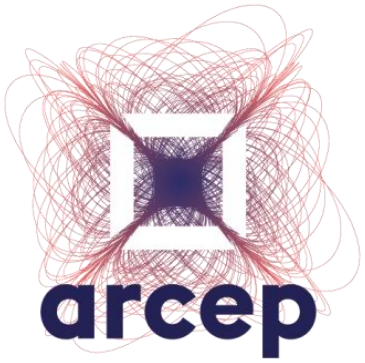


5G Work Programme

July 2018

5G

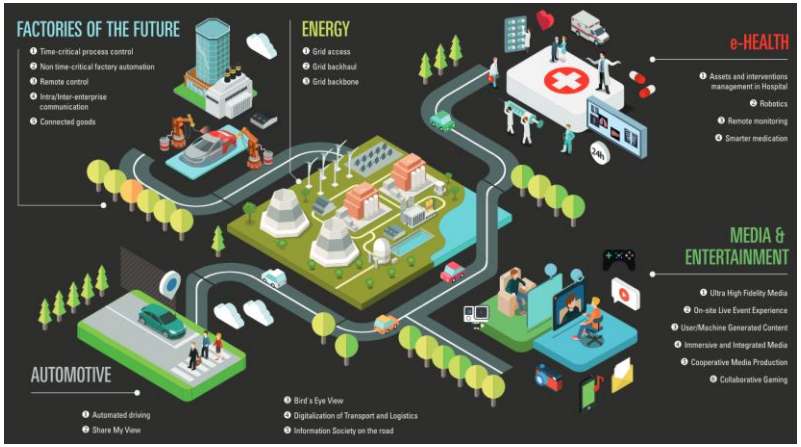
I. 5G: a disruptive generation
II. International mobilisation
III. Ongoing work since 2017
IV. Arcep’s work programme

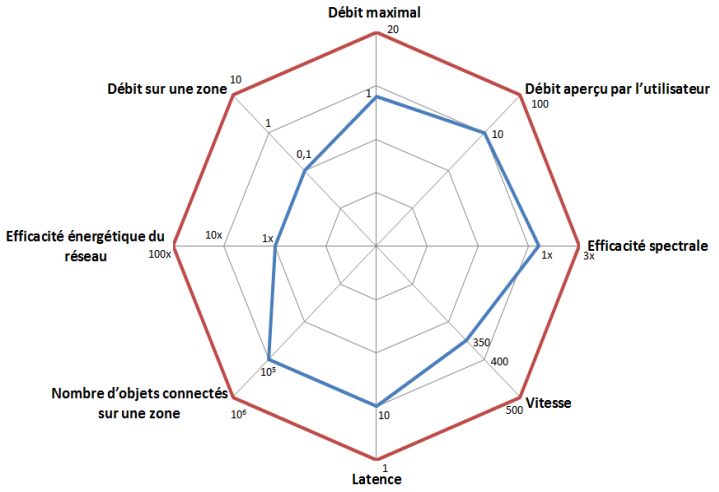
I. 5G: a disruptive generation

5G will make it possible to **increase network capacity**, **provide significantly faster connections,** and enable the development of a host **of innovative services** for consumers and businesses: **virtual and augmented reality, ultra high definition, autonomous cars, smart cities…**

- 5G will mark a **jump in performance** in terms of:
  - Speed (x 10)
  - Transmission time (÷ 10)
  - Reliability of communications

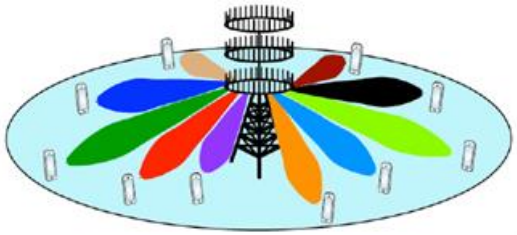
- 5G is **a digital society enabler.** It will allow the development of a variety of applications in a wide array of sectors: **connected cars, telemedicine, robotics, the Internet of Things.**

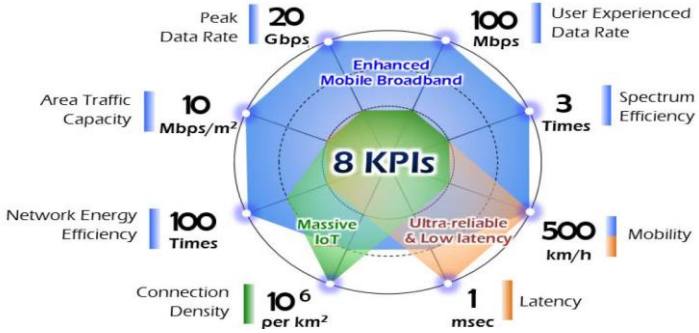




I. 5G: a disruptive generation

Progress enabled by several core innovations:





