

### GOALS

- The main objective of the 5GFed experiment is to integrate and test the latest OAI 5G NR standard-compliant implementation within two Fed4FIRE+ testbeds: IRIS (TCD) and CityLab (imec).

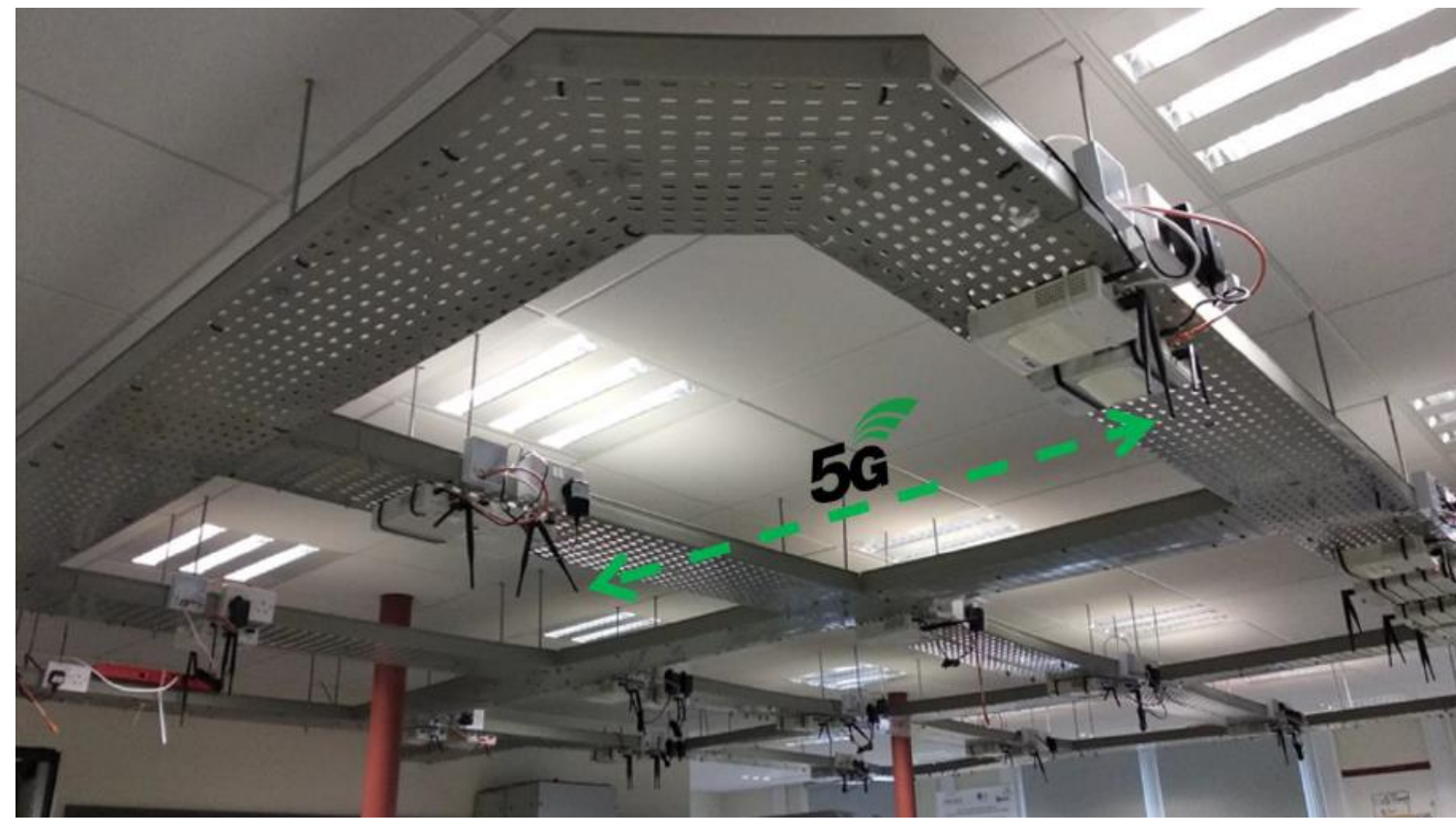
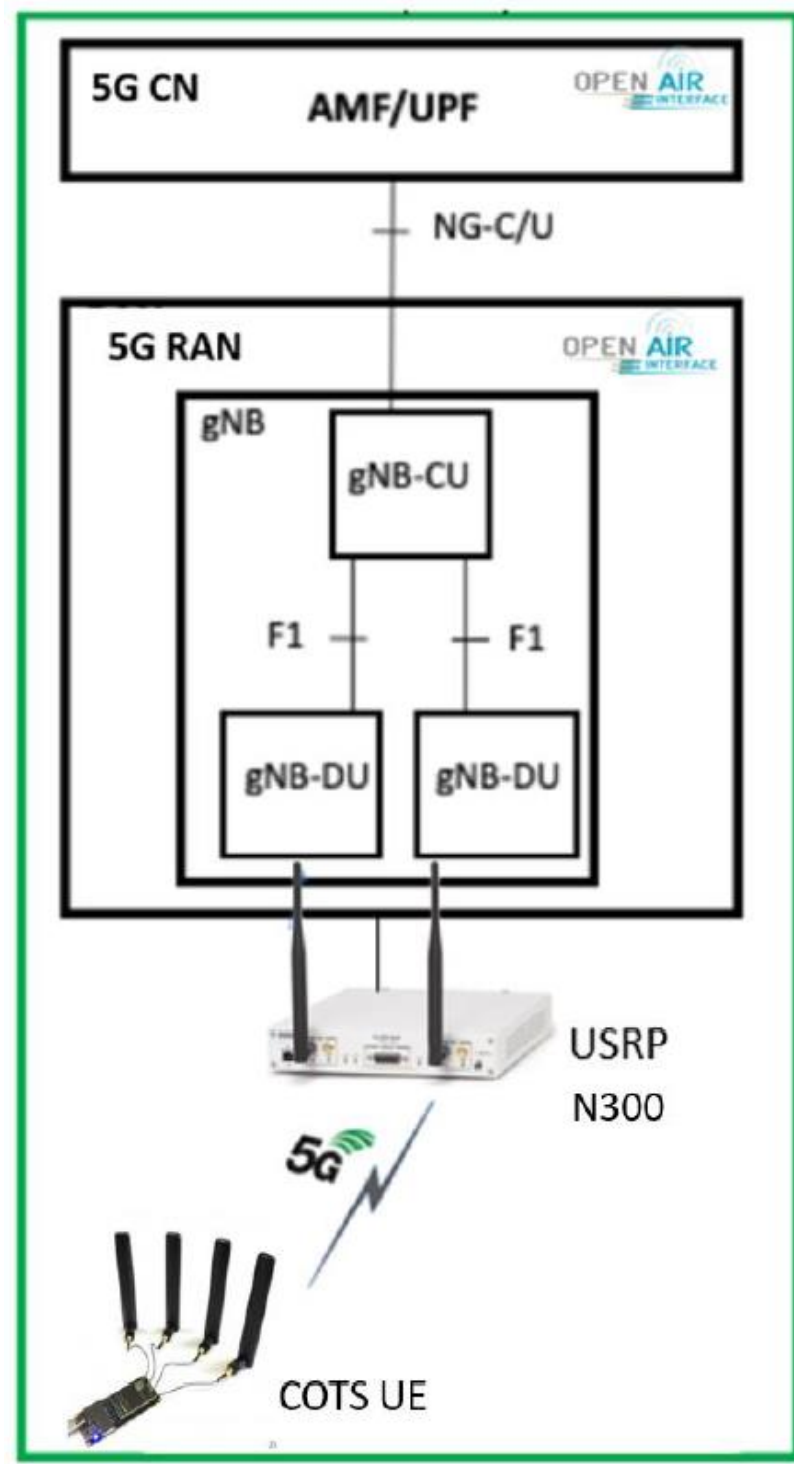


