

Can be addressed in later releases

Low-cost Development

- One basic function covering wide use cases → Economy of Scale
- Avoid massive optional features and flexibilities



Improvement of 3GPP working procedure

Low-cost Deployment

- Clear benefit of 6G even with existing sites and equipment
- Make the full use of Open RAN

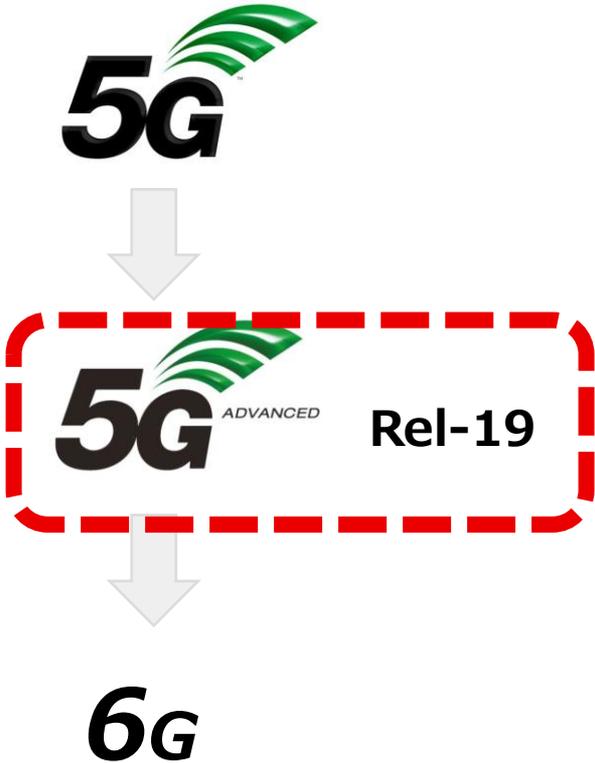


New functionalities in 3GPP

Low-cost Operation

- Energy saving
- Self-organization/optimization

Milestone for 6G What should we do in Rel-19?



1. Items for commercial requirements

- Products shall catch up with 3GPP standards
- Small WIs are expected to address the urgent needs

2. Preparation for next generation

- Address the problems found in 5G
- Specify the solutions in 5G as an optional feature, and aim at a native functionality in 6G
- Allow relaxing backward compatibility constraints

3. Reasonable work for vertical requirements

- Vertical WIs tend to too big in each release
- Reasonable scope is expected

4. Research activities

- Find break-through technologies in 3GPP

Overview of our preferred Rel-19 items



	RAN1 led	RAN2 led	RAN3 led	RAN4 led
Items for commercial requirements	MIMO eNCR		SON/MDT AI/ML for RAN Network controlled AP	FR2 femtocell NR BS receiver
Preparation for next generation	NES RIS	Mobility Multi-carrier		New spectrum range
Reasonable work for vertical requirements	Ambient IoT	XR		
Research activities	AI/ML for AI Duplex Evo ISAC	Metaverse		

Red: High Interest
Black: Medium Interest

● MIMO (RAN1)

- Motivation:
 - Solutions to improve UL performance
- Potential objective:
 - Leftovers from previous releases, e.g. enhancements on STxMP, UL sub-band precoding

● SON/MDT, AI/ML for RAN (RAN3)

- Motivation:
 - SON is an essential functionality for operation optimization, and SON functionality for new features should be supported
- Potential objective:
 - Support of new features such as RAN slicing, NTN and IAB can be considered

- **Network controlled Access Point (RAN3)**

- Motivation
 - Make the small cell deployment easier by introducing Home eNB concept to NR
 - Extend the coverage of higher frequency (i.e. FR2)
- Potential objective
 - Study and decide the architecture
 - Study and specify SON functionality for this purpose

- **FR2 femtocell (RAN4)**

- Motivation
 - Expand the use cases/scenarios for FR2
- Potential objective
 - Define RF requirements

- **NR BS receiver (RAN4)**

- Motivation
 - Introduce missing useful functionality (which is available for LTE)
- Potential objective
 - Demod: BS advanced receiver (MMSE-IRC)

● eNCR (RAN1)

