

PAVING THE WAY FOR 5G

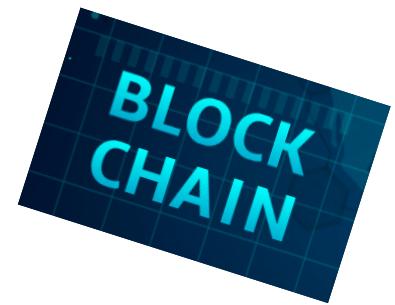
“Feedback from France”

*Didier CHAUVEAU
Deputy Director
Spectrum Planning & International Affairs*

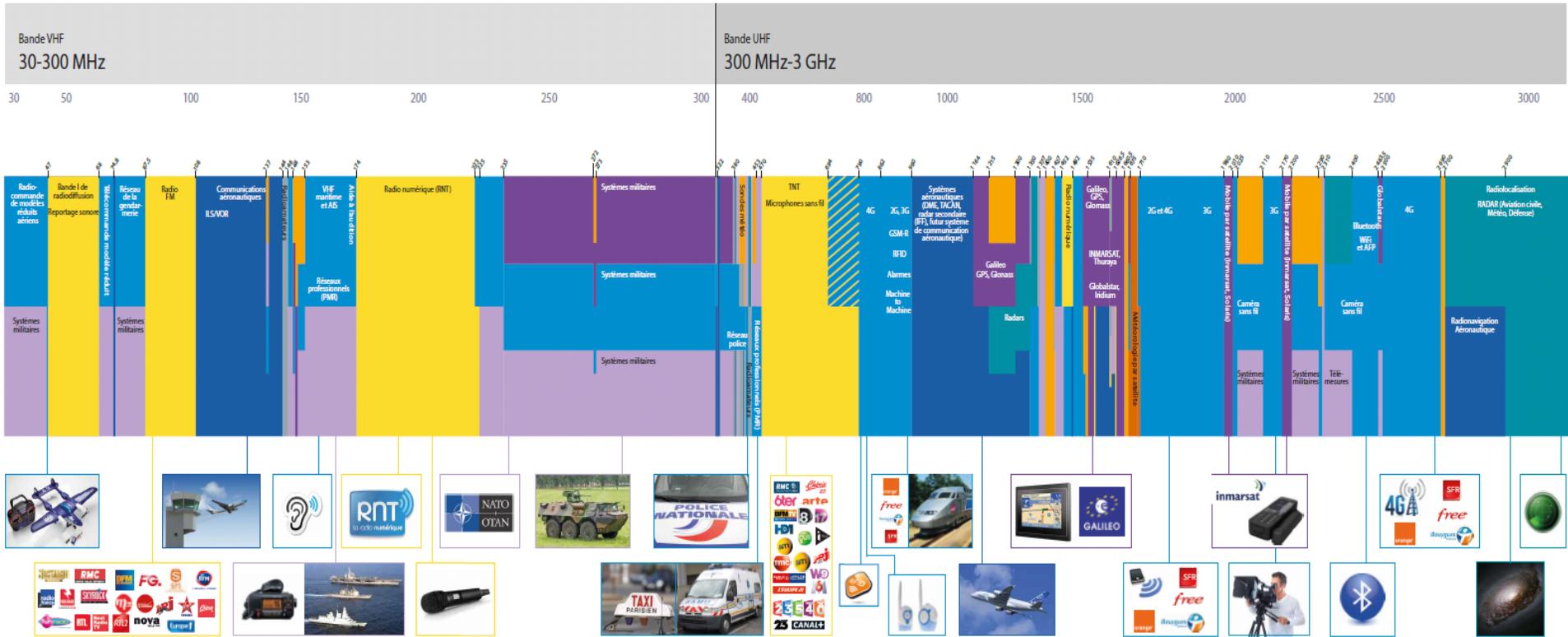
7-9 November 2018

To manage a public resource as spectrum “wholesalers” .. but not only...