- **Active antennae:** greater spectrum and energy efficiency
- **Network-slicing:** 5G networks will be configured in slices, to adapt to demand dynamically, according to the application, and so deliver reliable and tailored performances
- The use of high frequency bands **(26 GHz)** by small cells, for local uses with large spectral width, providing very high speeds (~10 Gbps)

II. A growing context at EU level

Ambitious roadmaps to make 5G a success

- European Commission's action plan of 14 Sept. 2016 and EU Council's of 4 Dec. 2017. Goal: commercial rollouts in one major city in every Member State by 2020 and coverage of the main urban areas and transport routes by 2025
- Review of the European Code: availability of at least 1 GHz in the 26 GHz (26.5-27.5 GHz) band under the same technical conditions in each country, by the end of 2020
- Adoption of 5G roadmaps in Germany, the UK, Italy and France

Meeting demand for spectrum resources

- Award procedures in several bands announced for 2018 and 2019: 700 MHz (UK, IT), 1.9-2.1 GHz (DE), 3.4-3.8 GHz (UK, DE, IT, Sweden…)

5G trials and pilot projects

- First trials in Italy and Germany – commercial testing planned for 2018; in Sweden – first 5G network in Stockholm scheduled for 2018

➡ Most commercial launches announced for 2020

Goal

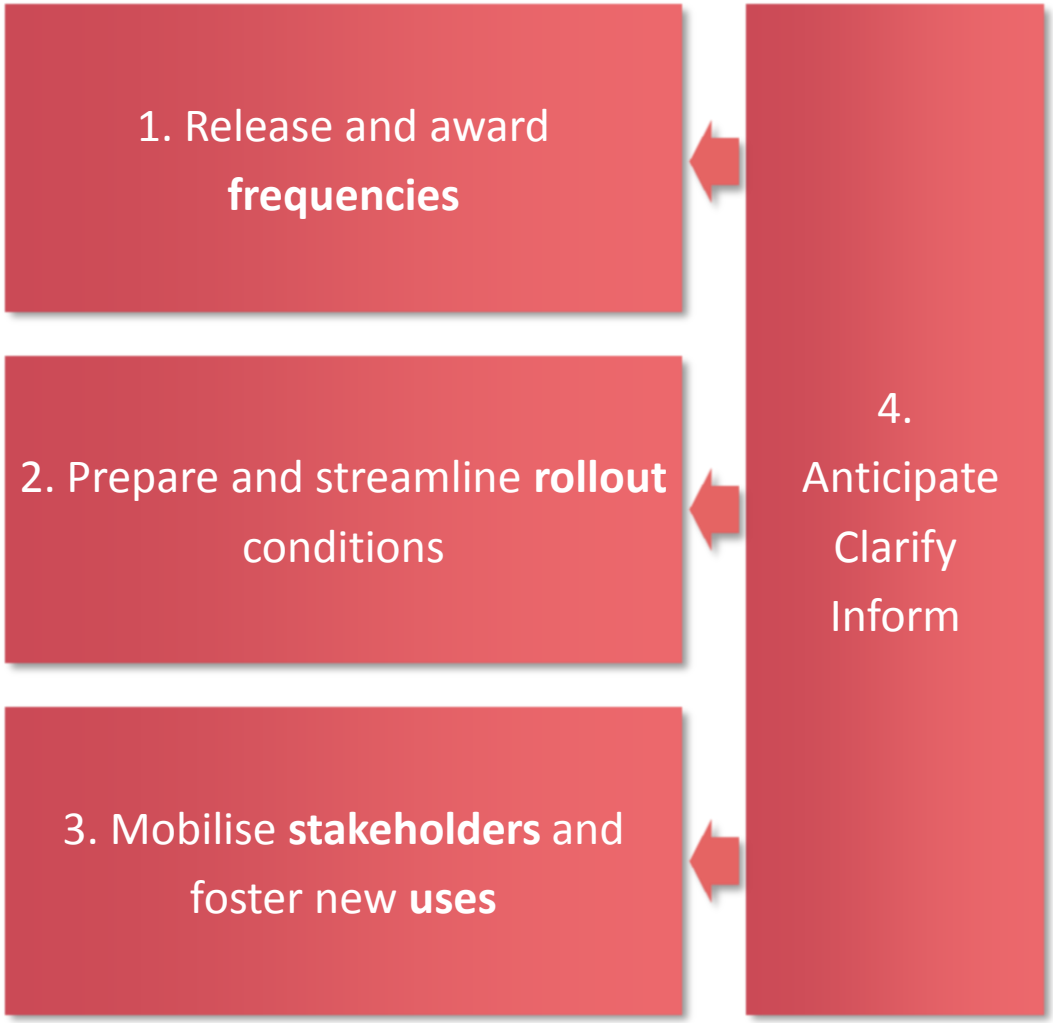
France,

a 5G leader!