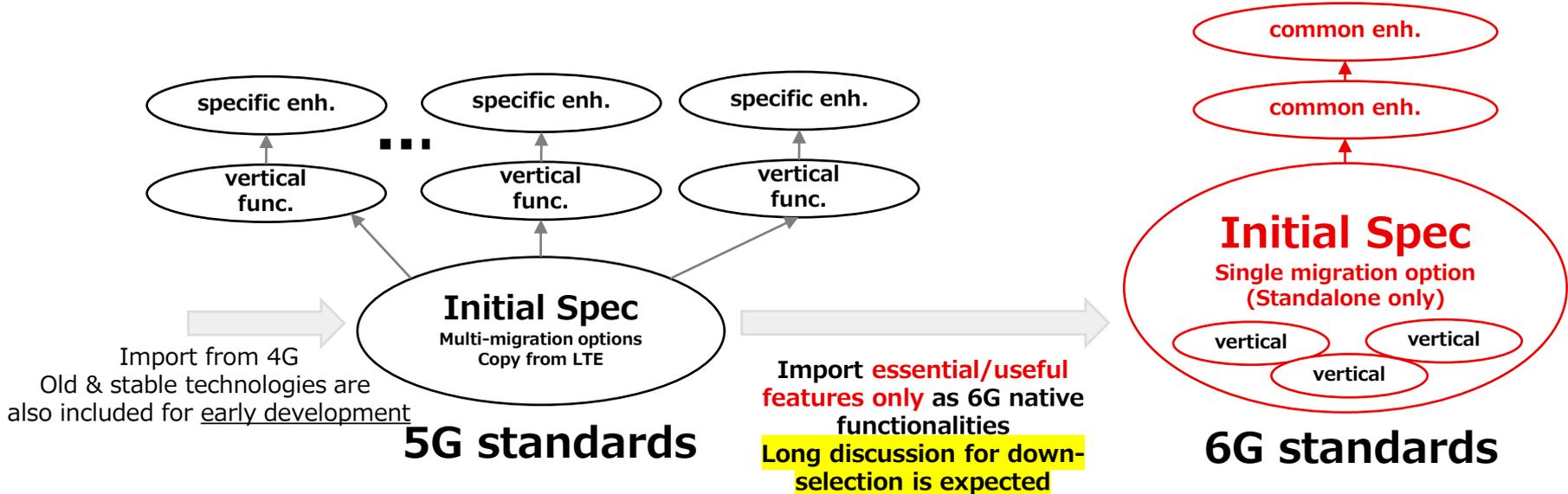
● Motivation:

- Specify the missing functionalities for Rel-18 NCR, which were discussed in Rel-18

● Potential objective:

- Support of out-of-band control, e.g. C-link in FR1 and access link in FR2 (and same FR but C-link and Fwd use different carrier → lower priority)
- Support of NCR power control, e.g. backhaul link and/or downlink of access link.

Background: Why preparation is necessary in Rel-19?



Good preparation will be a shortcut to successful 6G
Initial spec should be defined for 5G-Advanced and imported to 6G

What do we prepare for next generation?

Low-cost Deployment
Low-cost Operation

(key factors for ultra low-cost network)



- **Next Generation Network Energy Saving** → RWS-230267
- **Mobility enhancements** → RWS-230268
- **Multi-carrier Evolution** → RWS-230269
- **New Spectrum range (FR1.5: 7.125–24250MHz)** → RWS-230270

● RIS

- Motivation:
 - Provide additional solutions for achieving better coverage with FR2
- Potential objective:
 - Started from study phase, focusing on scenario and channel model discussion
 - The solution can be based on side control defined for NCR

● Ambient IoT:

- RAN SI → RAN WG SI
- Down selection of scenarios and device type is critical for successful commercialization before starting normative work
 - Network topology: To make the full use of existing coverage, “BS <-> Ambient IoT device” should be granted as the most important topology
 - Device type: C would have higher priority

● XR:

- Continue the RAN WG activities

● AI for Air interface:

- Both study phase and normative phase should be performed in Rel-19
 - Normative phase for 3 use cases in Rel-18 SI
 - Study phase for AI/ML framework (high priority) and new use cases (low priority)
- More details in our companion contribution → **RWS-230271**

● Duplex Evolution:

- Normative phase on SBFD or study on Full Duplex

● ISAC (Sensing and Comm):

- RAN WG SI based on the SA SI

● Metaverse:

- Depends on the outcome of SA

Thank you