International Negotiation « Spectrum Diplomacy »	Management of national Rights « Spectrum Notary »	Interference management, surveillance « Spectrum Police »
Coexistence between users « Trusted third party »	Public Exposure to Electromagnetic fields « Trusted third party »	Reframing « Spectrum refarming fund »
Roland-Garros, Tour de France, Ryder Cup « Major Events »	Innovation Hackathon & Open Data	Maritime Amateurs « Exam center »



All spectrum users are legitimate



Governmental and commercial usages
different needs, product life cycles, requirements

Spectrum regulatory framework



To provide legal certainties to all spectrum users

INTERNATIONAL



REGIONAL



NATIONAL



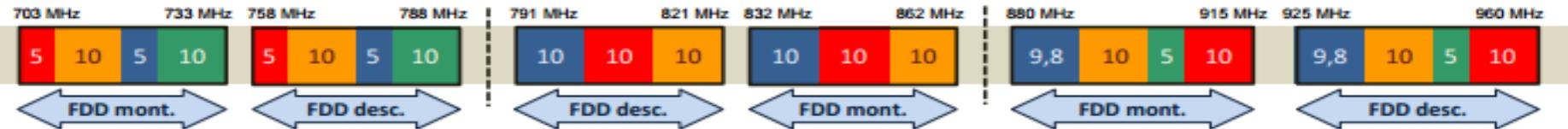
NATIONAL FREQUENCY
ALLOCATION TABLE



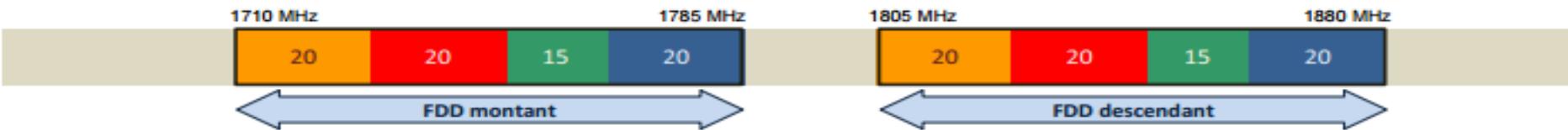
5G
Awards

4 Mobile Operators in France

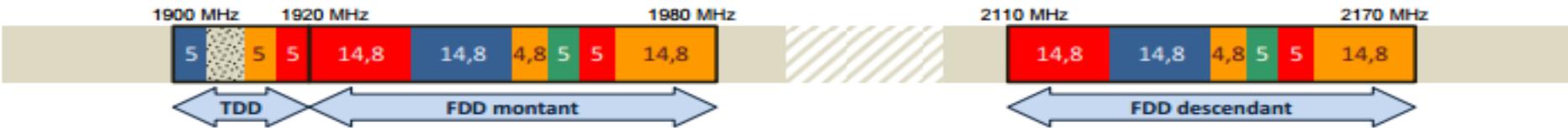
Bandes 700 MHz, 800 MHz et 900 MHz



