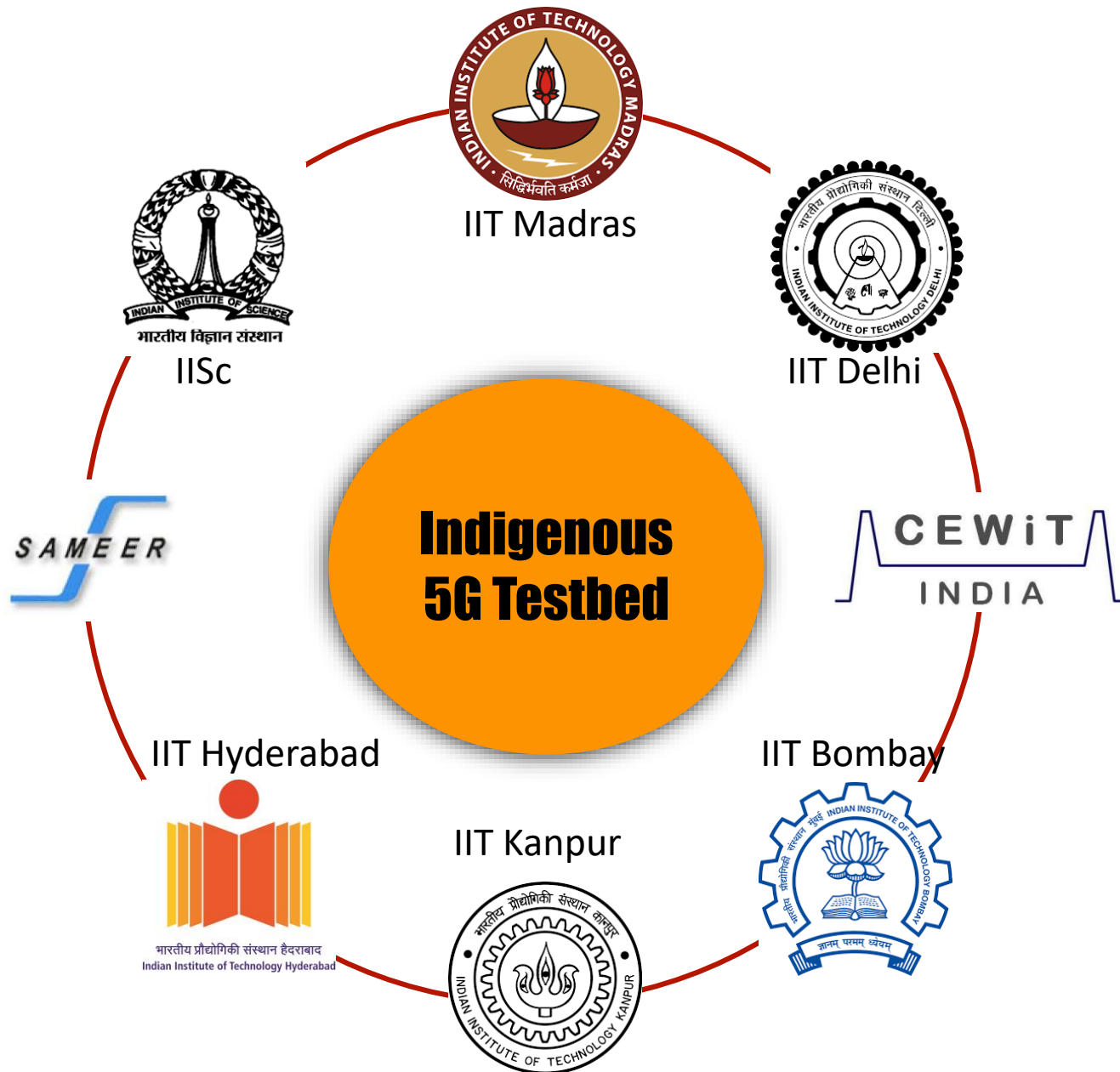


# Indigenous 5G Test bed Usage

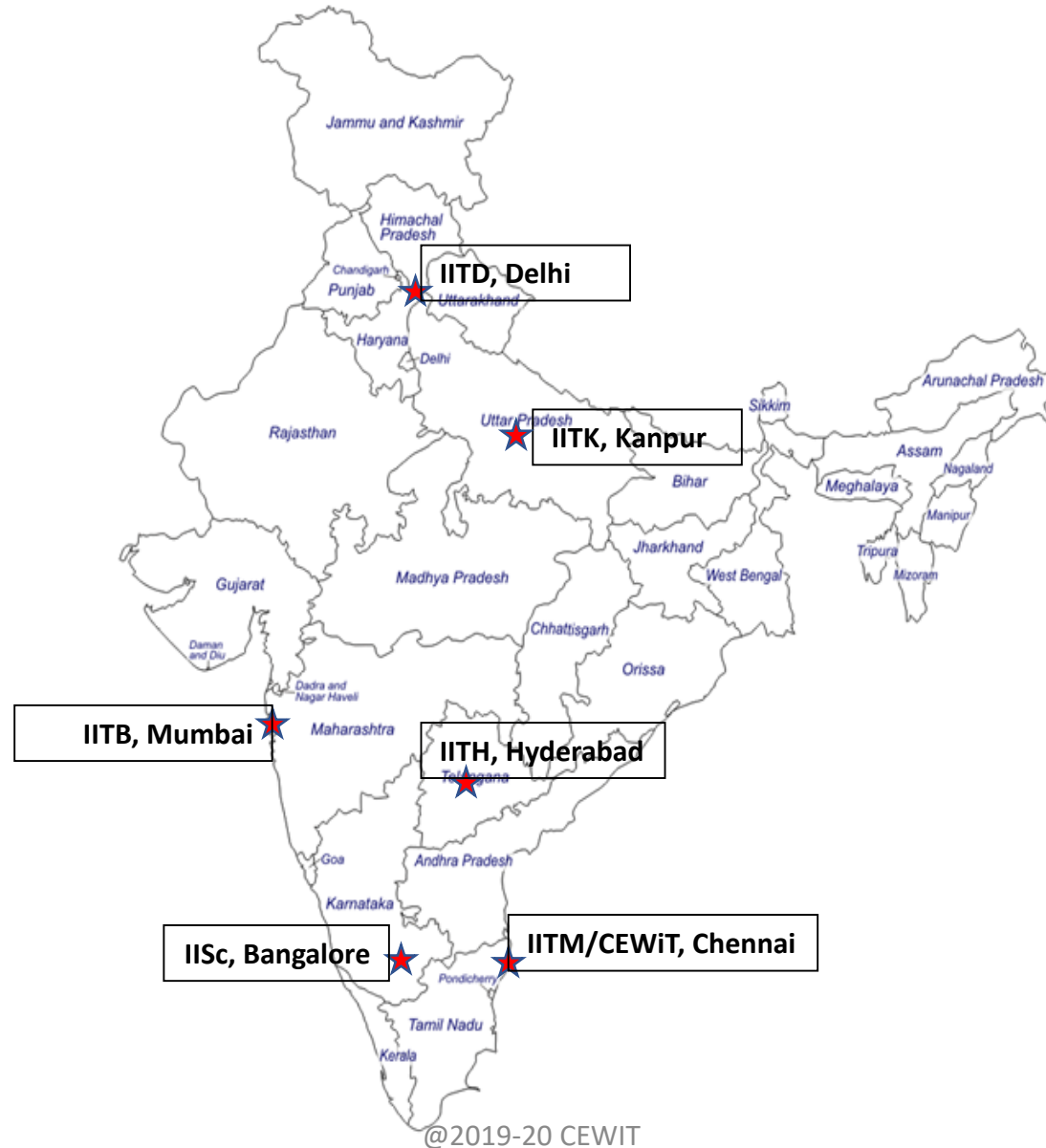
December 2019

Version 1



# Test bed Members

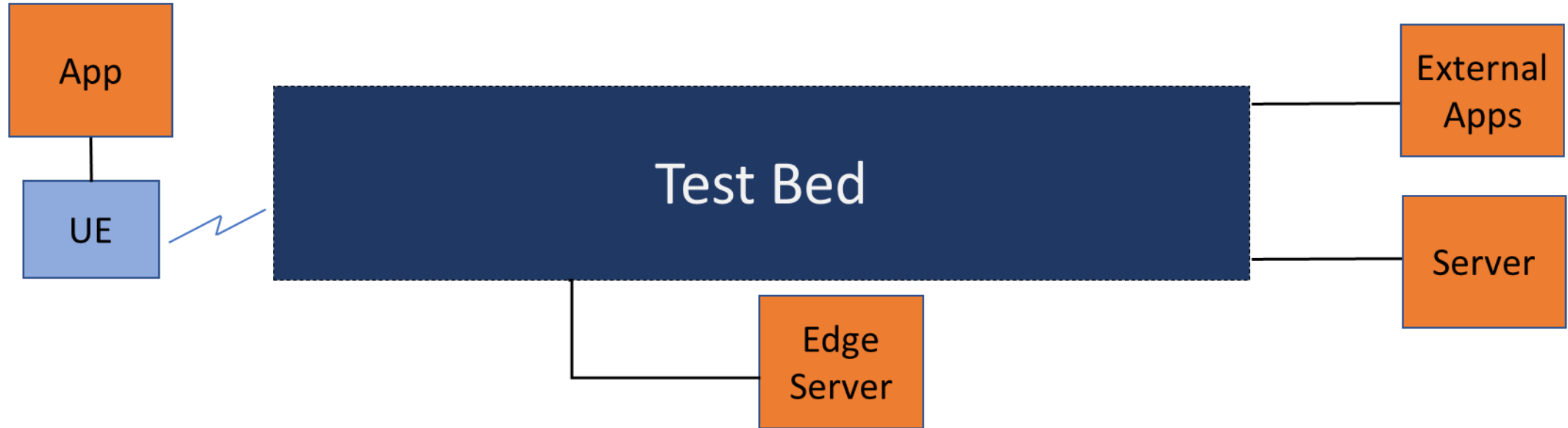
