



5G PAN-EUROPEAN TRIALS ROADMAP STRATEGY

Short Document – 28 FEBRUARY 2017

1. Introduction

This document addresses the high-level 5G Pan-European Trials Roadmap, focusing on the Trials Roadmap strategy, the Trials Roadmap Streams and the related actions to be defined and developed. This document is made available ahead of MWC 2017. The comprehensive Trials Roadmap document (with detailed content) will be released (public document) in version 1.0 before the 3rd 5G Global Event to be organized on 24-25.05.17 in Tokyo. The Trials Roadmap definition is worked out by the Trials WG (open membership) coordinated by the 5G Infrastructure Association, expanding the work initiated by the Industry and EC in the context of respectively 5G Manifesto (http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=16579) and 5G Action Plan (http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17131).

The Trials WG is elaborating a solid and comprehensive strategy to develop the Pan-EU coordinated trials as well as international trials with non-EU partner countries. The 5G Pan-EU Trials Roadmap is addressing several of the 5G Action Plan (5GAP) key elements and targets to develop the necessary synergies between these elements. The main objectives of the Roadmap are to:

- Affirm global European leadership on 5G technology, 5G networks deployment and profitable 5G business models.
- Demonstrate benefits of 5G to vertical sectors, public sector, businesses and consumers.
- Show a clear path to successful and timely 5G deployment.
- Provide robust response to the European Commission 5GAP.
- Complement commercial trials and demonstrations as well as national initiatives.

The 5G Pan-European Trials Roadmap is covering a broader scope than the 5GAP and the 5G Infrastructure PPP Phase 3 (2018-20+). Most of the Roadmap implementation is and will be covered by the Industry on private basis, with part of this implementation supported by EC through the 5GAP, EC 5G Infrastructure PPP Phase 3, EC 5G Investment Fund and by Member States through specific National programmes.

2. Trials Roadmap Strategy

Trials Vision and Mission

In the context of 5G experimentation and trials, some of the key questions which should be considered by all parties include (1) Why 5G is good for me?, (2) How do I prove that 5G is good for me?, (3) Why cannot this be achieved already now?, (4) What is 5G bringing that makes this possible? and (5) How do I transition from 4G to 5G? Each of the ICT stakeholders, vertical sectors, participants, sponsors and contributors will have different objectives, outcomes/expectations or KPI by which they will want to measure the success of the trial(s). These will be driven by the user requirements and will need to be measured (quantitative or qualitative) during the trial, so that an assessment can be made. All of these should be set and agreed before the trial commences.

Trials Phasing

Before 2018 (before the first 5G standard release by the 3rd Generation Partnership Project (3GPP)) it is envisaged to have technology trials run by independent trial consortia in various countries, independent of the status of standardization, to demonstrate and validate the new 5G capabilities as well as foster an ecosystem around the new 5G capabilities. Vertical industries will already be involved in this trials phase and the trials will demonstrate key 5G functionalities and technical / technological enablers. During and after 2018 (when the first 5G release of the 3GPP Standard (Rel-15 Stage 3 - June 2018) is planned to be completed and additional frequency spectrum for 5G is expected to be identified in WRC 2019 to enable the full performances capabilities of 5G in terms of capacity and speed), European stakeholders will move to agree on trial specifications (use-cases, scenarios, interfaces, agreement to transfer use-cases across trial networks) valid for Pan-European trials, based as much as possible on standard-compliant systems. These trials will aim to demonstrate wider interoperability and support for vertical use-cases in order to claim global public attention. Early trials will happen in US in 2018 (addressing Fixed Wireless Access (FWA)) and Asia in 2018-20 (Olympic Games addressing eMBB) while Europe will address the full spectrum of 5G use cases for its roadmap.

Trials System and Architecture

From a high level perspective, one way to view the 5G ecosystem is in terms of Platforms (Hardware and Software), Services and Use Cases. For new Platforms and Services to be created, investment and development will be required. Key decisions will need to be taken, both business-wise and technically. Business cases will be developed, and tests, trials and evaluations conducted to satisfy the various stakeholders that expected outcomes are being achieved. Considering vertical sectors, these will make use of the new Platforms and Services and generate Use Cases for their particular sector. Again investment and development will be required (new processes or ways of doing business may need to be considered), key decisions taken, business cases developed and evaluations conducted. There will be a top-down “pull” vs bottom-up “push” approach (e.g. requirement / offer). Some Use Cases will be more demanding than others and will drive the Platform and Services design and implementation (if the business case, i.e. Return on Investment (RoI), supports this). Some vertical sectors will be earlier/early adopters for the new technology/services and others will follow and make use of it once it is proven.

The current Pan-EU Trials Roadmap includes several inter-related streams, as depicted in Figure 1: (1) Private experimentation and trials, (2) Large scale 5G events and showcases, including National and Pan-EU events, (3) Development and use of Research & Innovation (R&I) platforms for 5G experimentation and trials, (4) R&I experimentation and trials in the context of vertical applications

and use cases, (5) 5G international trials cooperation and (6) 5G and 5GAP Regulation and Policy ensuring acceleration of 5G adoption and deployment (incl. spectrum, Net Neutrality, EU defragmentation...).

