Fed4AI-Stage 2
## Experimental validation of AI models for the prediction of wireless links performance

GOALS

- The main goal of this experiment is the validation of Allbesmart's connected cars technologies:

- Machine Learning (ML) models to forecast the performance of LTE radio links on the move and test the concept of proactive connectivity prediction.

- Test the implementation of C-ITS services using the ITS-G5 infrastructure of the Smart Highway testbed.

CHALLENGES

- The experimental validation of new features before its inclusion in the UXPERT network analytics framework is very important for ALLBESMART.

- Need to validate C-ITS services implementations in a real environment and test interoperability issues before commercial deployment.

DEMO SETUP

- Use case 1: Test Machine Learning models to forecast the performance of LTE radio links without active/intrusive transmission (UMA testbed)


University of Malaga
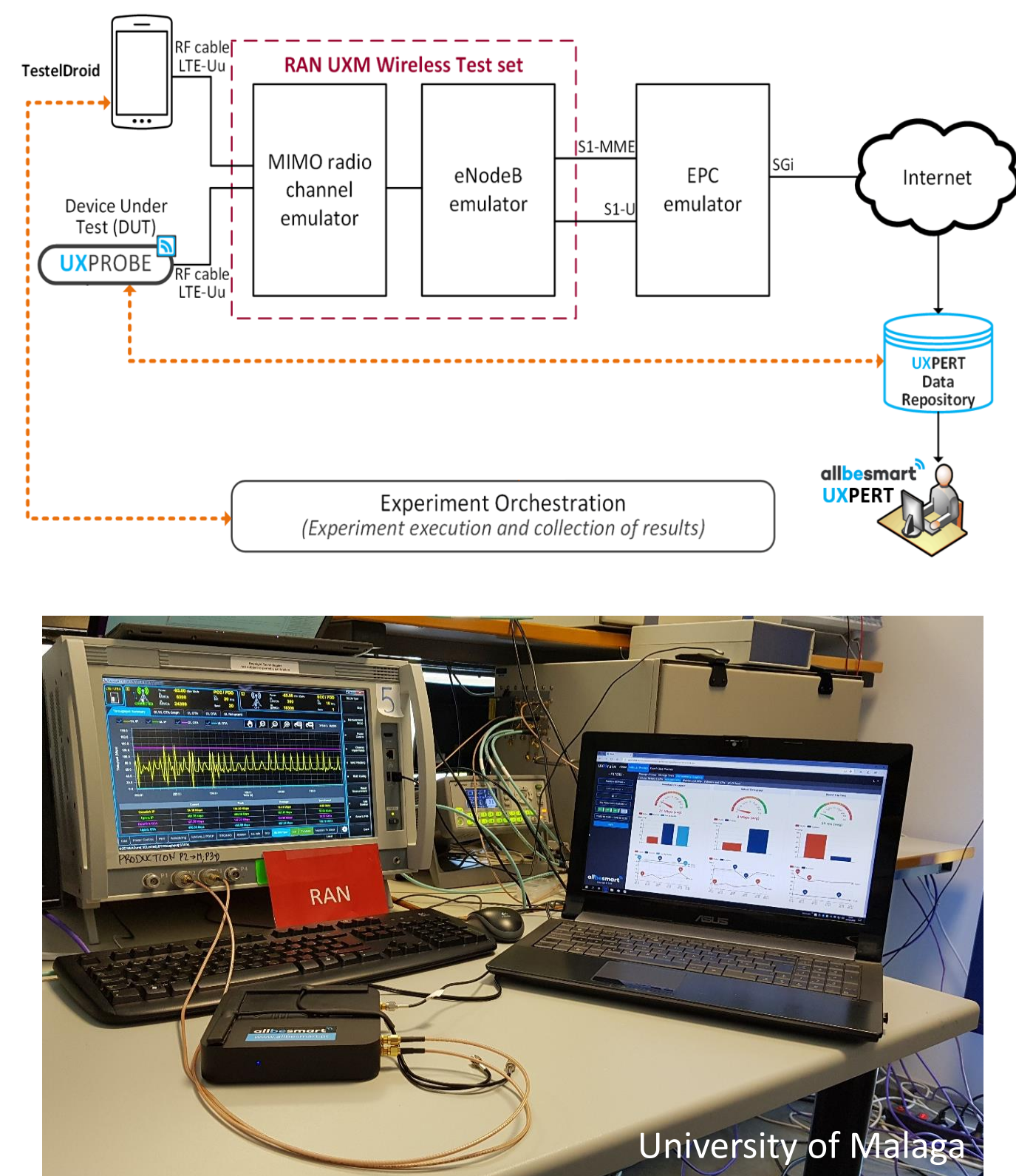
DEMO SETUP

- Use case 2: Test the concept of proactive connectivity prediction in the Smart Highway testbed (imec).

- Use case 3: Test the implementation of C-ITS services using the ITS-G5 infrastructure of the Smart Highway testbed (imec).
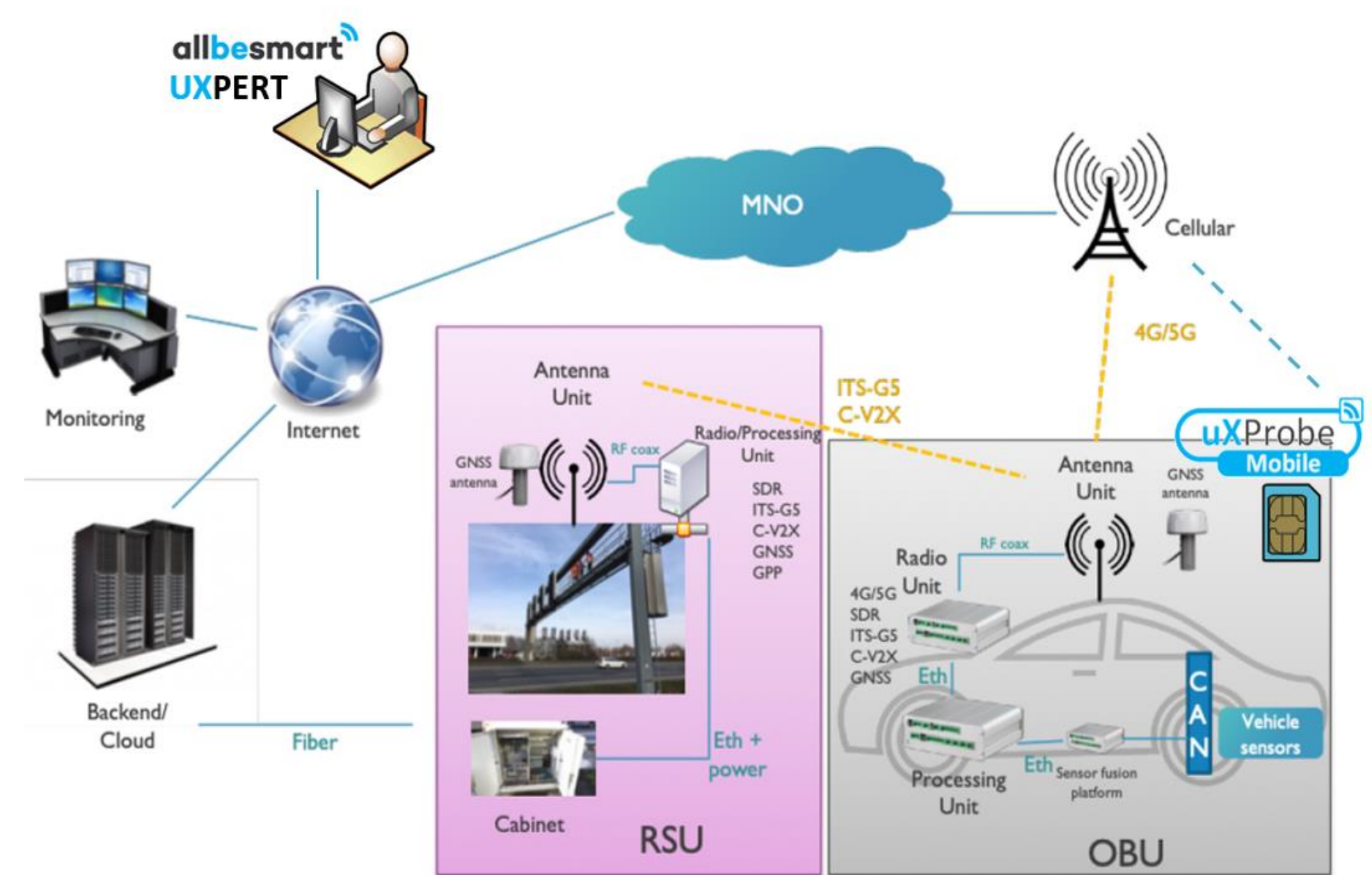