### OPORTUNITIES AND CHALLENGES

- OpenAirInterface (OAI) is an open-source initiative that provides a reference implementation of 5G gNB, User Equipment (UE), and 5G core network (5GC), standard compliant with 3GPP NR Release 15 and that runs on general purpose x86 computing platforms along with off-the-shelf SDR hardware platforms like USRPs.

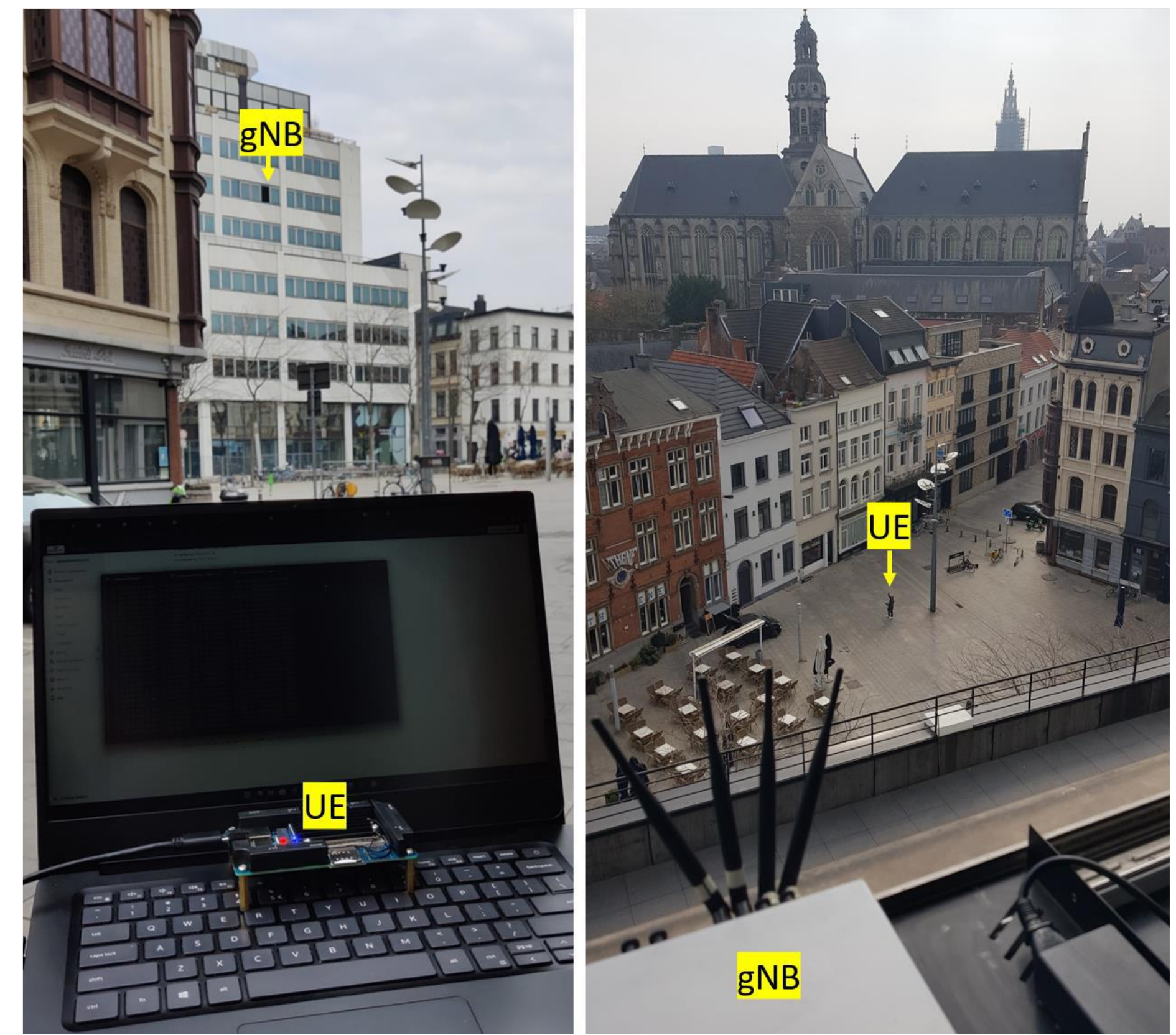
### DEMO SETUP

- End-to-end implementation of OAI 5GNR in the IRIS testbed. Interoperability test between OAI gNB and COTS UE (Quectel RM500Q).



### DEMO SETUP

- End-to-end implementation of OAI 5GNR in the testbed CityLab (imec), outdoor testing.