Band 1800 MHz



Band 2,1 GHz



Band 2,6 GHz



Source Arcep

4G networks roll out in France

+ 8,8% (700 MHz) 3 900 Base Stations

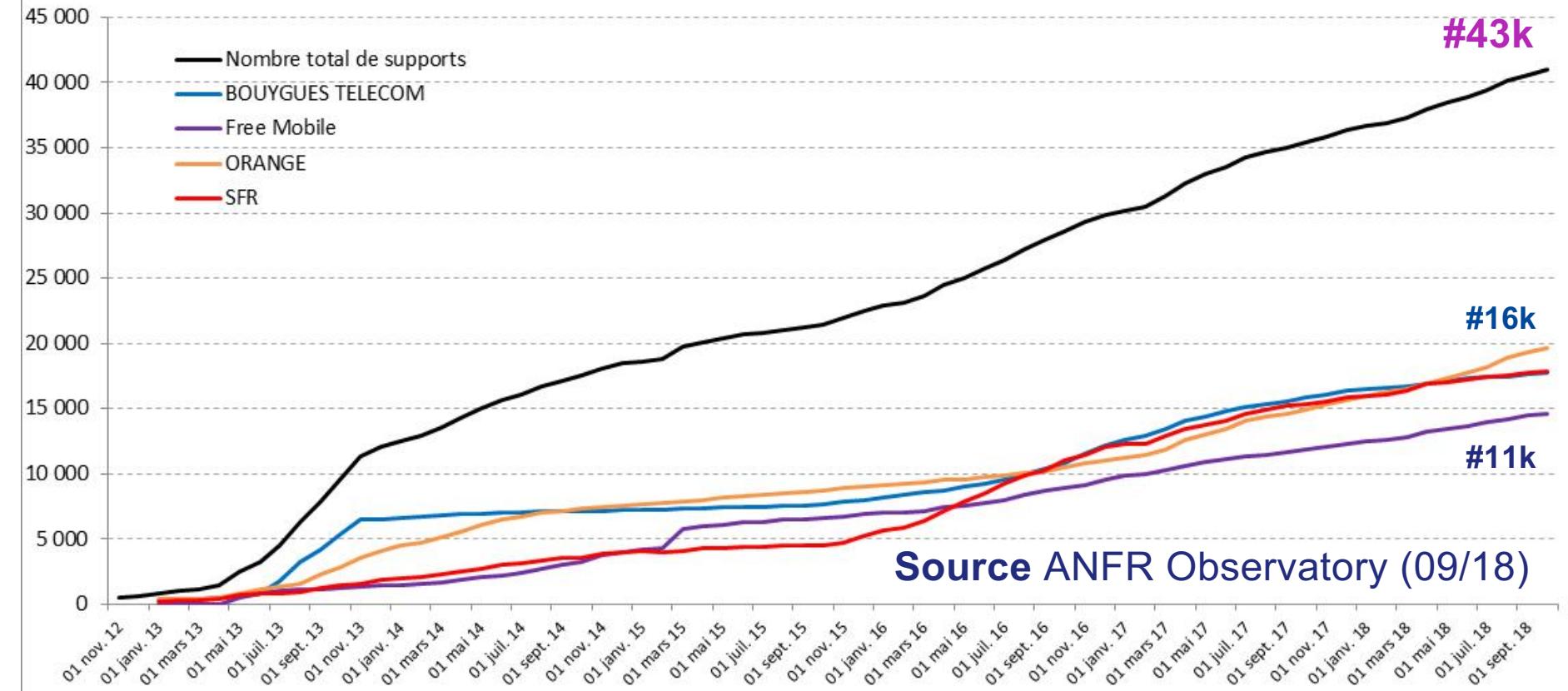
+ 1,1% (800 MHz) 34 849 BS

+ 2,0% (1800 MHz) 33 860 BS

+ 7,8% (2,1 GHz) 8 707 BS

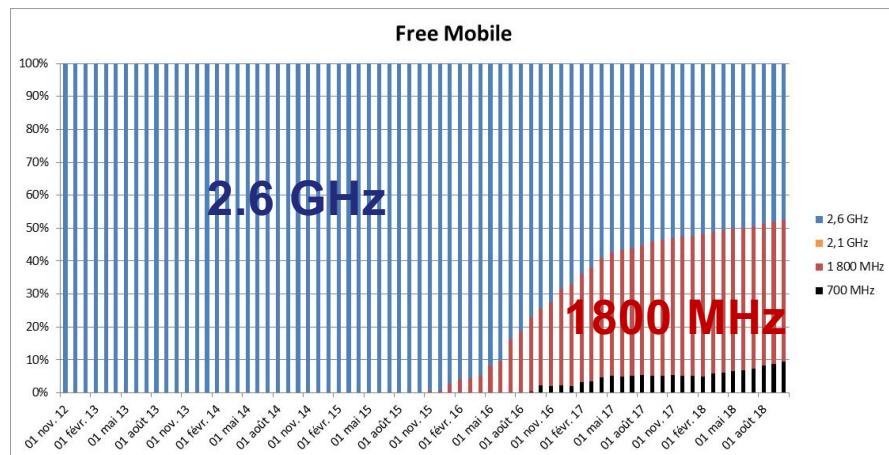
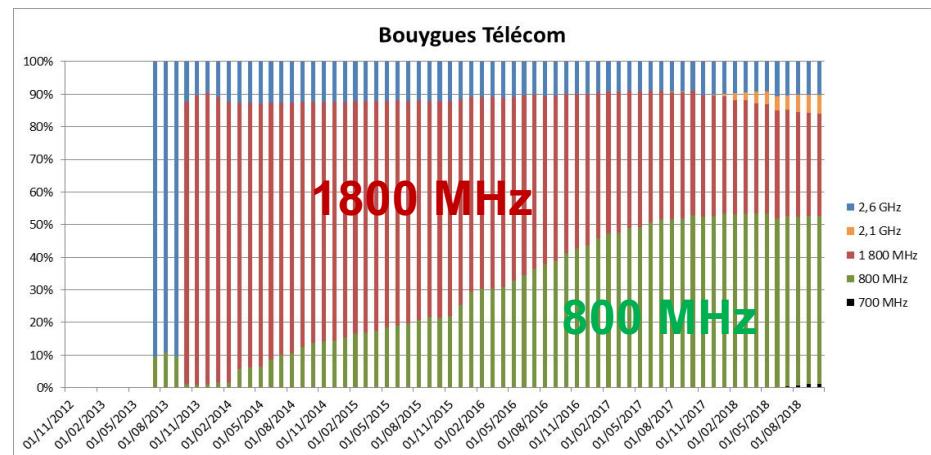
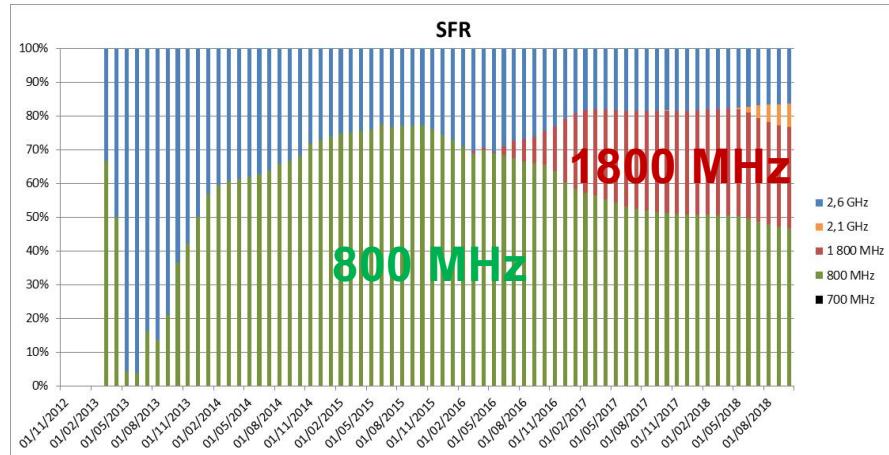
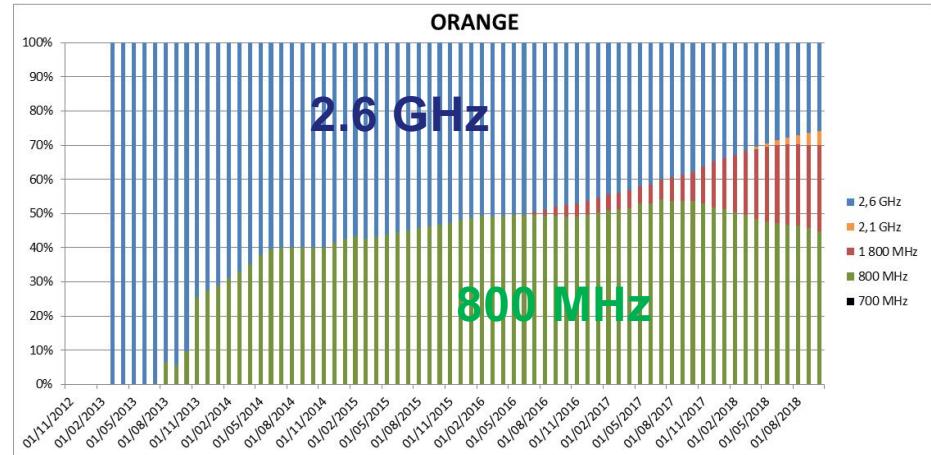
+ 1,1% (2,6 GHz) 28 668 BS