RESULTS

- We observed that a ML model – without any deep knowledge of the complex dynamics of LTE radio access – can estimate the link throughput with very good accuracy, reaching a value of R2-score of 89% for the case of the Gradient Boosting Regressor.
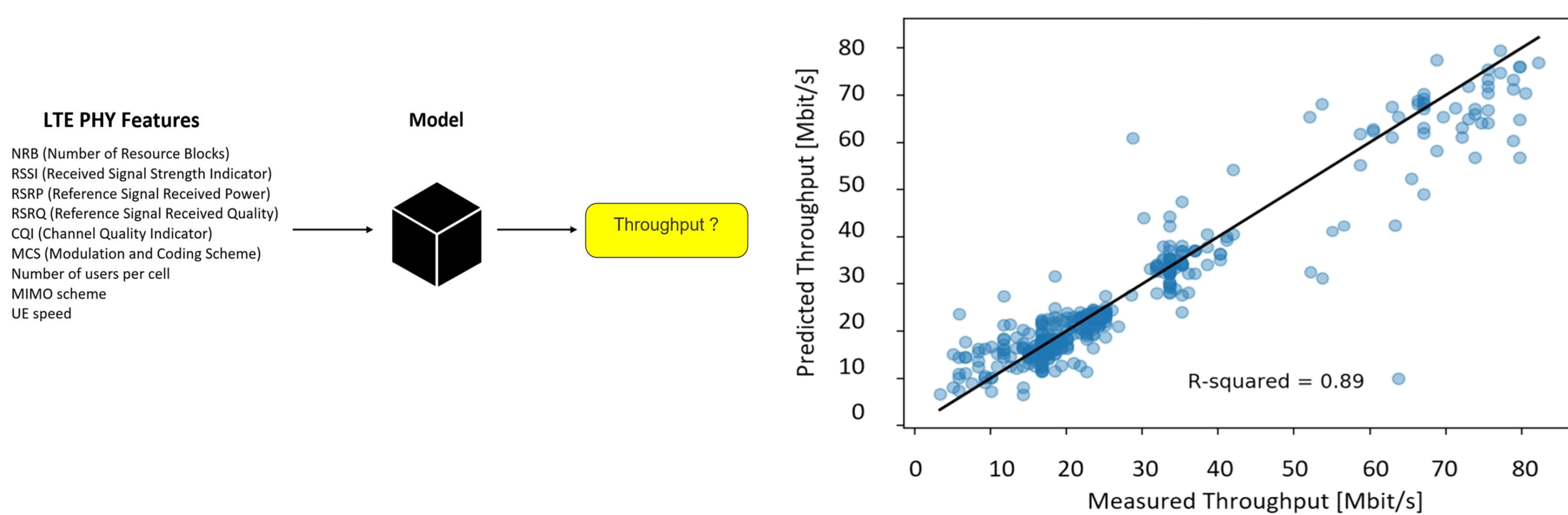
- Based on UXPERT data and ML algorithms a vehicle can forecast an upcoming area with poor cellular connectivity and starts pre-downloading the information it needs.

