

**Scope:** Standardized Radio Access technologies across generations (2G, 3G, 4G, 5G)

**Responsibilities:** Defines protocol stacks (PHY, MAC, RLC, PDCP, RRC, NAS, SDAP), interfaces (N2, N3, E1, F1), UE categories, QoS, signaling, and base station behavior (gNB/eNB) with the core network.

3GPP  
(3rd Generation  
Partnership Project)

O-RAN  
Alliance

- **Scope:** Specifies open, disaggregated RAN architectures and interfaces for multi-vendor interoperability.
- Responsibilities:**
- Defines functional splits (O-CU-CP, O-CU-UP, O-DU, O-RU).
  - Specifies E2, A1, and open fronthaul interfaces.
  - Defines Near-RT RIC and control loops.

**Scope:** Focuses on software-defined RAN controllers and orchestration.

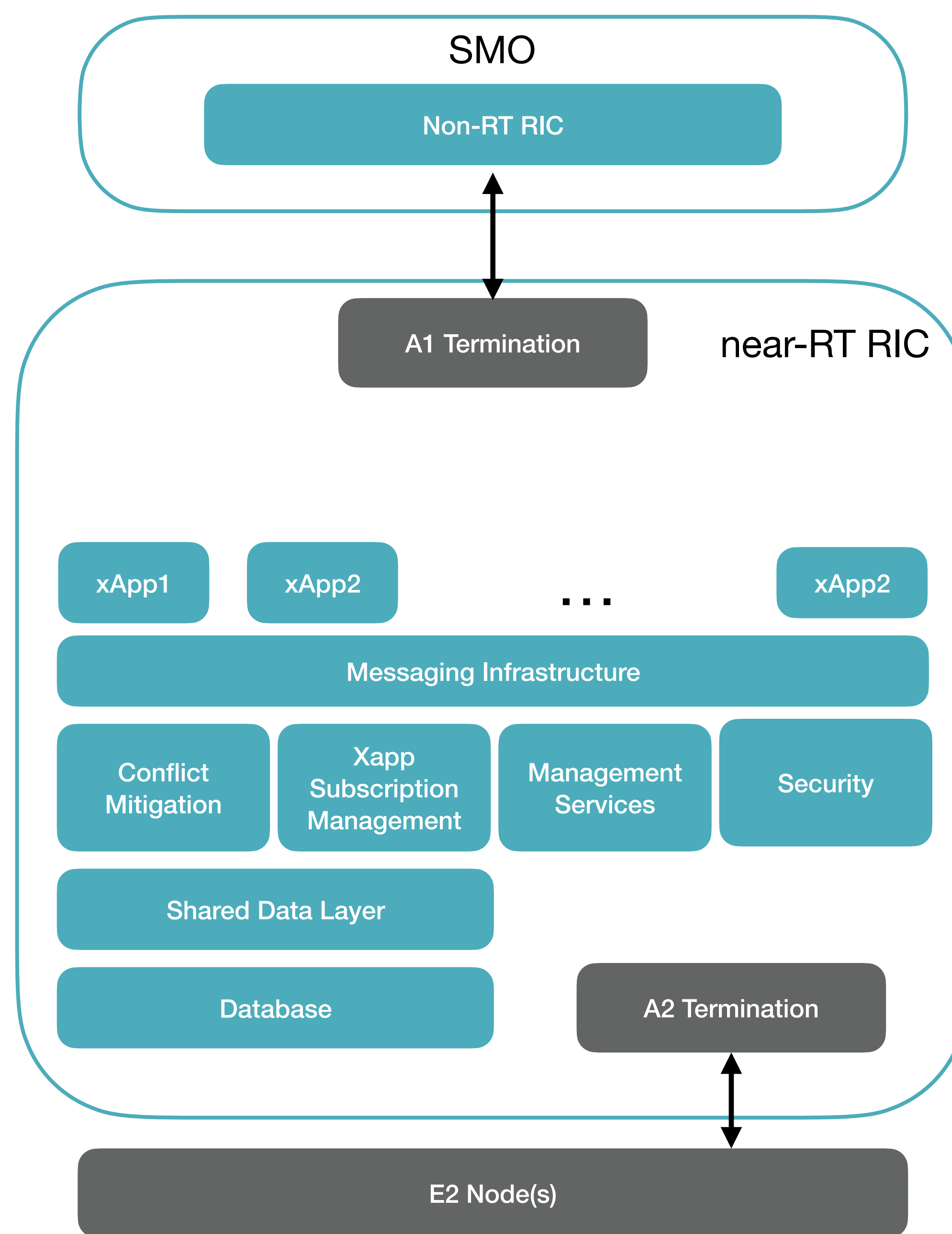
**Responsibilities:**

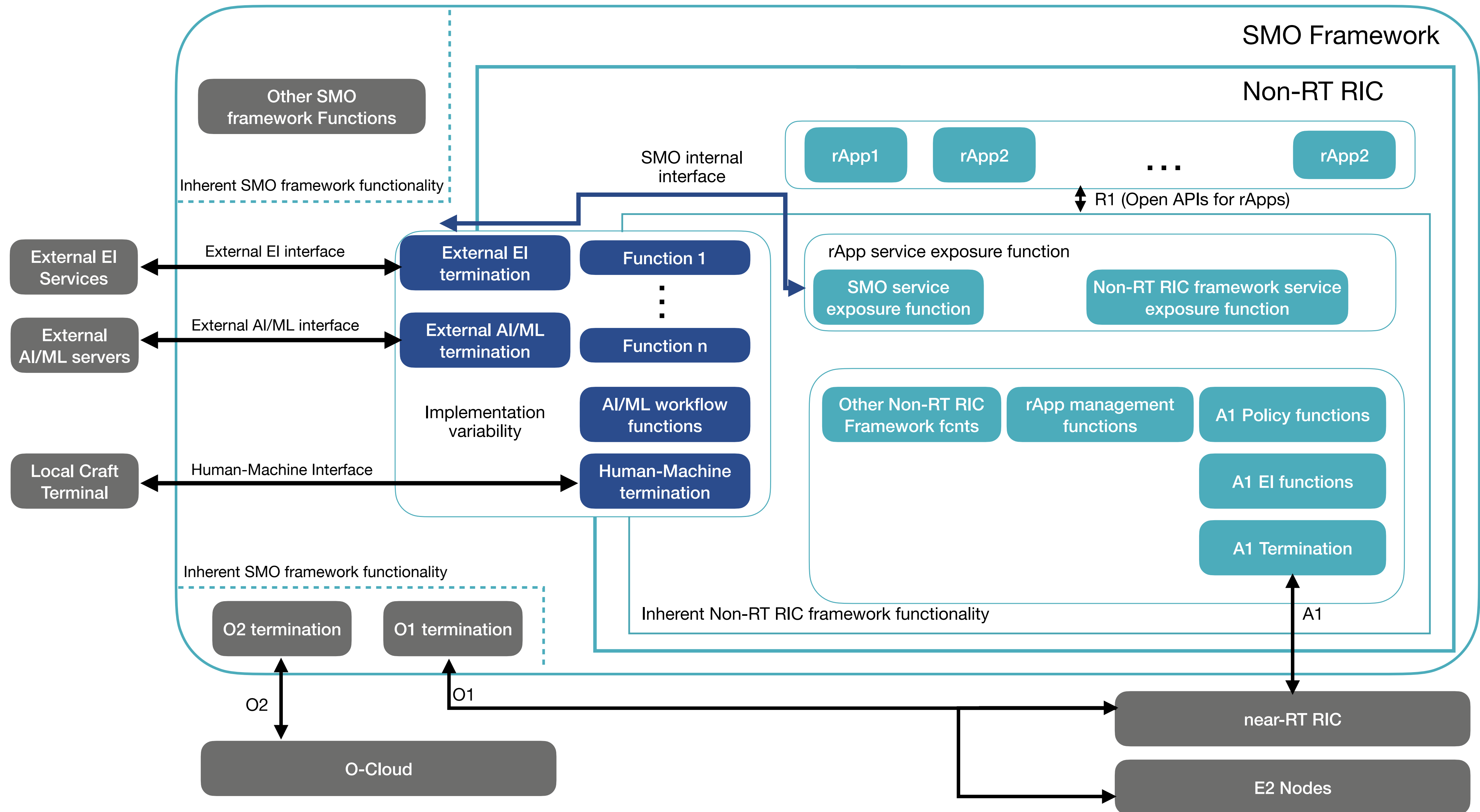
- Provides software platforms to control and manage disaggregated RAN elements.
- Implements policy-driven automation, network slicing, and optimization.
- Interfaces with O-RAN components via standard interfaces.