5G Pan-EU Trials Roadmap 2017-2020+

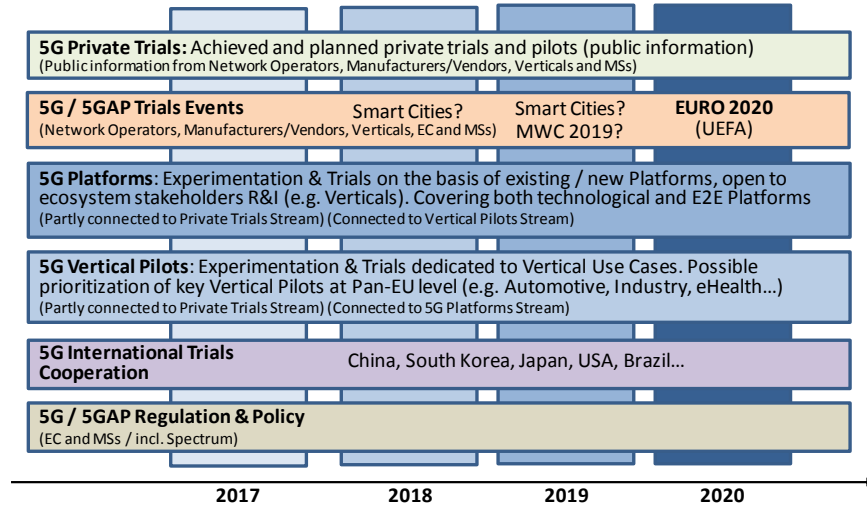


Figure 1: Pan-European Trials Roadmap 2017-2020 – Strategy and Streams

3. Roadmap Streams

5G Private Trials Stream

There are and will be an increasing number of 5G private experimentations and trials done on bilateral (Network Operator and Manufacturer/Vendor), trilateral (Network Operator, Manufacturer/Vendor and Vertical stakeholder) and multilateral (NO, Manufacturer/Vendor and different stakeholders) basis. These experimentations and trials will be done on private basis and information will be either available a posteriori (achieved) or a priori (pre-announcement). The Trials WG will collect the major public information related to announced and pre-announced experimentation and trials. Specific added value analysis will be achieved through different perspectives: (1) Industrial stakeholders, (2) Countries, (3) 5G pillars (eMBB, URLLC and mMTC) and KPIs (e.g. Data rate, Mobility, Latency, Density, Reliability, Positioning accuracy, Coverage...), (4) Timing (2018, 2019, 2020 and onwards) and (5) Standardization phases and releases (e.g. 3GPP Rel-15, Rel-16 and onwards).

5G / 5GAP Trials Events Stream

In connection to the Private experimentation and trials, specific events to be organized in 2017-2020+ will enable demonstrations, use and showcasing of 5G features and services / applications. The major Pan-EU event (Flagship) currently envisaged is the European Football Championship EURO 2020 to be organized in June 2020 in 13 different cities in the EU, e.g. London, Amsterdam, Munich, Bilbao, Brussels, Dublin... (<http://www.uefa.com/uefaeuro-2020/>). The rights and constraints associated with such an international event are currently being investigated (e.g. content rights). Other large scale events, not only sport events but also cultural events and large business events (e.g. MWC 2019 in Barcelona) are being considered as well. In addition, some European cities or regions with periodic large scale events can be identified as permanent validation places.

5G Platforms Stream

5G Platforms are a useful tool to support the 5G European trials. These platforms support the execution of 5G services and use cases, including for mass market and vertical sectors. Due to the high diversity of platforms, use cases, trials and maturity stages of technology, 5G Platforms can be classified in three different levels: Research, E2E Trials, and pre-Commercial. A number of platforms have been designed in Europe (e.g. from EU-funded research projects) that can serve as a basis for 5G trials (see e.g. the NetWorld2020 document “5G Experimental Facilities in EU” - <https://www.networld2020.eu/wp-content/uploads/2016/03/5G-experimentation-Whitepaper-v11.pdf>). However, because the standardization of 5G is an ongoing activity, 5G Platforms will have to evolve from existing and new platforms, requiring further investments. In such scenario, cooperation between platforms is a way to rapidly adapt to changes/improvements to standards, to reduce costs, permit large trials, and even to interconnect with sites in other regions. The Trials WG is currently assessing the interest, feasibility conditions and possible solutions to create and maintain a pan-European platform, or a network of federated platforms, that could be used for 5G Pan European trials. The Roadmap document will provide the WG orientations on such interest and feasibility conditions, as well as a Roadmap on how to deliver it if concluded desirable and feasible.

5G Vertical Pilots Stream

5G experimentation and trials will obviously address vertical applications and use cases. The vertical trials may be partly connected to the private trials and directly connected to the 5G available platforms (Pre-Commercial and R&I). The selection of vertical pilots should take into account the sectors already mentioned in the 5G Manifesto, including, but not limited to the media and entertainment, public safety, eHealth, automotive, transport and logistic sectors. It will incorporate the progress already achieved by the 5G Infrastructure PPP on the 5G use by vertical sectors. The Trials WG aim is to support the selection of vertical and use cases for trials for a better understanding of the technical and technology requirements. The pre-definition of the vertical trials will address (1) Description of vertical sectors, (2) Use cases addressed, (3) Technical requirements and (4) Technologies required to provide requirements. This step will also enable a gap analysis to focus further R&I to overcome any remaining technology gaps.

5G International Trials Cooperation Stream

Multiple European 5G network trials will be in progress by 2018, and most of the 5G technologies under trials will be available for commercial deployment by 2020. However, since 5G will be deployed worldwide, it is required to work not only towards accelerating global 5G standards, but also on trialing and interoperability with other main regions. EU-X joint trials, where X includes international counterpart countries like Japan, Korea, China, Brazil and US, will be key to ensure a common understanding of 5G as well as global interoperability. On the private side, the 5G Infrastructure Association has already signed bilateral Memorandums of Understanding (MoUs) with the leading 5G visionary organizations in China (IMT-2020 5G promotion group), Korea (5G Forum), Japan (5G Mobile Communications Promotion Forum), and 5G Americas (North and South America). Specific joint experimentations and trials could be developed in the context of these MoUs. On the public side, institutional funding to partially support the development of these EU-X joint trials between regions is of paramount importance.