

**Orange**

# On the road to **5G**

**Jean Michel SERRE**  
CEO of Orange Japan-Korea



**Orange  
today**



# Orange at a glance

**#51** in 2017  
global brand  
ranking



**269 millions**  
customers  
worldwide  
(30 June 2017)



**3.3 million**  
Fibre customers



**450 000 kms**  
of undersea cables  
(enough to go around the  
earth 10 times!)



**29 millions**  
Orange Money  
customers in 17  
countries



**705  
millions**  
euros invested  
in research and  
innovation

**6 844**  
patents in our  
R&D portfolio



**4G**  
in 18 countries



**+22 million**  
fans on  
Facebook



**+3 million**  
followers on  
Twitter



**+1.5 million**  
visits on Orange.com each month



**Over 269 million\* customers worldwide**

**B2C in 29 countries  
and B2B in 220  
countries**

**For mobile,  
207 million  
customers worldwide**

**28 millions  
4G customers in Europe**



## Our network

Orange invests and contribute to the development of high performance global networks.

Around **450,000 km of submarine cables**.

More than **42.7 million** fixed lines.

Orange ranked **best network 2G/3G/4G** in France by Arcep for the 6th consecutive year in 2016.

**4G/LTE** networks in **18 countries** and **3G/3G+** networks in **21** African and Middle East countries

High speed networks (fibre, VDSL2) in Spain, France, Poland and Slovakia



# 5G for Orange

# connectivity expectation is growing

<b>Coverage</b>		the customer's expectation is increasing : a <b>high quality</b> connection <b>everywhere</b> (home, transports, rural,...)
		our customers, specially in Africa, ask for a <b>more affordable</b> basic internet access
<b>Speed</b>		new usages, like virtual reality or augmented reality, requires <b>faster speed</b>
<b>Connected Objects</b>		some objects, like driverless vehicles, drones or robots, call for <b>higher performance</b>
		low-end, low energy consumption sensors will be <b>massive</b> and should be handled properly

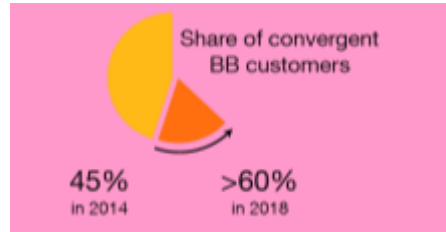


# a strong market demand for broadband services reflected in Orange strategic plan

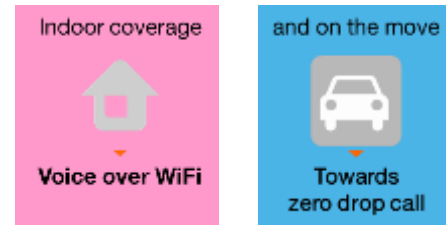
customer request:  
coverage and speed



market trends: broadband  
quad-play and  
convergence

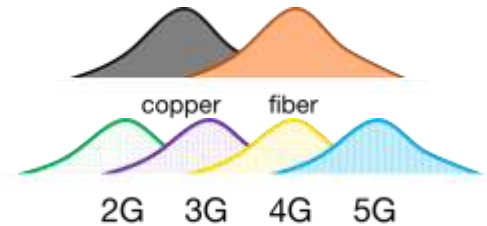


network quality  
contributes to customer  
experience



## Essentials2020

Always in touch to connect what's essential in your life



**€15 billion**

invested in our networks

2015 - 2018

**€5bn**  
in mobile access

**€4.5bn**  
in FTTH

# Orange is leading 4G connectivity in Europe\* and MEA



### IoT

LTE-M  
- Ultra reliable narrowband  
- Extends coverage

LoRa

### SON

ONAP

### IA

“What’s important to our customers is the **quality of the network they perceive**, in the places where they spend most time or pass through on a daily basis”