- Successful validation of C-ITS services such as "Emergency Vehicle Approaching".
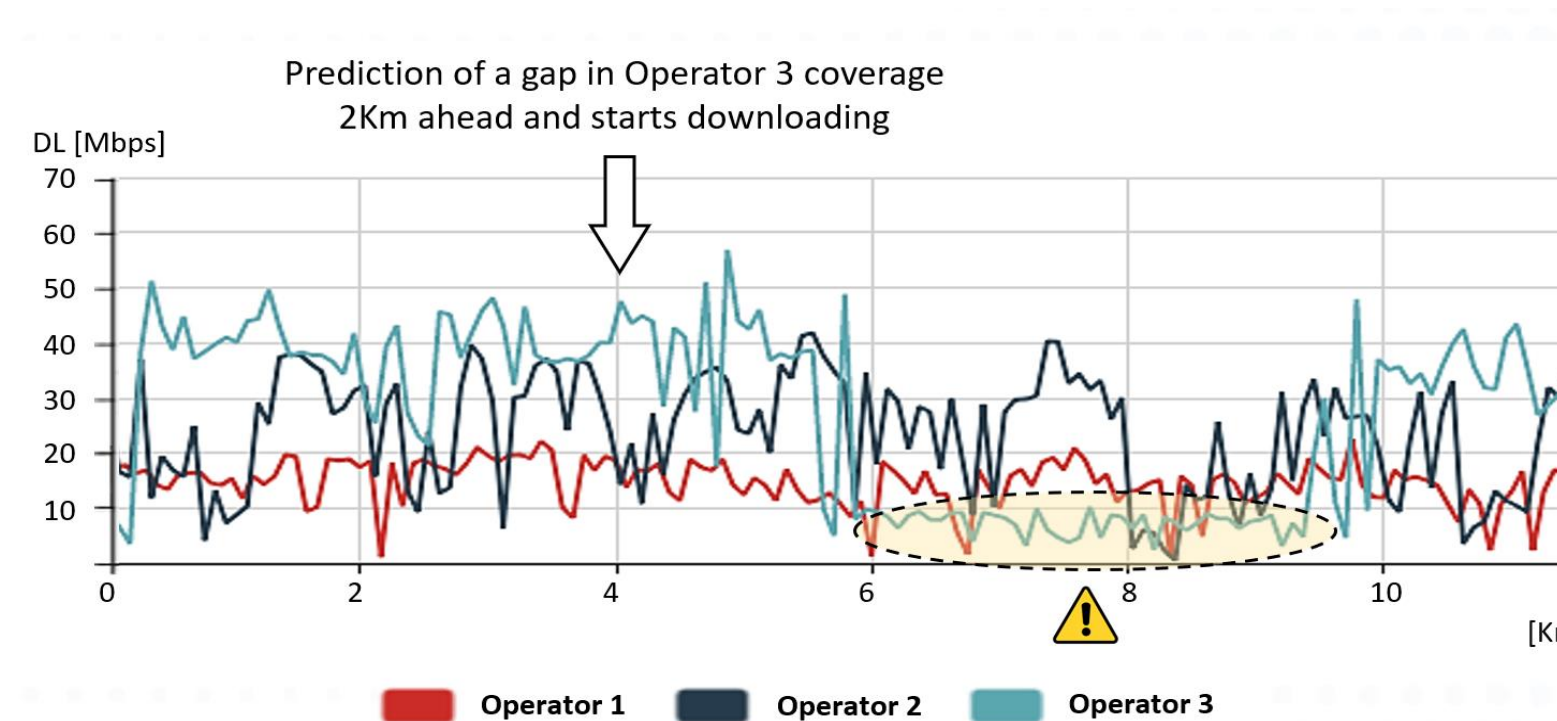
CONCLUSIONS

- ITS-G5 connectivity is limited to the existence of a direct line of sight between the RSU and OBU. The average communication range was about 640 m.

- From a broader perspective, this experiment has confirmed the benefits of the Smart Highway testbed to provide a realistic vehicular test environment that enables rapid, highly collaborative trial deployment, moving from C-ITS use case concepts through to trial completion.

POST MORTEM

- The results of this experiment are very important in the context of the C-ITS pilot that Allbesmart is implementing in the A23 highway in Portugal for the road operator GLOBALVIA.

- Thanks to this experiment we were able to validate three C-ITS services implementations in a real environment and test interoperability issues before commercial deployment.

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