ONF SD-RAN

Telecom Infra

- Scope:** Physical deployment of RAN components and networking infrastructure.
- Responsibilities:**
- Supply radio units (O-RU), antennas, fiber fronthaul/backhaul, and data centers.
  - Ensure site installation, power, cooling, and maintenance.
  - Integrate O-RAN and 3GPP components into a working network.





1.



Conventional Base Station  
Combined RF + BB

2.



RRH

CPRI



BBU

Mobile Front-haul Network  
Separated RRH and BBU

3.

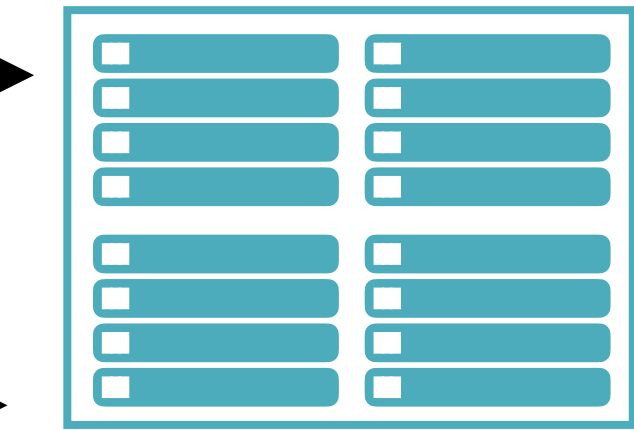


RRH

CPRI



RRH



BBU Pool

Centralized RAN  
Multiple BBUS Combined to Pools (often virtualized)

4.