Stéphane Richard, Essentials2020



### Transport

### Indoor

### Vacation

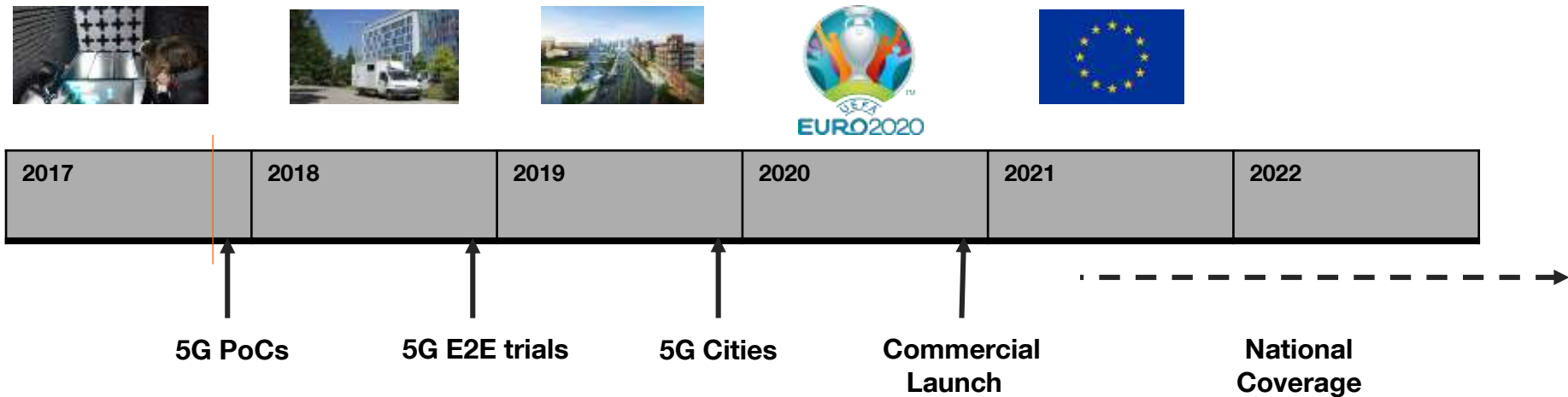
### Rural

an unmatched customer experience thanks to fiber and LTE investments

\* Orange 2017 Best Network Awards in 6 out of 8 European countries; source ARCEP and Systemics



# Orange is on the road to lead 5G connectivity in Europe



- ICT-17-2018: 5G End-to-End Facility
- ICT-18-2018: 5G for Cooperative, Connected and Automated Mobility
- ICT-19-2019: Advanced 5G validation trials across multiple vertical industries



# 5G will create new business opportunities

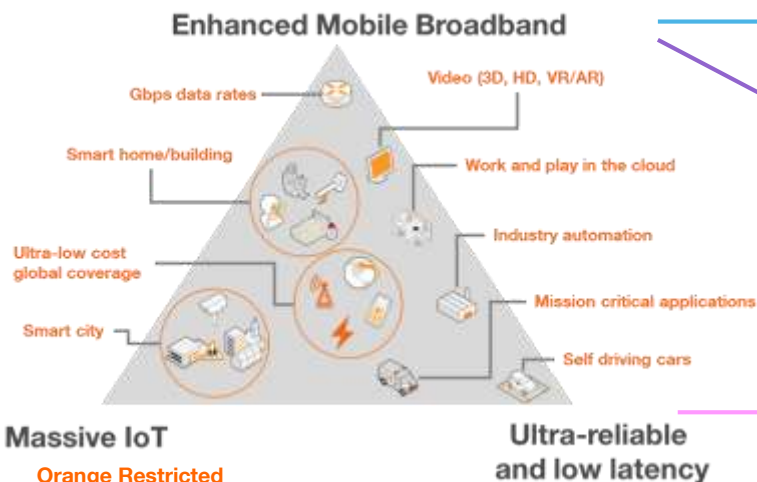
## 5G is a new wireless standard

- will drive the wireless technology until 2030
- first phase of the standard: mid 2018 and devices/networks 6-12 months later
- new spectrum and new equipment

## 5G means

- more network capacity
- opportunities to launch new services

## 3 core opportunities



### enhanced Mobile Broadband (eMBB)

- more speed, lower latency
- multi-service : QoS by type of object ?