SUPPORTS 4G AUTORISES EN METROPOLE



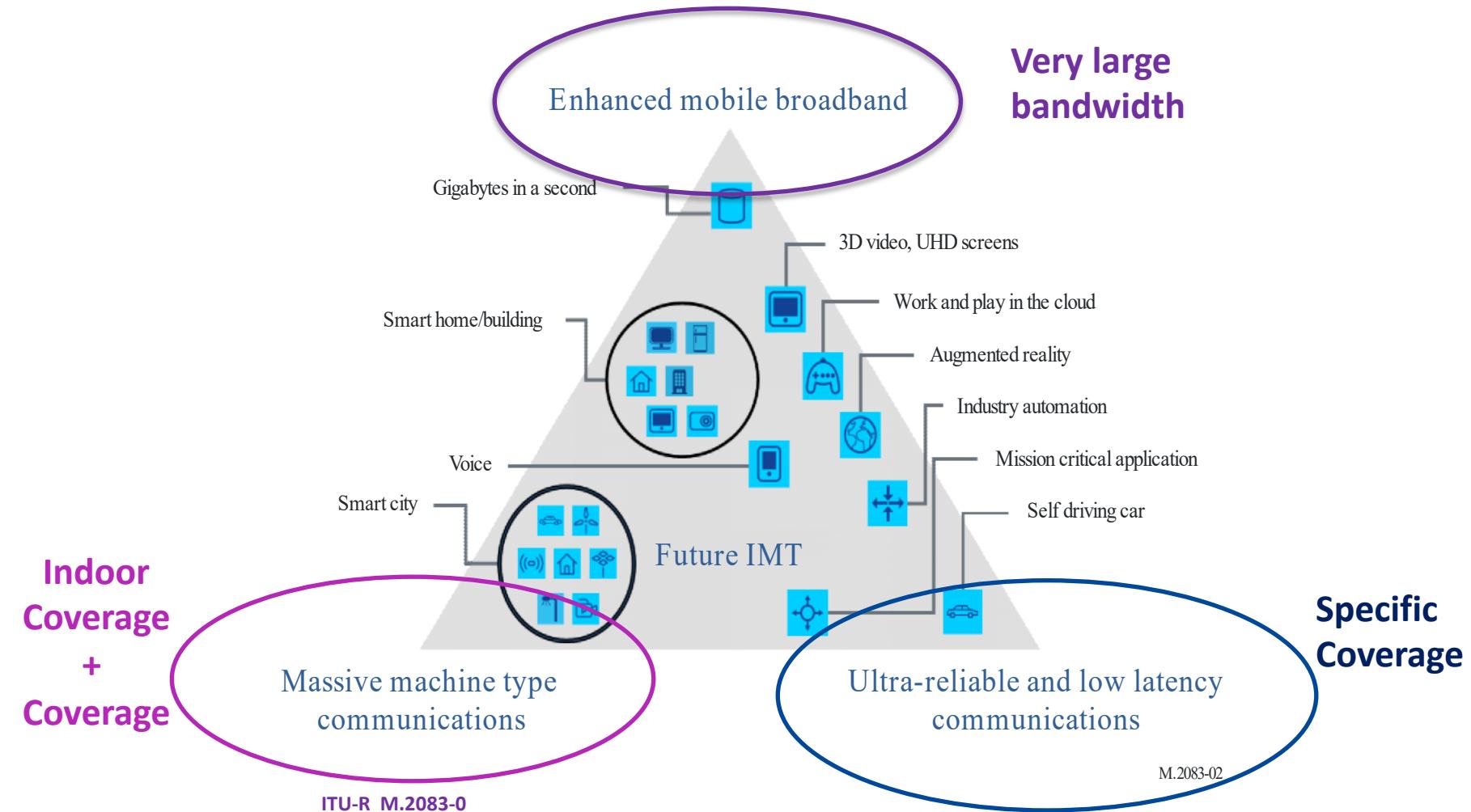
How to roll out 4G networks ?