Remote Radio Head

Fronthaul



Far Edge Data Center

Midhaul

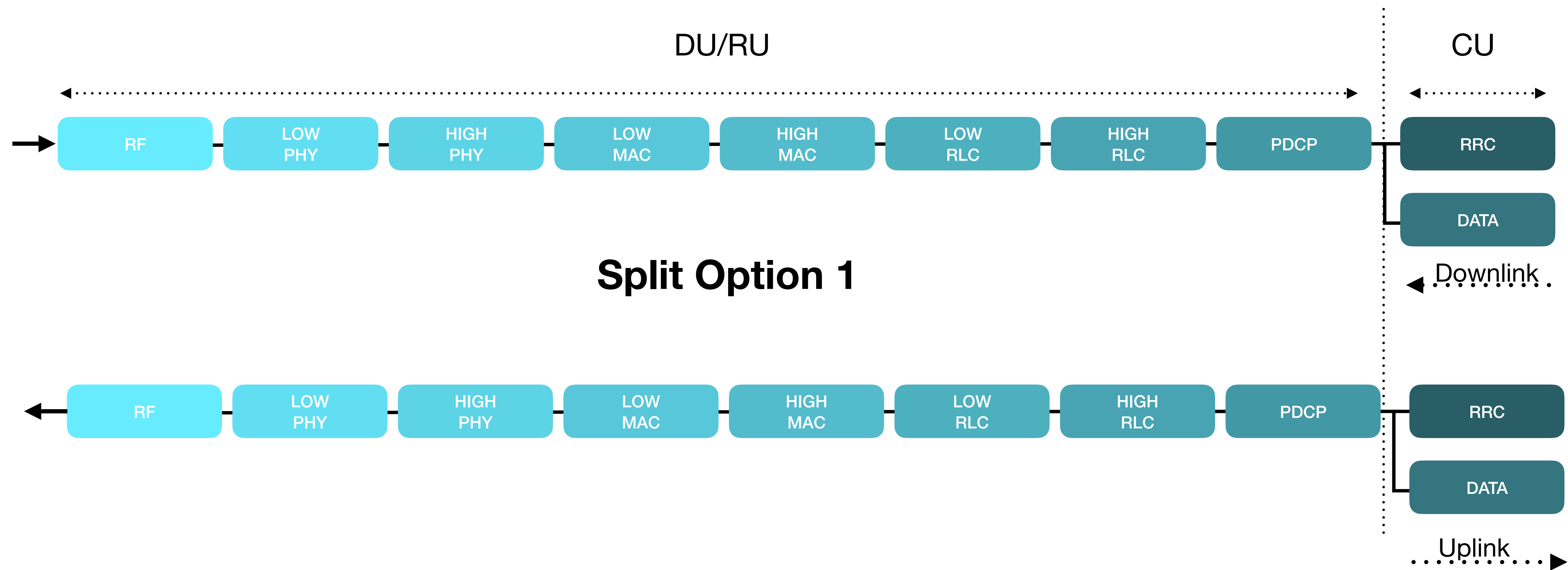