### Fixed Wireless Access (FWA)

- 5G Fiber to connect households
- not before 2022

### Specialized Services (B2B) :

- Class of Services
- P&L approach

# Orange VR

## Experience

**New usage will push the traffic further**



### **Initially computer based**

Computer simulated environment visualized on head mounted display. Most often a PC or console peripheral designed for gaming

### **Develop to Virtual presence**

Real environment captured with high quality 360 video cameras and visualized on a head mounted display or smartphones, mostly in real-time

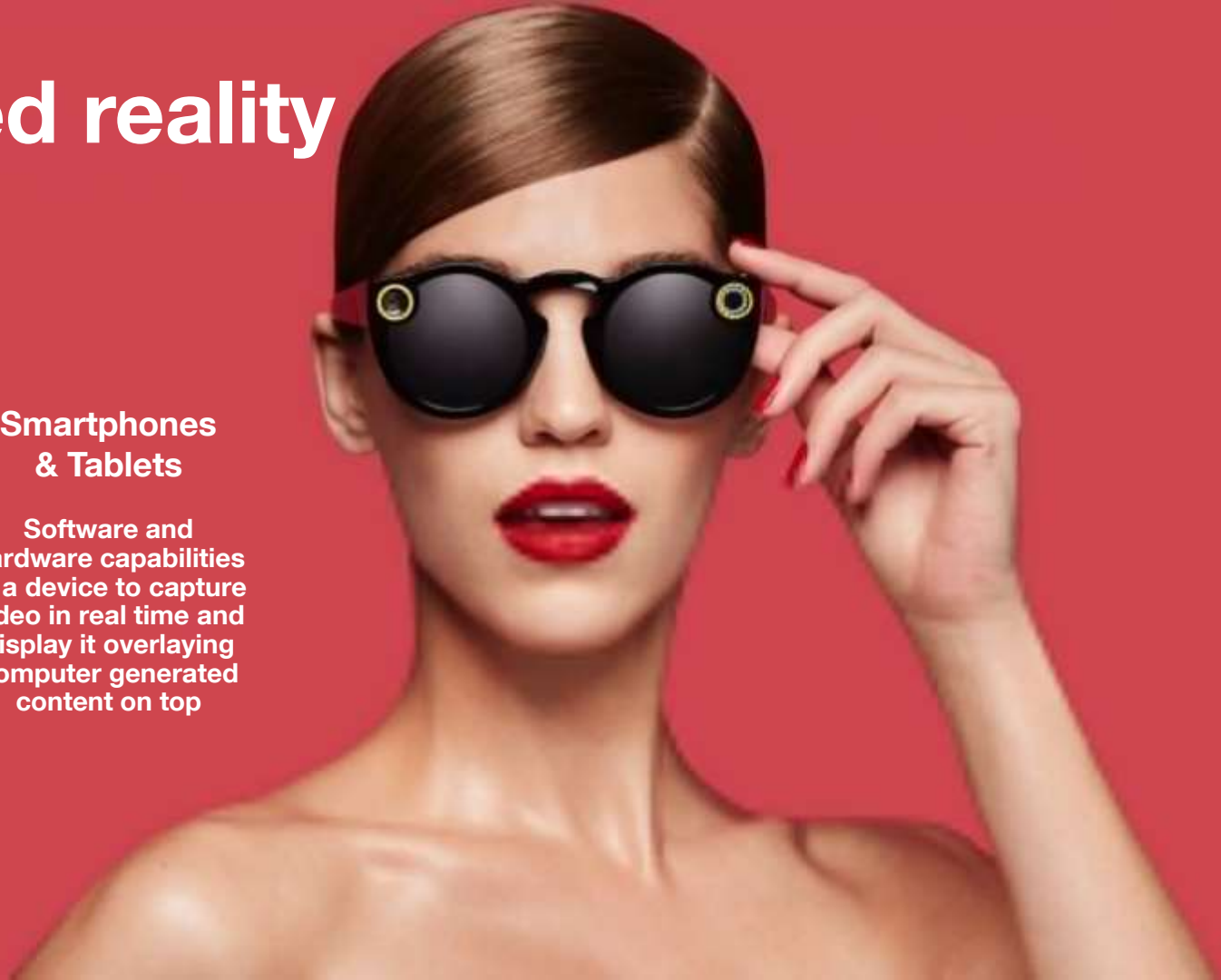
# Augmented reality

## Optical Head Mounted Displays

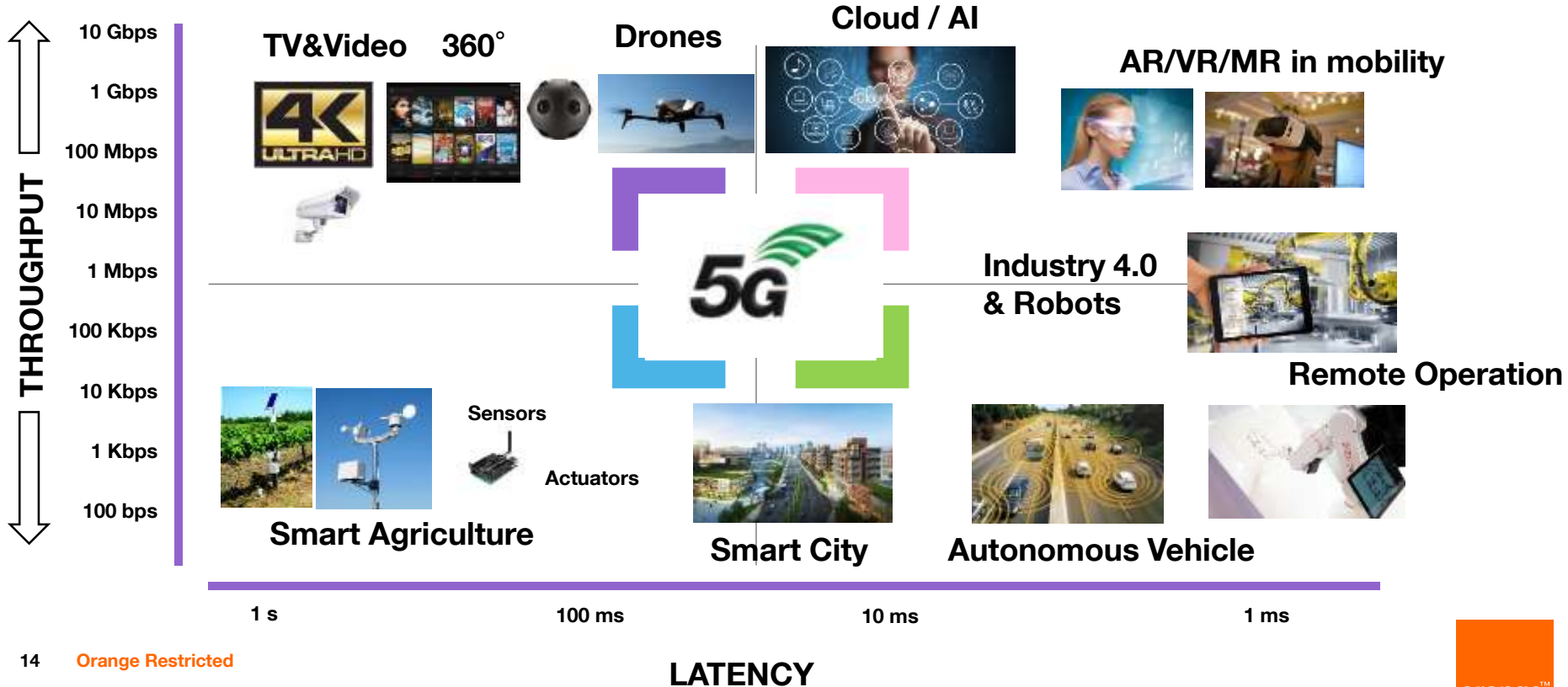
Head set that allows users to see through it, having the capability to overlay images and computer rendered graphics on field of view

## Smartphones & Tablets

Software and hardware capabilities of a device to capture video in real time and display it overlaying computer generated content on top