# 5G Test Bed Locations



# Test Bed Usage illustration

# Application Users (ex. Domain users)

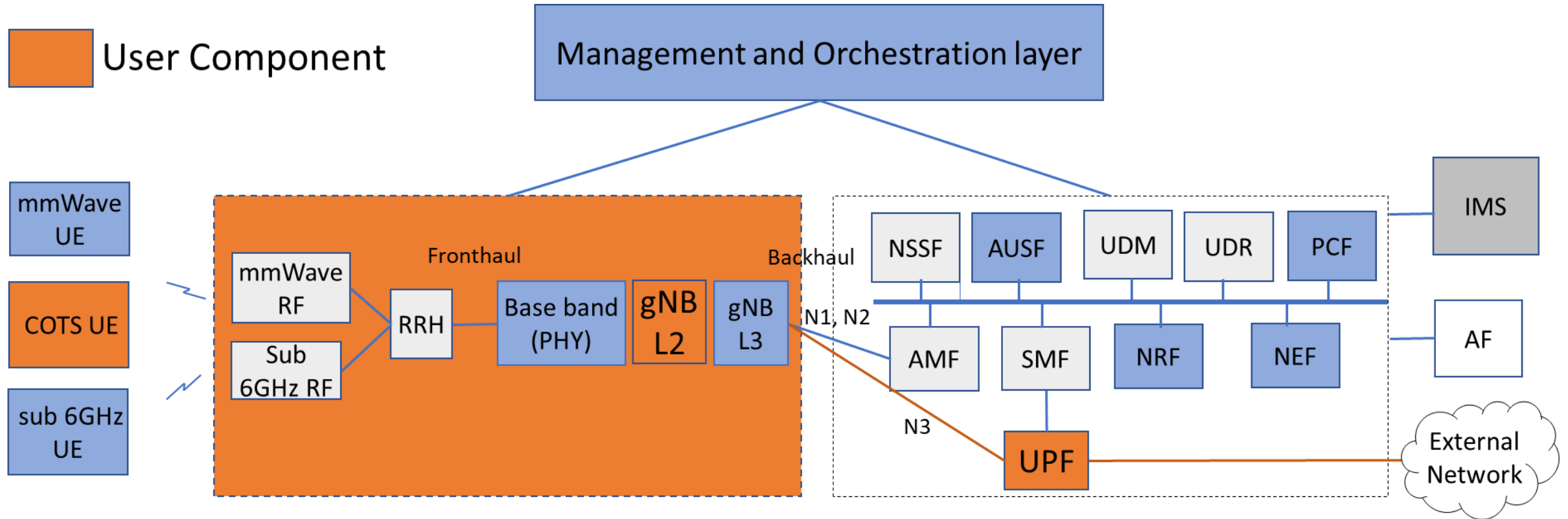
 User Component



## Examples of Usage

- IOT Application developer like Smart city applications, Power System monitoring for Utility etc
- Application developers who use network data Ex. Network Analytics