### RESULTS

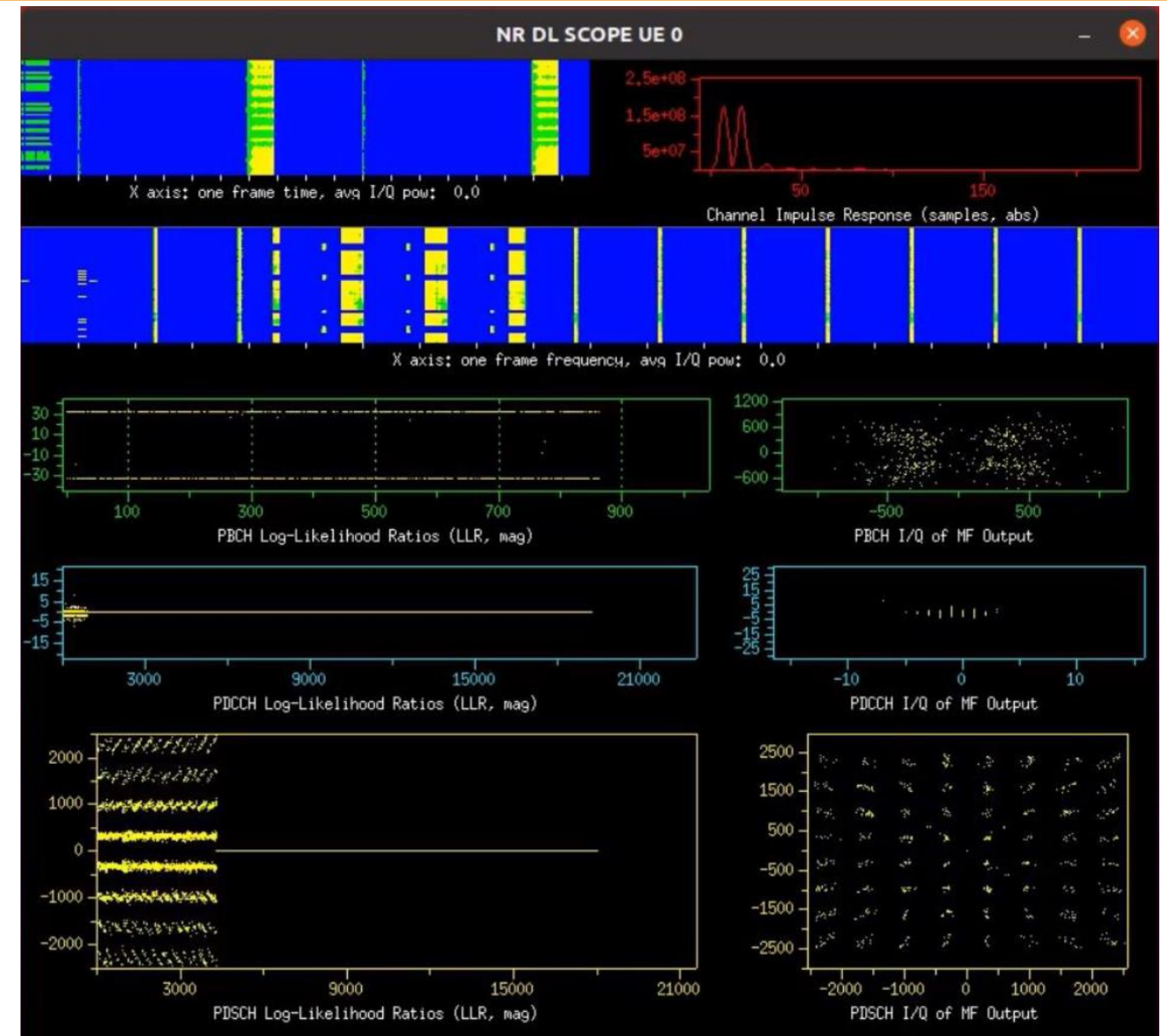
- Allbesmart has published a tutorial to allow the OAI community to replicate the 5GFed experiment. The tutorial is available in the gitlab repository from Eurecom.

Table 1 - Measurements results

Configuration	Bandwidth [MHz]	DL throughput [Mbit/s]
SISO	40	123
SISO	60	188
MIMO 2x2	40	184
MIMO 2x2	60	240

```

3] local 12.1.1.2 port 9002 connected with 192.168.79.135 port 36792
ID Interval Transfer Bandwidth Jitter Lost/Total Datagrams
3] 1.0- 1.0 sec 23.0 Mbytes 137 Mbits/sec 0.070 ms 32/11651 (0.275)
3] 2.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.003 ms 7/17105 (0.041%)
3] 3.00-1.00 sec 7 datagrams received out-of-order
3] 3.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.004 ms 30/17135 (0.18%)
3] 4.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.100 ms 7/17120 (0.041%)
3] 4.00-5.00 sec 7 datagrams received out-of-order
3] 5.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.113 ms 15/17120 (0.088%)
3] 6.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.104 ms 15/17105 (0.088%)
3] 7.0- 1.0 sec 24.0 Mbytes 201 Mbits/sec 0.101 ms 7/17120 (0.041%)
3] 7.00-8.00 sec 7 datagrams received out-of-order
3] 8.0- 1.0 sec 23.9 Mbytes 200 Mbits/sec 0.105 ms 16/17054 (0.094%)
3] 8.00-9.00 sec 7 datagrams received out-of-order
3] 9.0-10.0 sec 23.9 Mbytes 201 Mbits/sec 0.007 ms 30/17100 (0.18%)
3] 10.0-11.0 sec 24.0 Mbytes 201 Mbits/sec 0.110 ms 15/17120 (0.088%)
3] 11.0-12.0 sec 24.0 Mbytes 201 Mbits/sec 0.105 ms 15/17120 (0.088%)
3] 11.00-12.00 sec 7 datagrams received out-of-order
  
```



### CONCLUSIONS

- Fed4FIRE+ has provided a unique opportunity for Allbesmart to have access to state-of-art Software Defined Radio (SDR) testbed infrastructure.
- The deployment of the 5G OAI stack in the Fed4FIRE+ infrastructure will enable the scientific community and company researchers in exploring end-to-end 5G experimentation for new application areas.



### POST MORTEM

- Allbesmart wants to leverage its OAI deep expertise to provide consultancy services on OAI implementations of 3GPP 5G NR protocol stack to accelerate 5G product development and innovations.
- Thanks to this experiment, Fed4FIRE+ will be able to provide end-to-end 5G NSA and SA open-source implementation for 5G protocol testing, promoting 5G innovation.
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