Edge Data Center

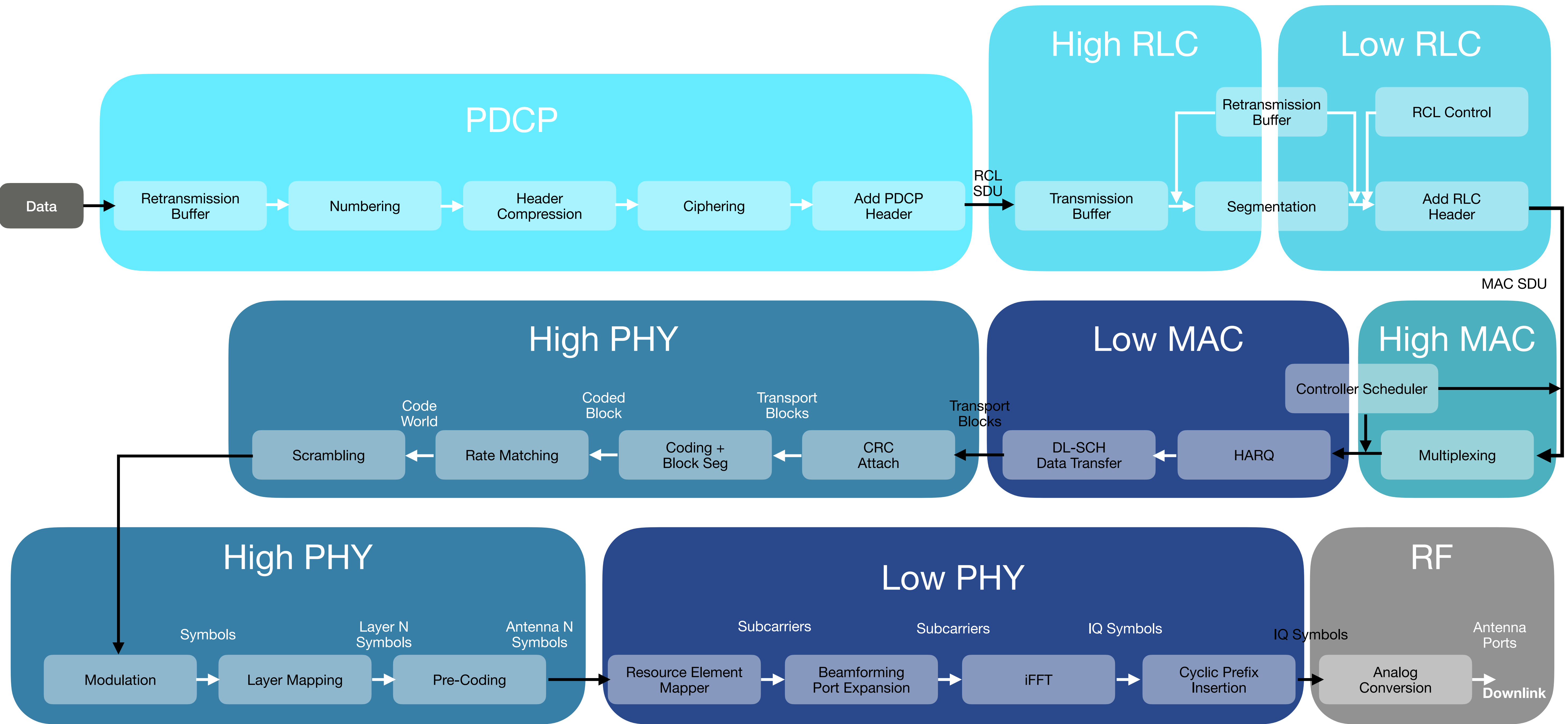
Backhaul



Mobile Core

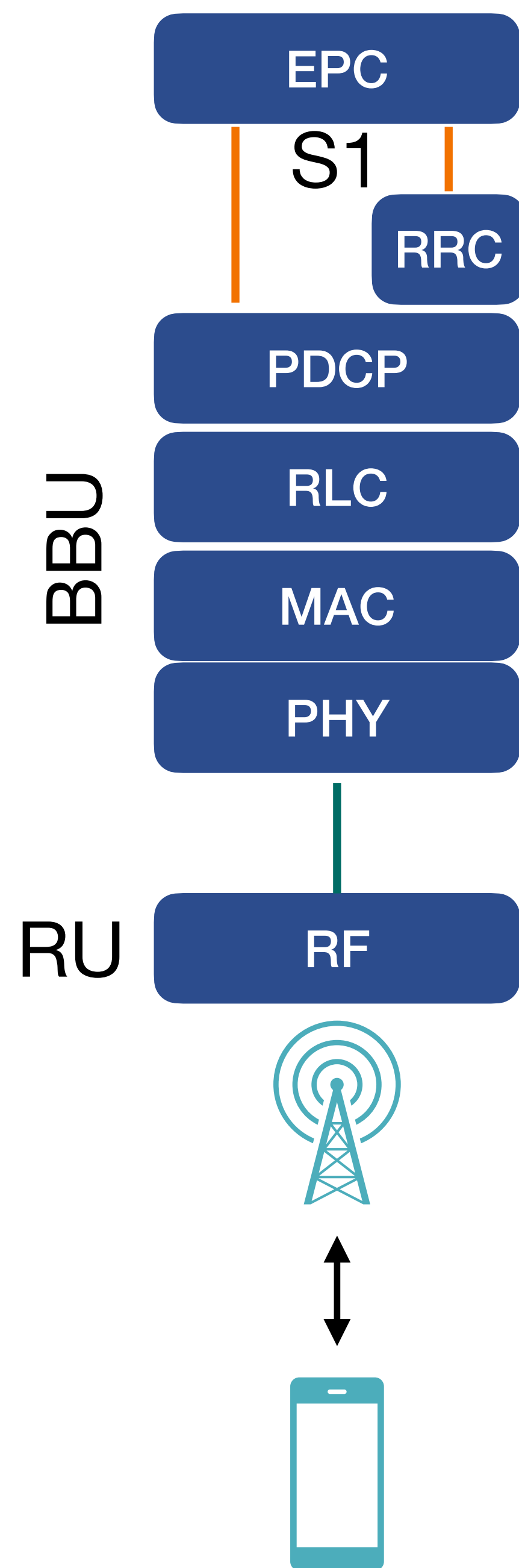