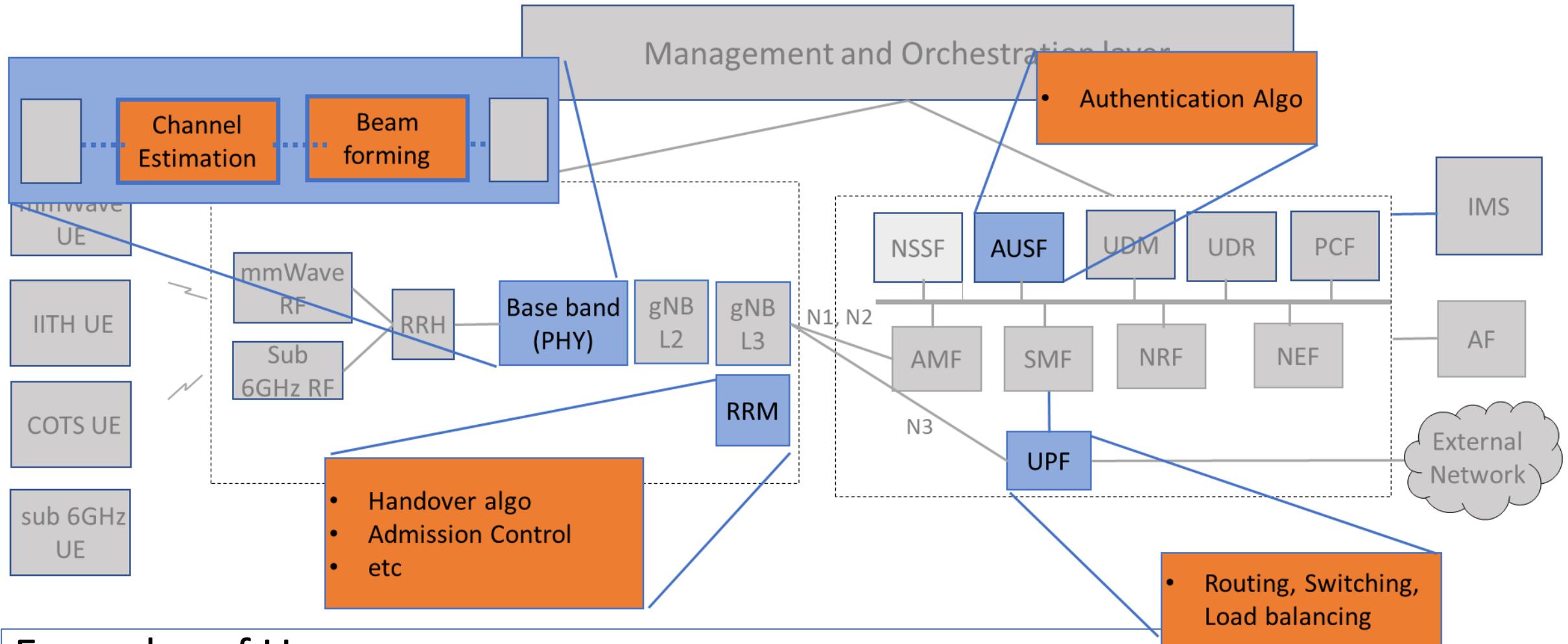
# Start-ups/SMEs (Technology developer)



## Examples of Usage

- L2 stack brought and validated in the test bed
- UPF Network Function brought and checked in the test bed
- gNodeB or 5G Core interoperated in the test bed