# thanks to 5G multi-service network, new usages will emerge



# allowing new opportunities

1

an acceleration of our **Internet of Things** diversification



2

a **fixed wireless access** to terminate fiber in suburban and rural areas



3

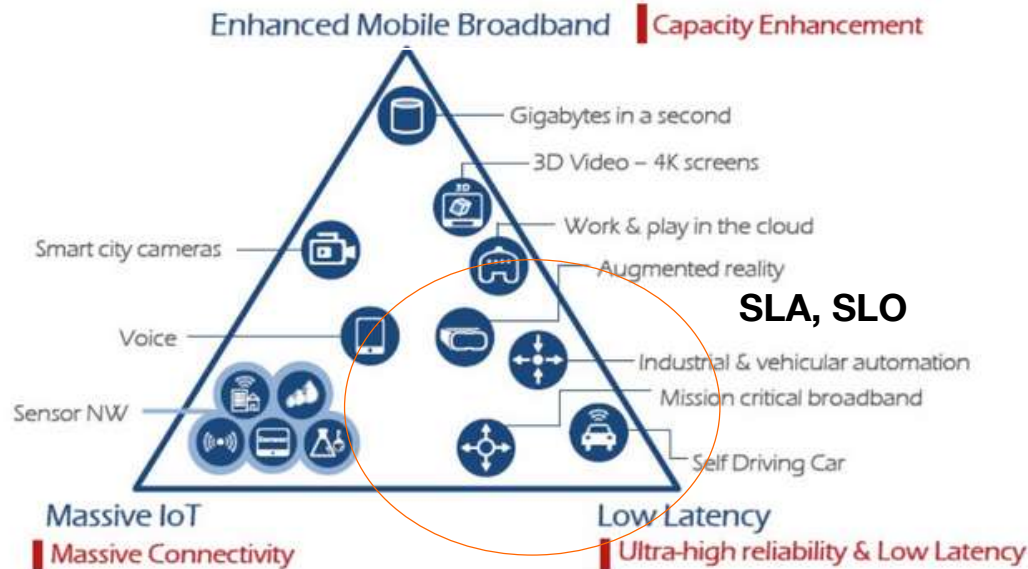
a reliable **LAN connectivity** for businesses



# Specialized 5G services: verticals

## a clear opportunity for B2B

### 3 angles for 5G



(Source: ETRI graphic, from ITU-R IMT 2020 requirements)

### key performance objectives

- **lower latency:**  
-> 1 to 10 ms
- **higher minimum throughput:**  
-> 50 Mb/s “everywhere” (cell edge)
- **higher capacity:**  
-> x10 vs. 4G+  
x3 with more antennas (MIMO) and  
x3 with New Radio in cm/mmWaves
- **higher peak rate:**  
-> 10 Gbps in cm/mmWaves  
-> 1 Gbps in 3.5/3.7 GHz  
-> 2 Gbps with 4G+5G aggregation
- **higher reliability:**  
-> towards 99.999%

# 5G deployment and investments

## Key elements to be considered for 5G deployment

---

- re-use of existing sites
- site densification is not required at the beginning
- new active antennas (massive MIMO) need to be deployed
- new 5G RAN Hardware and Software
- fiber backhaul upgrade
- move to new generation core network (with virtualization)

