The NGMN 5G Trial & Testing Initiative (5G TTI)

ITU 5G Licensing

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Orange 5G Roadmap

ON THE ROAD TO 5G
- ✓ 2018 : demonstrator & trials
- ✓ 2019 : Pre-Commercial Orange Cities
- ✓ 2020 : Commercial LAUNCH

NGMN 5G Trial & Testing Initiative in a nutshell

This NGMN project, which was launched end of June 2016, aims at :

- Enabling a global collaboration on testing activities → Supporting an efficient, successful, and in-time 5G technology and service introduction
- Consolidating contributions and report on industry progress → Ensuring the development of globally aligned 5G technology and service solutions
- Testing future 5G use-cases with industry stakeholders (e.g. from vertical industries) → Identifying and promoting new business opportunities

Leading global Operators, Vendors and Research Institutes are involved in a 4 phases endeavour !

From Testing Candidate 5G Building Blocks to Proof of Concept

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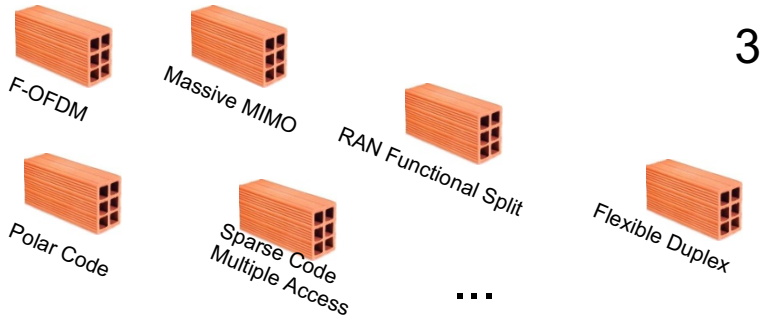

3GPP SI – R14
5G Phase 1

5G
functionalities

Completed

Test of Technology Building Blocks

Executing the performance test of potential candidate technology building blocks for 3GPP 5G Phase 1. Tests were performed in lab environment as well as small-scale outdoor environments, either by real equipment or via well-designed simulations.

Completed

Proof of Concept

Demonstrating that basic 5G functionality and performance are achievable with prototypes involving pre-standards proprietary equipment. The PoC experiments can be performed both in lab and also small- to medium-scale outdoor environments

& Corresponding Achievements

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Test of Technology Building Blocks

16 candidate 5G building blocks have been proposed, discussed and tested within the TTBB project.

This impressive amount of information is available on the NGMN web site.

10 out of these 16 candidate building blocks are now part of 3GPP R15.

supported by : KUMU NETWORKS

The Proof of Concept phase has delivered its promises

NGMN TTI POC phase addressed both, functional & architectural proof points as well as performance proof points.

PoC test procedures have been defined

And practiced by NGMN Partners

Functional & Architectural Proof Points	Performance KPIs
Massive MIMO	UL/DL peak system data rate
CP/UP separation	UL/DL average system data rate
CU/DU separation	UL/DL Single UE peak data rate
MEC Traffic Steering	UL/DL Single UE edge data rate
Slicing	UL/DL Single UE average data rate
FWA	

Main highlights on Proof of Concept

Overall results indicate that design choices being made for 5G systems are in the most cases meeting expectations already in the pre-standard implementations and prototype systems.