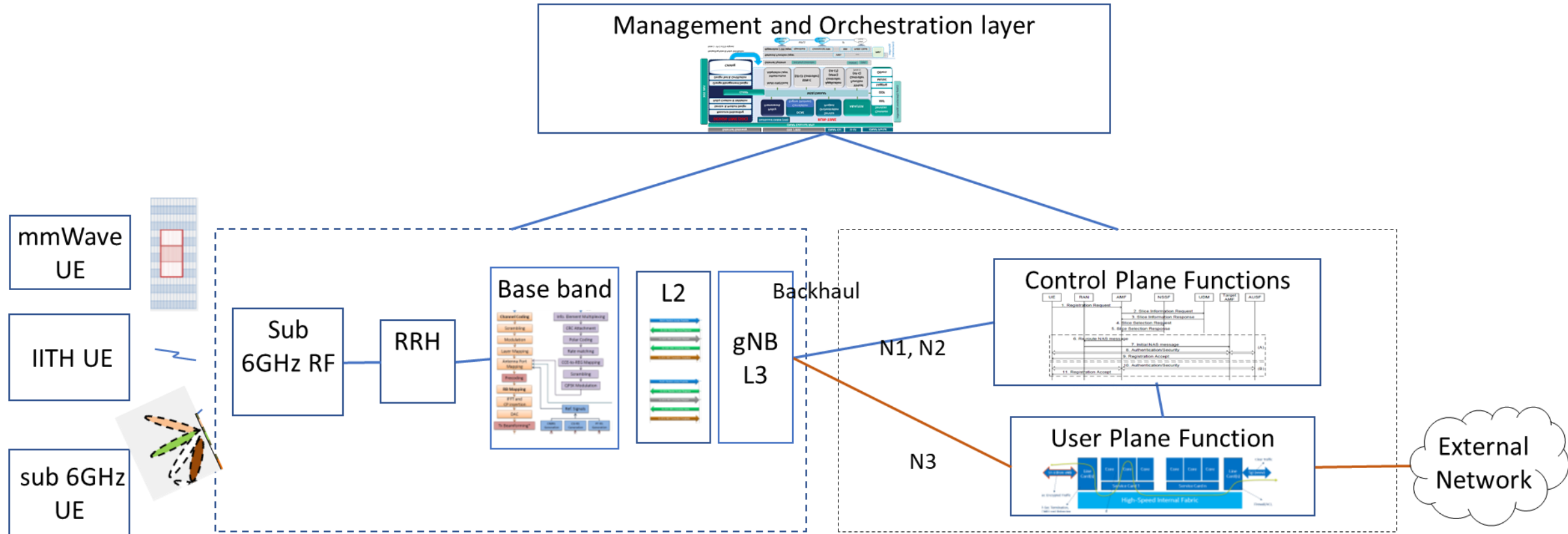
# Research user



## Examples of Usage

- Key algorithm or modules across the subsystems plugged in and analysed in the test bed

# Scholars/Students



## Examples of Usage

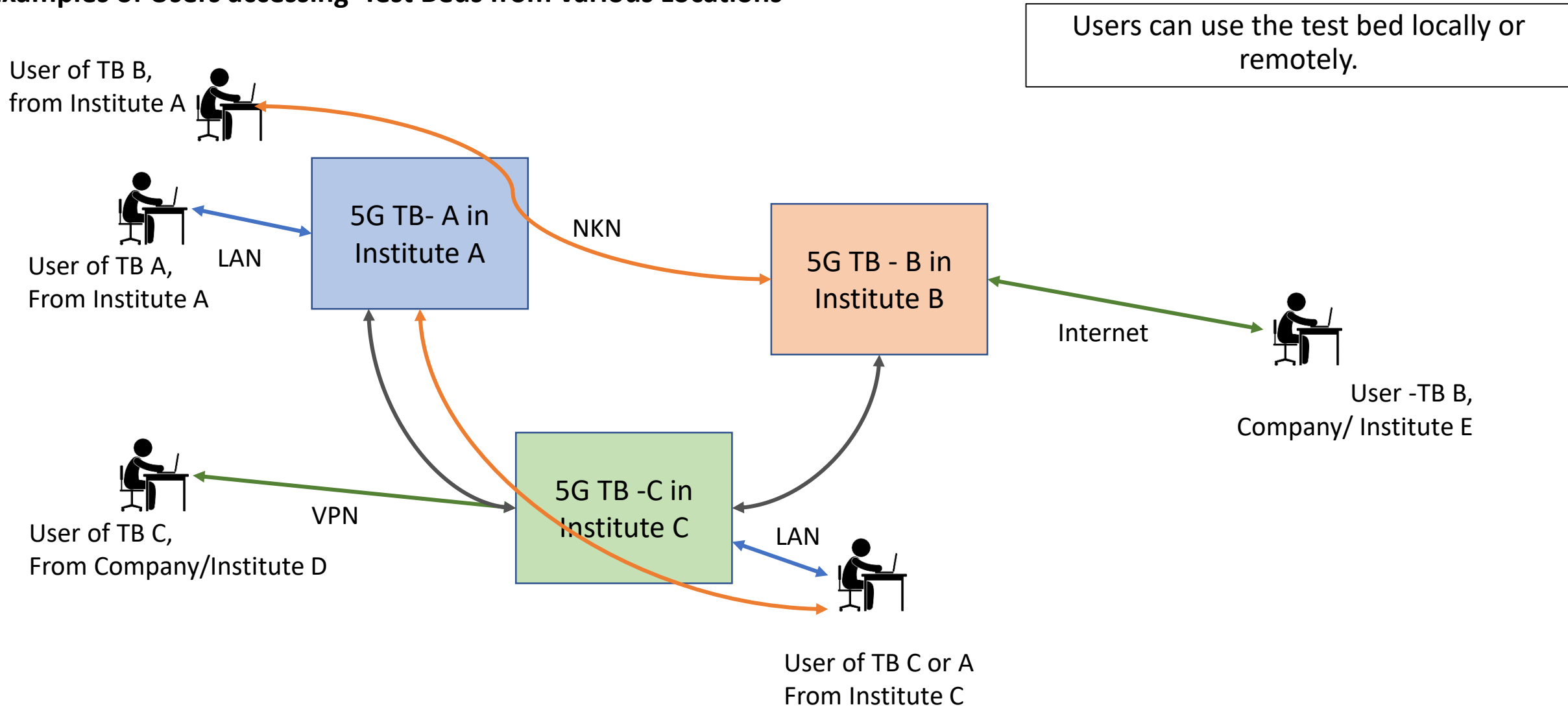
- Unlimited!!