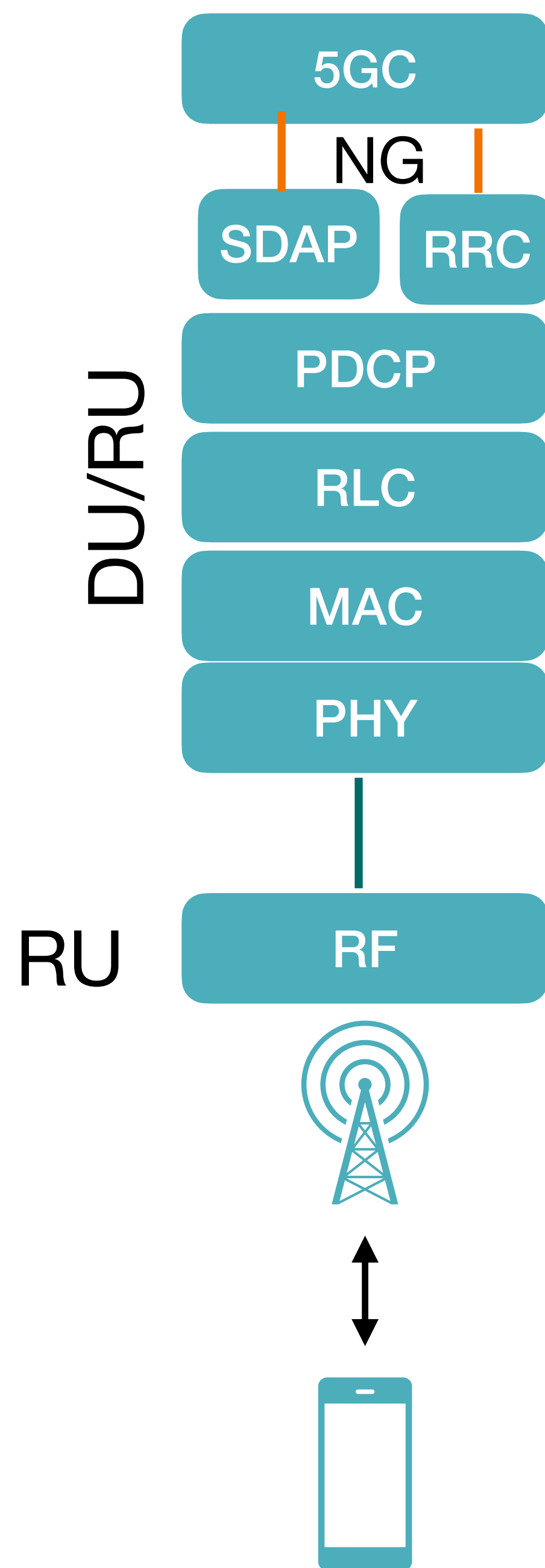




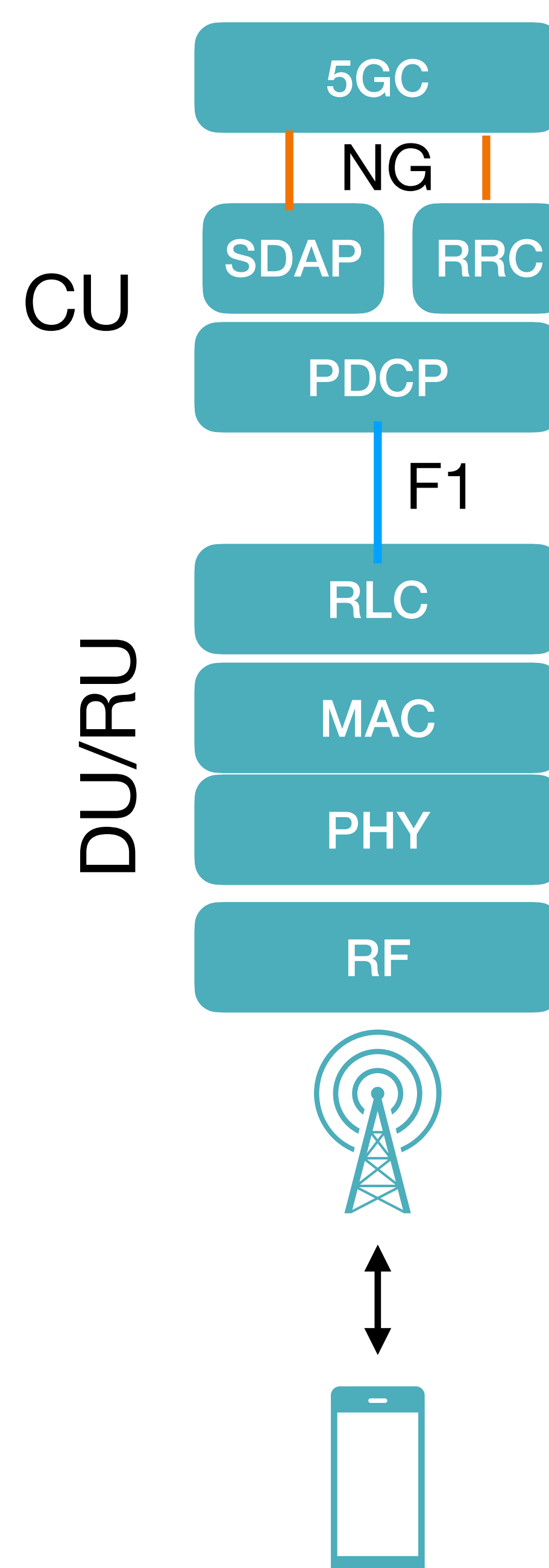
4G/LTE - Split 8