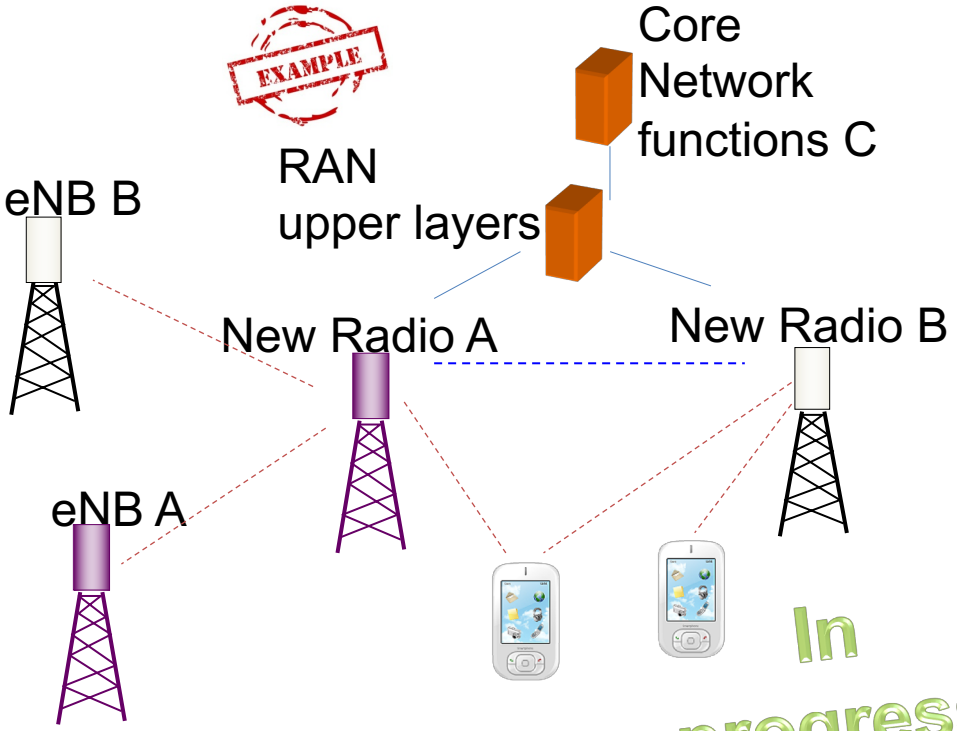
- Functional & Architectural highlights
  - Most Functional and Architectural proof-points were reached, in particular for network slicing, Mobile Edge traffic steering and Fixed Wireless Access cases. For CU/DU, CP/UP split as well as Fronthaul proof-point, certain limitations were observed that should be further addressed.

- Performance Statements
  - Most of the performance criteria were met or we see it feasible to be met with more advanced implementations.
  - We recommend to further check some of the performance criteria during pre-commercial trail phase (e.g. 5G NR latency under loaded scenarios)

Then Interoperability Testing triggered by 3GPP 5G Work Item in R15

Testing of key interfaces for ensuring that there are no different interpretations of the standard between solutions of 2 to 3 different providers (A, B, C).

New Radio A - eNB B



On Standard compatible product platforms to reach the market

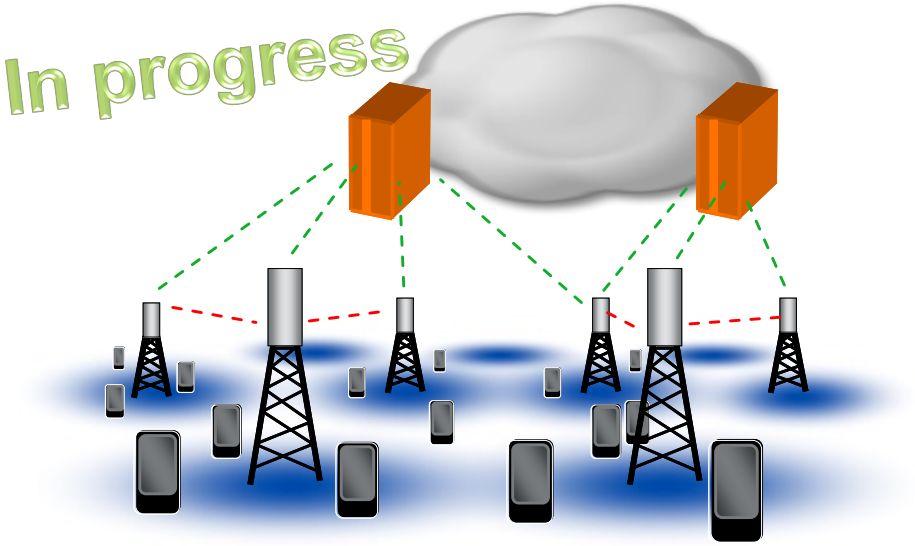
Tests will start soon with pre-commercial equipment.

- IOT testing methodologies have been defined for 4 main interfaces linked to NSA architecture:
  - UE-NR interface
  - eNB-gNB interface
  - eNB-EPC (NSA specific features)
  - gNB-EPC (NSA specific features)

- This set of methodologies is being adapted for SA architecture, notably on:
  - Uu (SA UE-RAN) interface
  - N1 (SA UE-AMF) interface
  - N2 (RAN-AMF) interface
  - N3 (RAN-UPF) interface
  - N4 (SMF-UPF) interface

The IOT team is ready to start collecting, analysing and reporting on Interoperability testing until the end of 2019.