# Test Bed Connectivity

# Connectivity to Test Bed

## Examples of Users accessing Test Beds from various Locations



# Test Bed Users and Policies

# 5G Test bed Users and Categories

Type of Users	Category	Meaning
Company	MSME company	Indian entity which is registered as an MSME (can be a start-up)
	Non-MSME company	Indian entity which is not registered as an MSME
	Non-Indian entity	Any entity which is not headquartered in India
R&D Organisations and Test Labs	R&D	Any Indian organisation that is recognised as an R&D Lab
Govt of India	Govt of India	Central or State Govt department OR Centre established by Govt
Academic Institute	Academic	Any college/institute recognised by an Indian government body like UGC, AICTE etc

# Usage Policies

- Registration for Test Bed usage needs to be approved before allowing usage.
- Individuals are not allowed to register. In order to use the test bed, the users need to be part of an organization.
- Only the employees/students of the registered organization can use the test bed in the organization's name.
- Access Level is not limited based on User category. However they may be restricted on a case to case by the Test Bed management.
- The organization confirms the Terms and conditions of usage while registering.
- Audit trail of usage will be logged

# Support for Test bed usage

- Basic support for setting up the test bed will be provided as part of the booking.
- All required documentation and manuals will be provided to the user.
- The users can run and monitor the test bed, and access the logs etc without intervention from the Test bed team
- Additional support for module integration, debugging, etc will be provided on request and will be charged.

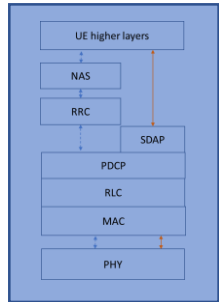
# Test Bed composition and configurations

# Components of the End-to-end 5G Test Bed

These are the components which can be scheduled independently



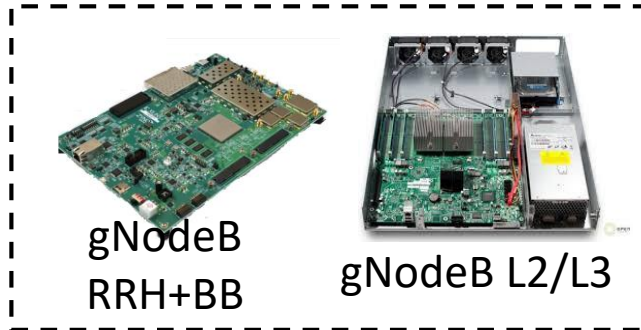
Test Equipments



UE

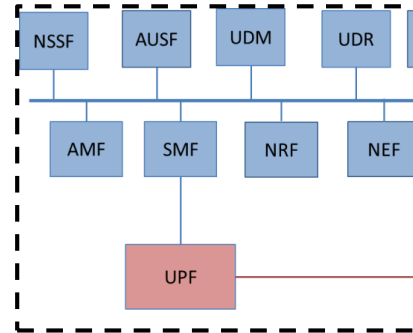


LiFi

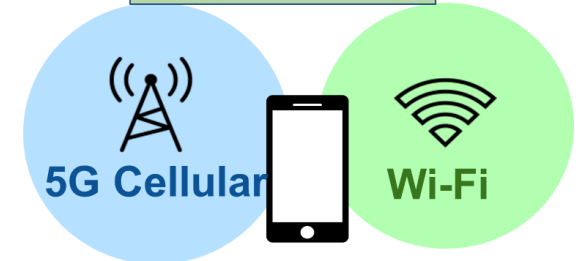
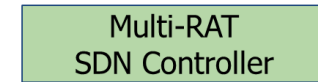