III. Ongoing work since 2017

Arcep has been working to pave the way for 5G since 2017:

IV. Arcep's work programme



1. Free up and award frequencies

Release

- **3.4 – 3.8 GHz band: rearrange frequencies assigned to other uses** (WLL-WiMAX, Ministry of the Interior's radio systems, weather applications…) to fully release the band
- **26 GHz band: identify frequencies** that can be made available (the 26.5-27.5 GHz sub-band in particular was identified in the new European Code for allocation by end of 2020) and the **conditions for switching over users** – target bands, timetable – (public consultation launched on 22/05)
- **1.5 GHz band ("L band"):** Diagnose the state of and demand for the band, and analyse **switchover conditions** (upcoming public consultation – summer 2018)

Prepare

- Define the technical conditions for using the bands, **to avoid interference between 5G networks** and **existing applications** (ultra-broadband fixed wireless access, radar, etc.) in 5G bands and adjacent bands
- Establish the spectrum award timetable to enable 5G service launches in 2020

Award

- Define award procedures and their sequence (upcoming public consultation – Oct. 2018):
  - **Award mechanism, block sizes, spectrum cap**
  - **Obligations** (notably **rollout**s) and **frequency sharing rules**

2. Prepare and streamline rollout conditions

- **Develop/accelerate backhaul:** examine the conditions under which operators deploying an **FttH network** should provide a **base station connection solution**
  - In particular, Arcep has already established the right of operators that have invested in FttH network rollouts to use surplus fibres for mobile base station backhaul (Decision No. 2018-0569-RDPI of 17 May 2018)
- **Meet the technical challenges** of 5G rollouts (technical experts group), notably:
  - Assessing the feasibility of **network sharing** (microcells, active antennae, macro-cell/microcell interaction, etc.)
  - Assessing the feasibility and associated restrictions of **providing specialised mobile services on public networks** (e.g.: PMR, connected cars, etc.)
- **Foster 5G and small cell rollouts**, and identify and **help spread best practices** (within a working group **with local authorities**):
  - Explore the possibility of **aligning practices** in terms of the **rules governing access to public infrastructure** for 5G rollouts
  - Establish a **best practices guide** for local authorities on **small cell deployment conditions**

3. Mobilise stakeholders and foster new use cases

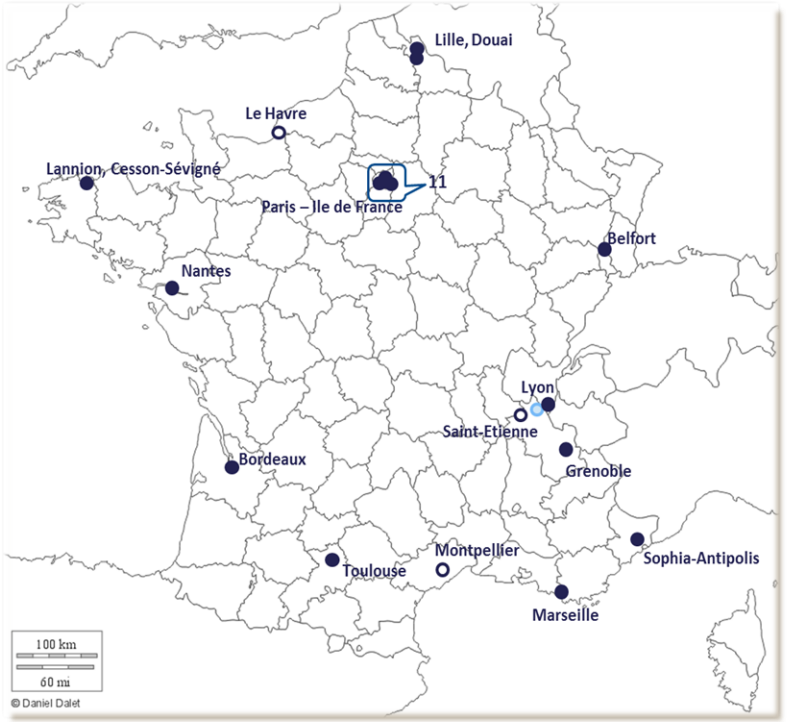
The use cases enabled by 5G will require **joint action from stakeholders** from a wide variety of backgrounds, **to test and develop new partnerships and business models,** thanks to **full-scale pilot projects** (hospital, port, section of smart motorway, etc.)

