3GPP TSG RAN Rel-19 workshop
Taipei, June 15 – 16, 2023

RWS-230405

Discussion on Reconfigurable Intelligent Surface in Rel. 19

KDDI corporation

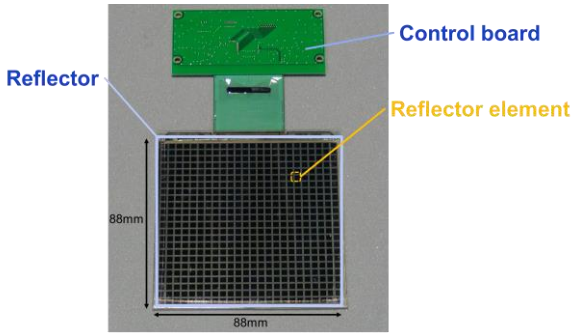
Tomorrow, Together
KDDI

Motivation

- Although many operators deployed NR in FR2, the frequency bands in FR2 suffer from dead spot issue.
- As a solution to address the dead spot issue in FR2, RIS becomes a key technology to enhance the coverage with low cost and low power consumption.
- We believe that RIS becomes an important technology for more spread of service in FR2.

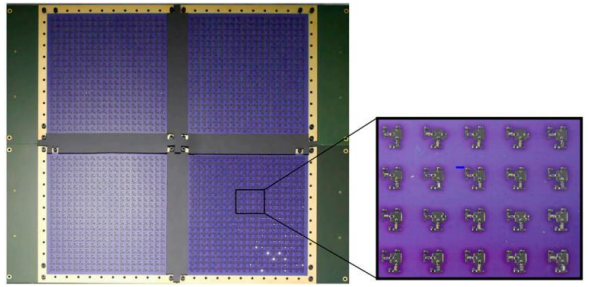
Progress of RIS from Rel. 18

- Many companies demonstrated RIS to clarify
  - Design concept
  - Propagation modeling, etc.



[1]

[2]



[3]

Large RIS	$\propto (d_{SR} + d_{RD})^{-1}$
Small RIS	$\propto (d_{SR} d_{RD})^{-1}$
Repeater	$\propto \min\left((d_{RD})^{-1}, (d_{SR})^{-1}\right)$

SNR to distance from BS[4]

[1] Development of the World's First Direction-Variable Liquid Crystal Meta-Surface Reflector | KDDI Research, Inc. (kddi-research.jp)
[2] R. Liu, *et al*., "Simulation and Field Trial Results of Reconfigurable Intelligent Surfaces in 5G Networks," in *IEEE Access*, vol. 10, pp. 122786-122795, 2022
[3] V. Popov, *et al.*, "Experimental demonstration of a mmWave passive access point extender based on a binary reconfigurable intelligent surface," *Frontiers Commun. Netw*., vol. 2, Oct. 2021.
[4] M. Di Renzo, *et al*., "Reconfigurable Intelligent Surfaces vs. Relaying: Differences, Similarities, and Performance Comparison," *IEEE Open Journal of the Communications Society*, vol. 1, pp. 798-807, 2020.

Proposal

- We propose starting discussion of RIS in rel. 19
- Prioritized Issues
  - Study use cases and deployment scenario and identify target requirements
  - RF requirements, architecture design
    - to clarify the difference against conventional RF devices and to define the requirements for the actual use.
  - Channel model
    - to prepare the evaluation environment of RIS.
  - RIS control signaling
    - Since the RIS control signaling has common discussion point with NCR, we consider it may be discussed in NCR-enhanced.