gNodeB  
RRH+BB

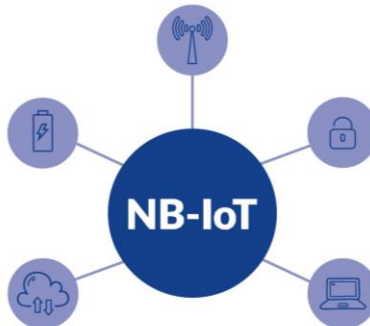
gNodeB L2/L3



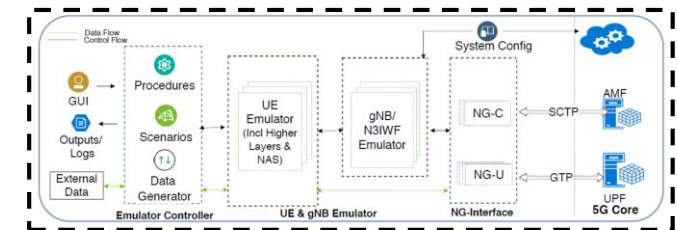
5G Core



Non-3GPP (WiFi)



NB IOT

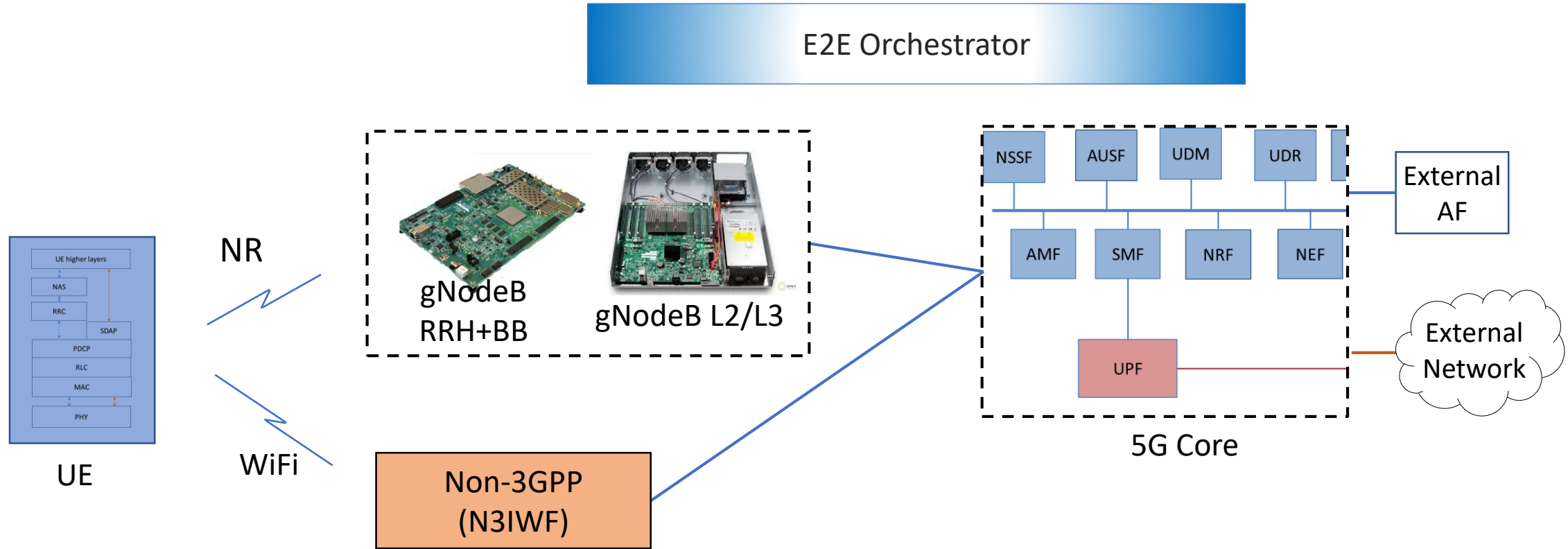


RAN Emulator



# Illustration of an End-to-end 5G Test Bed

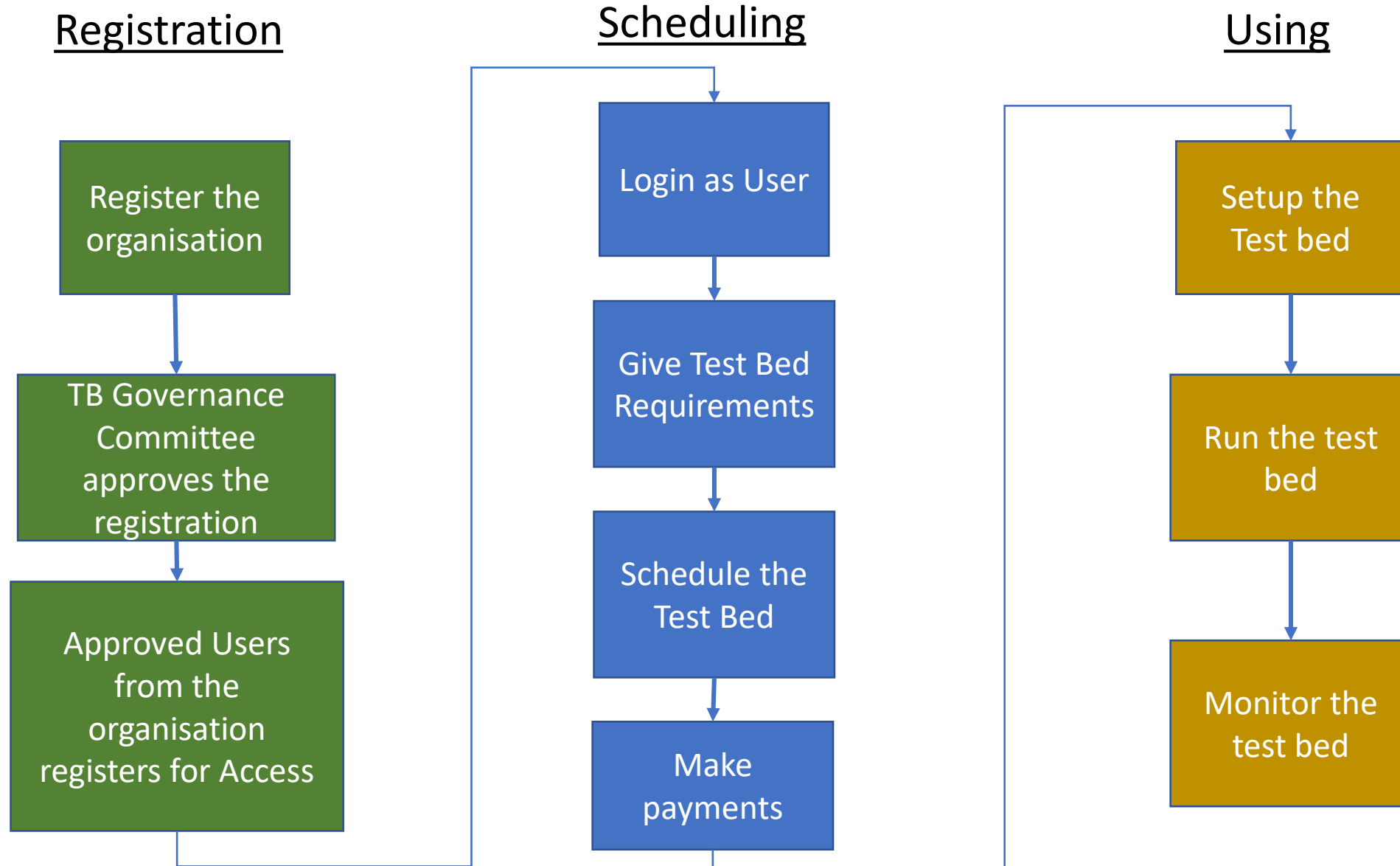
Below is an example of how an End to end test bed can be created from individual components. Users can build test beds of various configurations as per their requirements.



# Scheduling Test bed components

	Typical Setup Configurations	Subsystems
1	End to end Service level	UE + NG-RAN + 5GCore with Orchestrator
2	RAN level without RF Equipments	UE + NG-RAN
3	RAN level with RF Equipments	UE + NG-RAN with RF Equipment
4	PHY level with RF Equipments	RRH + BB with RF Equipment
5	Emulated RAN	RAN Emulator + 5GCore
6	Individual Test Equipments	Test Equipments only

# Workflow for Test Bed usage



# Thank You