A "5G pilot" window, open since January 2018

22 trial authorisations granted in the 3.4 – 3.8 GHz band

- The list of identified cities is not exhaustive, and can be expanded on request, and depending on frequency availability

Arcep examines every request in the 3.4-3.8 GHz and 24.25-27.5 GHz bands: in concert with the Ministry of the Armed Forces, **the window includes GHz in the upper end of the 26 GHz (26.5-27.5 GHz) band.**



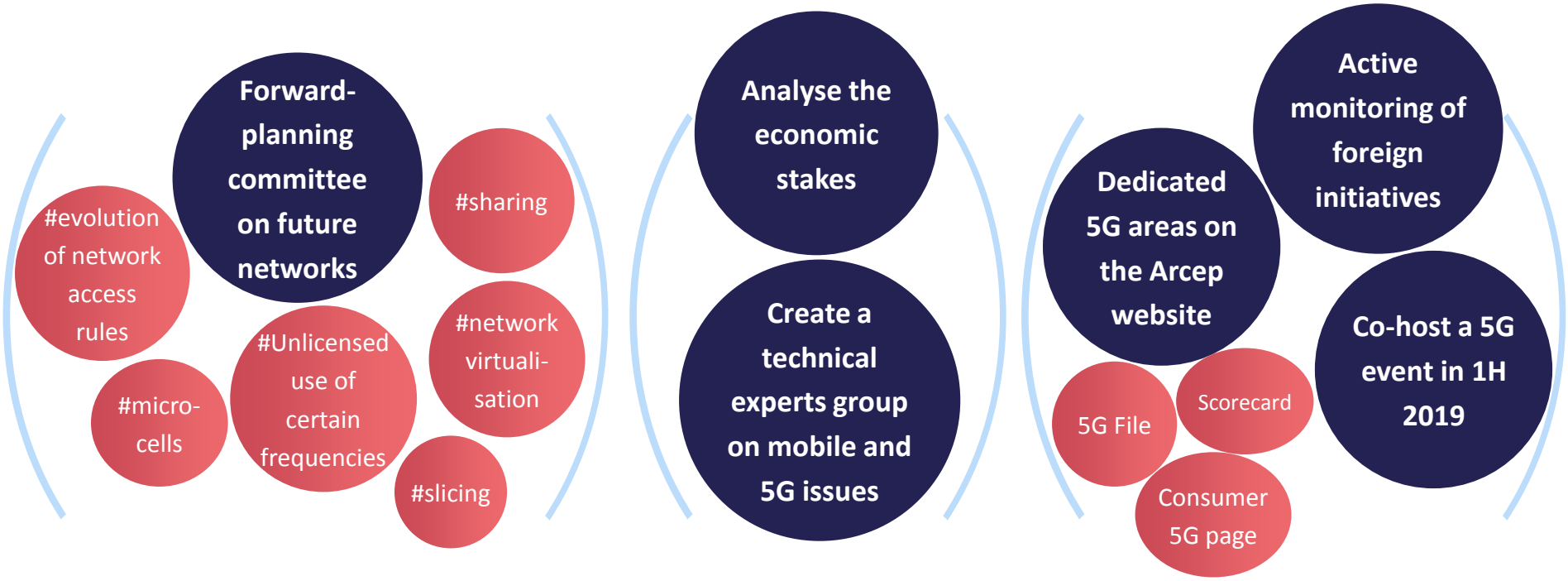
3. Mobilise stakeholders and foster new use cases

In addition to issuing trial authorisations, Arcep is working to mobilise the stakeholders, and especially to:

- **Mobilise start-ups:** thanks to its presence at “Station F” and in other business incubators, Arcep is supporting start-ups through information, facilitating procedures and helping with trials. **Dedicated 5G briefings** are already planned (Autumn 2018)
- **Work hand in hand with the Government to bring together stakeholders from the same value chain** from sectors that are a priority in terms of applications, to **facilitate connections** and obtain feedback on demand, notably with respect to frequency allocations:
  - connected cars
  - smart farming
  - industry 4.0
- **Share information on 5G trials/pilots** being conducted in other countries, to better understand possible uses
- **Create a scorecard for 5G rollouts in France**