4 Mobile Operators , 4 strategies



Source Mobile Base Stations ANFR Observatory

5G and various targets



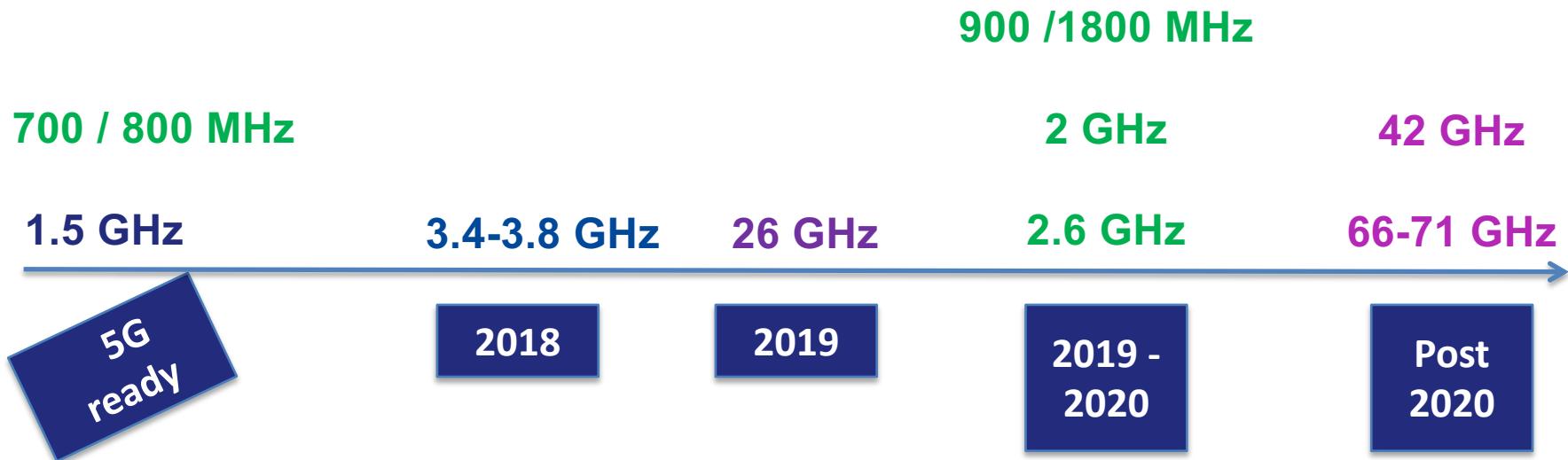
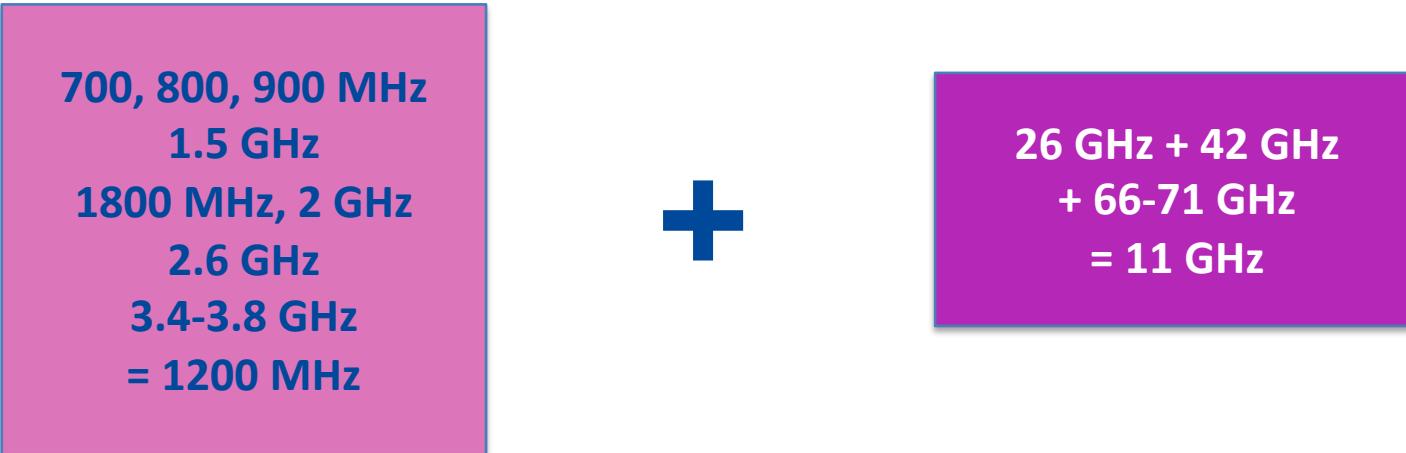
International Arena, taking the lead !