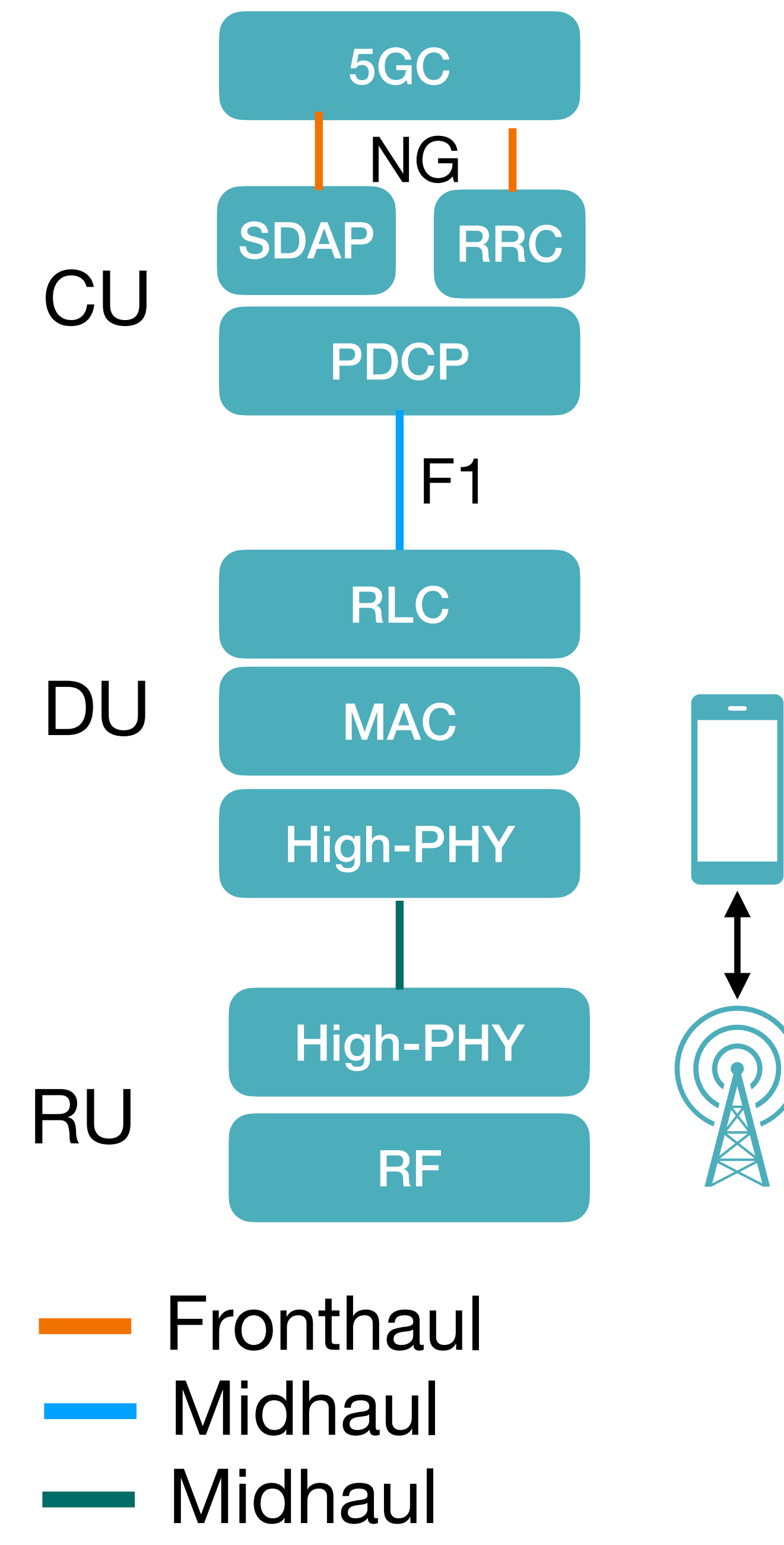
5G/NR - Split 8



5G/NR - Split 2

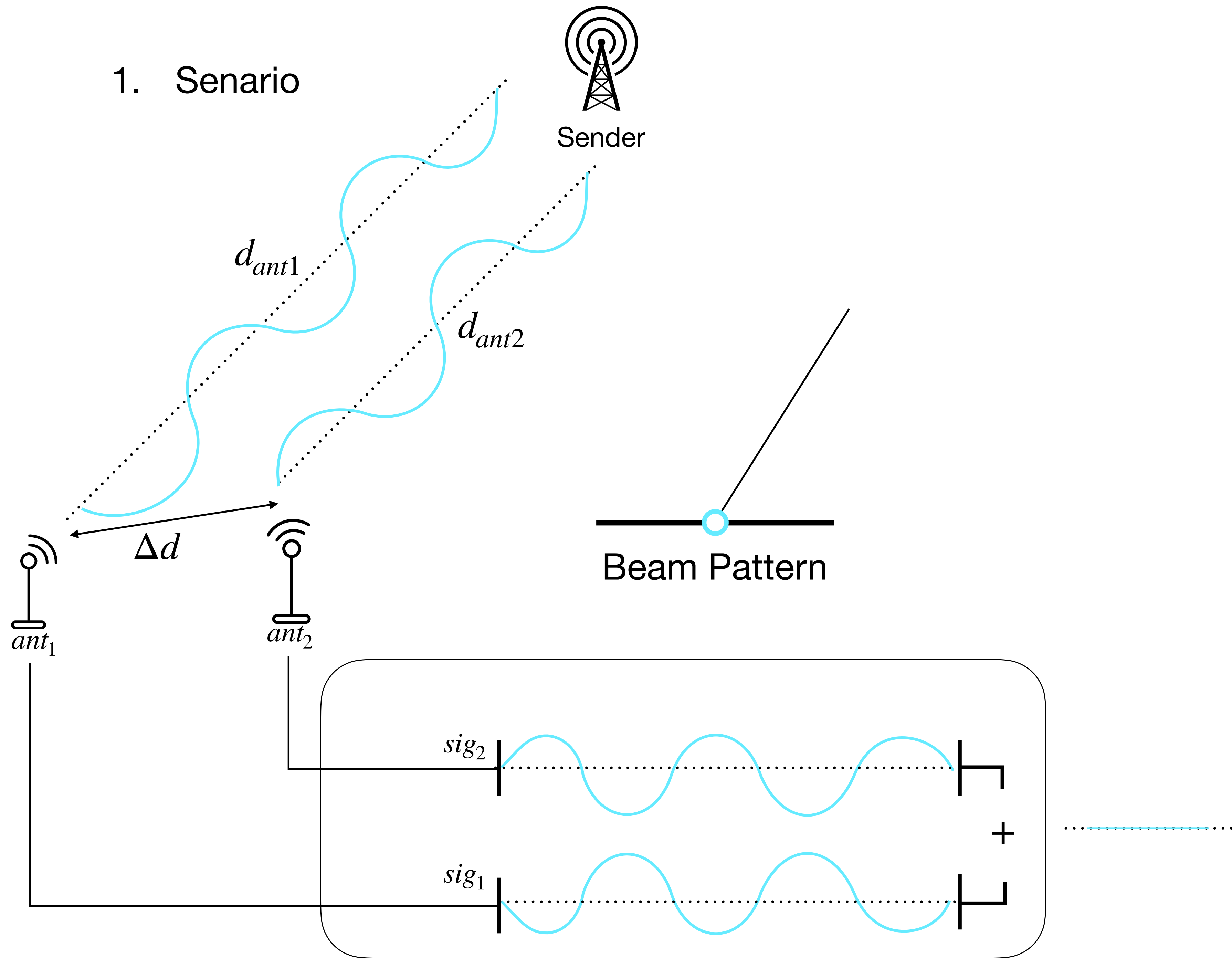


5G/NR - Split 7.x & Split 2



— Fronthaul  
— Midhaul  
— Midhaul

# 1. Senario



## 2. Senario