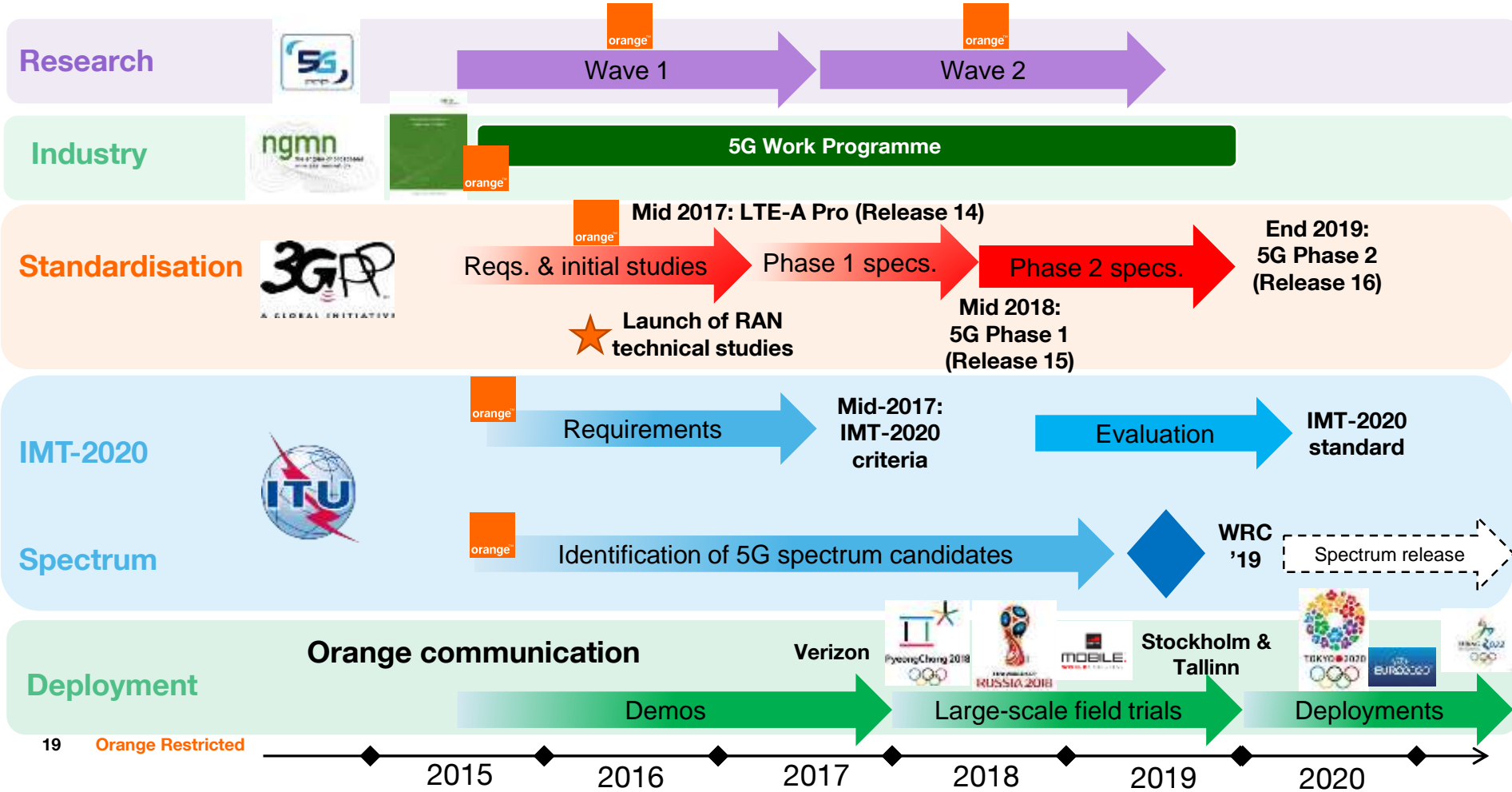
## Investments

---

- In several countries, 5G frequencies will be auctioned in 2018/2019. Prices are not yet known in most of the countries
- As a comparison, 4G licenses cost in France was a bit higher than 1 Billion € (800MHz & 2.6 GHz)
- 5G deployment will be needed anyway to face traffic growth and radio mobile saturation
- 5G will offer a better cost structure (cost per Gbyte) than existing radio access networks
- no major CAPEX in 2018 and 2019 (only trials/initial deployment)
- CAPEX beyond 2020 will depend on market conditions (mass market and B2B / new verticals)

# How 5G was prepared?

# How 5G is created?



## Orange prepares for the arrival of 5G with three new tests

- **Orange is actively preparing for the arrival of 5G to keep the leadership of high quality mobile network and to create new usages**
  - **Improved high-speed mobile broadband**
  - **High speed fixed broadband access**
  - **New applications for digital transformation of businesses**
- **Test till 2020 to prepare the arrival of 5G in the area of consumer and business customers**
- **Partnership with Nokia and Kathrein for compact smart antenna design for 4G/5G**

## Near-term field tests to be done

### UTAC CERAM have chosen Orange for 4G/5G connectivity for autonomous vehicles

- To provide 4G+ high speed coverage on entire site of Linas-Montlhery(ile-de-France)
- Deploy 5G test network by Autumn 2018 with Ericsson

### First technical end-end 5G test in France in Lille and Douai

- First test in Lille and Douai between Mid-2018 and mid-2019 as soon as ARCEP approved

### High speed broadband internet access at home under the real condition to enhance the fiber network in Romania

- Temporal high speed network projects
- Test under the real condition in Romania 2H 2018 with Samsung and Cisco

# Thank you