In parallel, Pre-Commercial Networks Trials are being prepared



Visualizing 5G capabilities and advantages on a system close to real network operation.

… until December 2019.

NGMN Partners have released the second version of the Pre-Commercial Network Trial Framework adapted to SA architecture. This outstanding document has just been published on the NGMN website here.

Key messages from the NGMN 5G Trial & Testing Initiative

- Reference documents have been elaborated for preparing 5G testing.

- The effective testing effort is in progress, notably with very interesting proof points passed in the PoC phase (e.g. on Slicing).

- For the remaining interoperability and pre-commercial network trial phases, first tests reports are already available and the effort will last until end of 2019. It will hopefully allow NGMN to bring a very positive message on “5G technology” to the Ecosystem.

All new contributions from the audience will be warmly welcome at NGMN !

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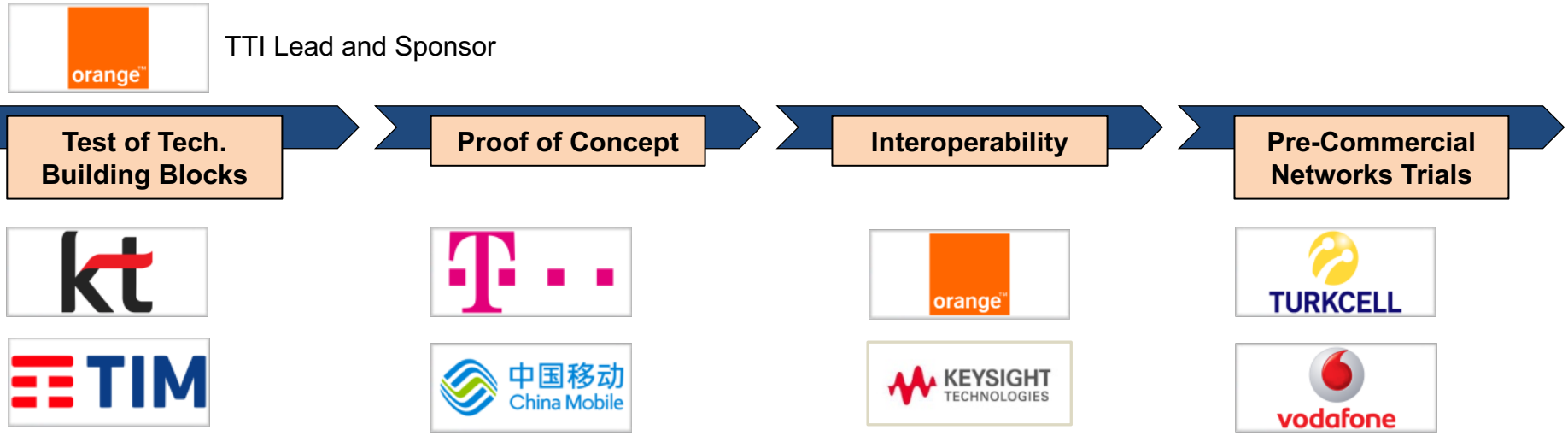
Thank you

Back-up

The TTI Leadership Team is active



Contributing Partners

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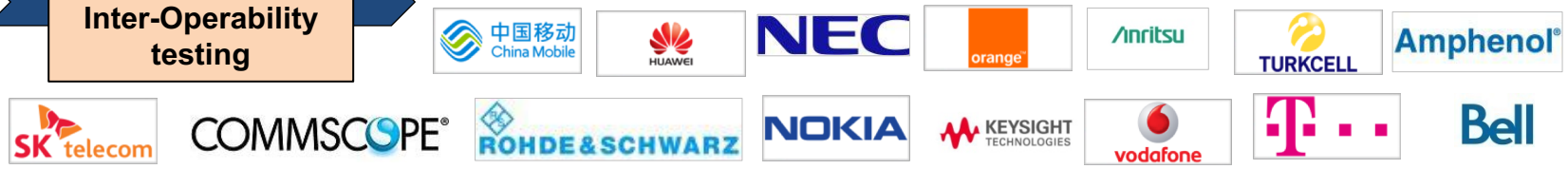
Test of Tech. Building Blocks

Proof of Concept

Inter-Operability testing



Pre-Commercial NWs Trials