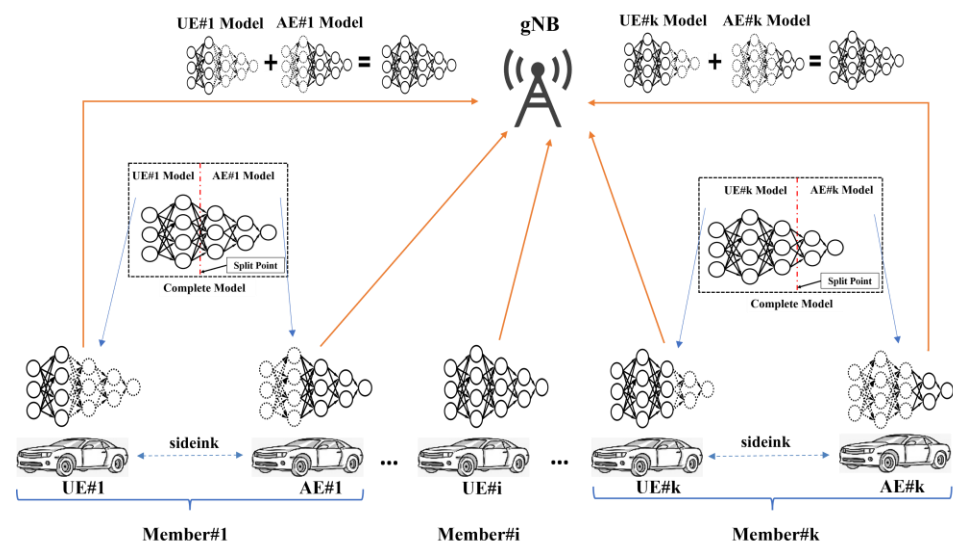
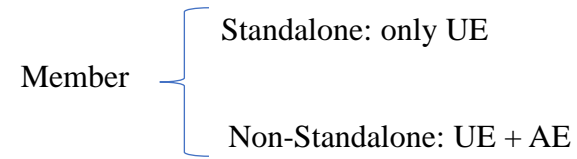


# SYP350091: A Split Learning (Model Splitting) Aided Federated Learning (SL-aided FL) Network

## 1. New network architecture



Federated Learning: Central server (gNB) + FL members



UE: User Equipment

AE: Assistant Equipment, edge, VMR, UAV, peer devices, etc

gNB chooses members (standalone, non-standalone, UE, AE, split point, service flow) based on:

- 1). The computation capability of UE and AE
- 2). The communication capability of UE and AE, i.e., uplink, downlink and **sidelink**

## 2. Benefits:

- 1. Exploitation of computation forces in the network (AE) **via sidelink**
- 2. Reduced communication cost
- 3. Enhanced data privacy (smashed data at AE, client model at UE and gNB)a

## 3. Standard impact:

- 1. **TR22.876**: Study on AI/ML Model Transfer-Phase 2
- 2. **3GPP R19 WID** “Study on AI/ML Model Transfer Phase 2” (**S1-221225**):

For Distributed Learning, controlled by network, each device uses the localized data while **transfer the intermediate data to other nodes** the device moves a certain coverage, has low power, or for combined computation for a big mode.

For Federated Learning, Using direct device connection can involve devices outside 5G hotspot for distributed AI training/inference, partly **offload computation to neighboring device**, so as to improve the training accuracy/generalization and save device power

**Objective:** Distributed AI training/inference based on direct device connection, e.g. traffic KPIs, different QoS and functional requirements on **sidelink transmission**.