This will inform the work being done on determining the format and conditions for future frequency awards

4. Anticipate, clarify, inform



Anticipate
the disruptions created by 5G and their implications

Clarify
technical and economic issues

Inform

Arcep's 5G timetable

- Summer 2018: public consultation on the release of the L-band
- September 2018: creation of a forward-planning committee on future networks
- October 2018: public consultation on spectrum award
- Autumn 2018: work begins on a best practices guide for 5G rollouts (within the local authorities' working group)
- Autumn 2018: work begins on network sharing and 5G network access rules (within a technical experts group)
- H2 2018: briefings and meetings to discuss targeted uses – autonomous vehicles, future of manufacturing… (co-hosted with the Government)
- Early 2019: launch of full-scale pilot projects
- H1 2019: 5G event co-hosted with government
- After mid-2019: call for tender for spectrum awards

Annex

5G trials

“5G pilot” window

In **January 2018,** Arcep created a **“5G pilot” window** (5G@arcep.fr) **to**:

- Enable **rollouts under real-life conditions** to:
  - Understand how stakeholders can live together;
  - Test and foster new business models;
  - Test the innovations ushered in by 5G.

    Goals: connected hospitals, smart ports, smart motorway sections, etc.

- Obtain initial feedback to help **design future awards.**

Arcep is already issuing trial authorisations in the 3.4-3.8 GHz and 24.25-26.5 GHz bands, which are under its responsibility. The list of cities announced in January 2018 for the 3.4-3.8 GHz band is not exhaustive. All requests are examined.

Working together with the Ministry of the Armed Forces, **this window has been expanded to the GHz in the upper part of the 26 GHz (26.5-27.5 GHz) band** for which equipment is expected to be available first, as they are millimetre-wave bands. This band is expected to drive disruptions in terms of performance, notably speed, and so innovation.

The first 5G trial authorisations

January 2017 t-Trial in Grenoble (**CEA Leti**)

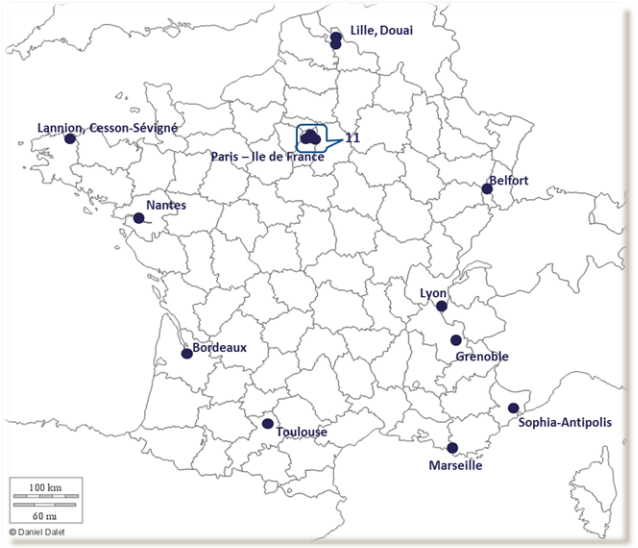
July/Sept. 2017 Trial in Belfort (**Orange**)

February 2018 Trials in Lille/Douai (**Orange**) and in Bordeaux/Lyon (**Bouygues Telecom**)

March 2018 Trials in Rennes/Lannion (**b-com**)

June 2018 Trials in Nantes/Toulouse (**SFR**), in Marseille (**Orange**)

July 2018 One trial in Sophia Antipolis (**Eurecom**), 11 trials (**Orange, SFR, Bouygues Telecom, Nokia**), including three autonomous car use cases in Paris region



July 2018: trial authorisations in Paris region

Several authorisations have been requested for the Paris region as they can serve as a vital international showcase.

Arcep's in-depth work on releasing frequencies and analysing the region made it possible to authorise 11 trials in this area in July.

Close-up: 5G and connected cars

Three use cases authorised in July 2018 for connected cars:

- **Trials at the Linas/Montlhery speedway, in partnership with UTAC-CERAM:** these trials seek to explore connected car-related applications opened up by 5G – mobile data transfer for delivering information, entertainment, platooning*, expanded sensors, etc.
  - Orange trials
  - Bouygues Telecom trials
- The "**Saclay 5G Autonomous Vehicles"** project involving Nokia, Vedecom and their partners aims to provide wireless coverage to autonomous vehicles, to cover travel outside the city centre, and compare the advantages of different ITS G5, LTE and 5G technologies.

** Grouping vehicles by platoons*