Various initiatives targeting spectrum for 5G

	600 MHz	800 MHz	900 MHz	2.5 GHz? 3.5 GHz ? + 3.7-4.2 GHz ?	24.25/24.45 GHz 24.75/25.25 GHz (2018)	27.5- 28.35 GHz (2018)	37 GHz 39 GHz 47 GHz (2019) 42 GHz ?
 FCC's 5G Fast Plan 10/18							
				3.3-3.6 GHz (3.3-3.4 GHz in-door only)	4.8-5GHz		
				3.6-3.8/3.8-4.2 GHz	4.4-4.9 GHz 4.5 GHz NTT DoCoMo KDDI	27.5-29.5 GHz 28 GHz NTT DoCoMo	
				3.4-3.7 GHz		26.5-28.9 GHz	
02/18 Winter Olympic Games							

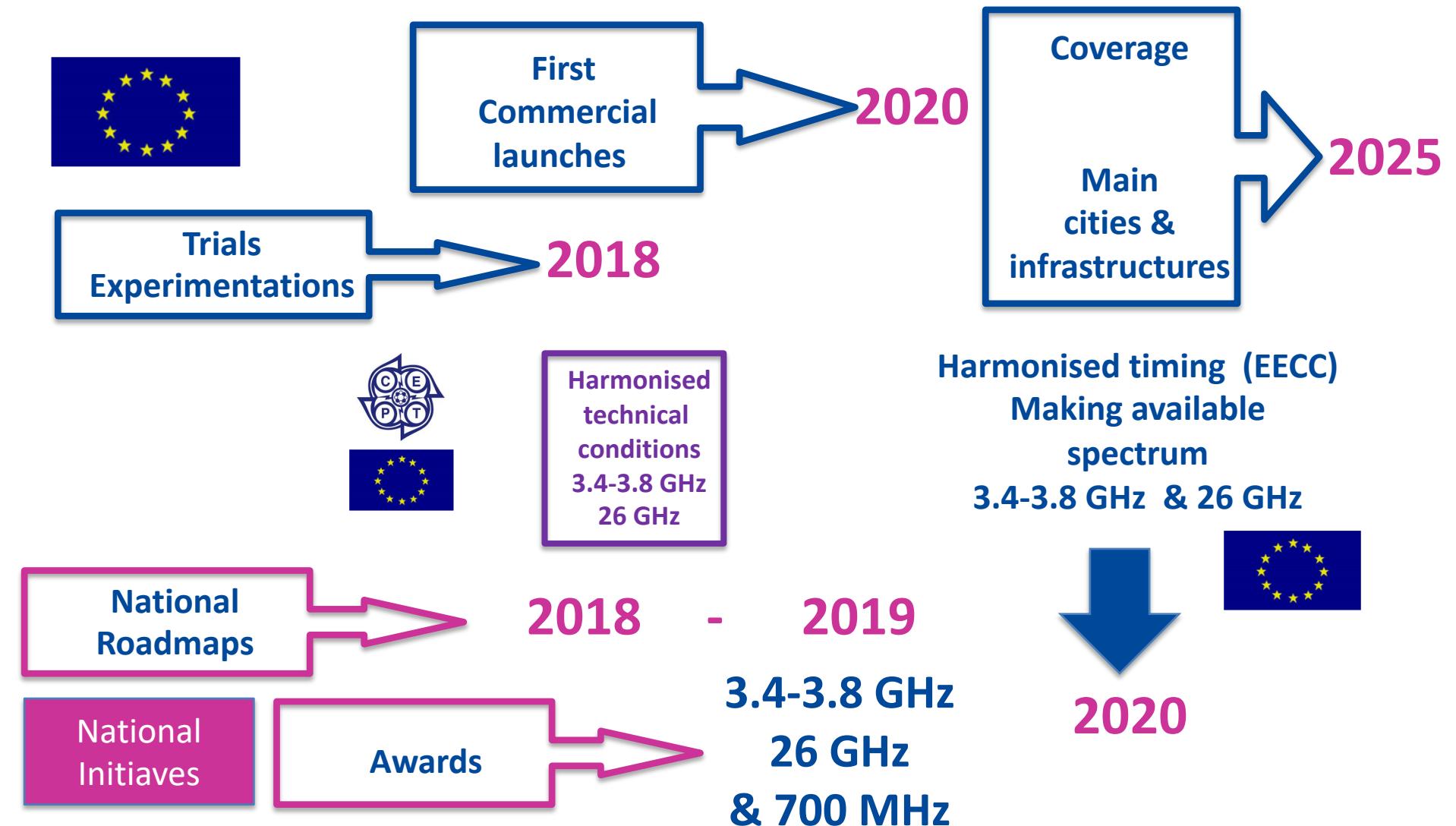
Sources : ECO bulletins, 5G Observatory

Europe.. Which spectrum for 5G ?



Bands with mobile operator's rights (except 50 MHz at 2.6 GHz)

Which roadmap(s) ?



5G in France & main objectives

To launch 5G pilots
in various areas

Today



2020

5G spectrum awarded
Commercial launch
within at least
a main city



National 5G plan
launched in July

Objectives
+ 4 main priorities for actions

2025

5G Coverage
Main transports
infrastructures



To make spectrum available and to assign spectrum (1)

3.5 GHz



26 GHz

5G Pilots

Trials

Lyon, Bordeaux, Nantes, Lille, Le Havre,
Saint-Étienne, Douai, Montpellier,
Toulouse, Pau, Grenoble

3.4-3.8 GHz Under process

BB for all

3410 3460 3520



3400 3490 3800

National Frequency Allocation Table (NFAT)



FS (GVT) on-going refarming (to be finalised March 2020)



Thanks to the ANFR Spectrum Refarming Fund (SRF)

Fixed broadband (4G) : Supporting Broadband for all (up to 2026)

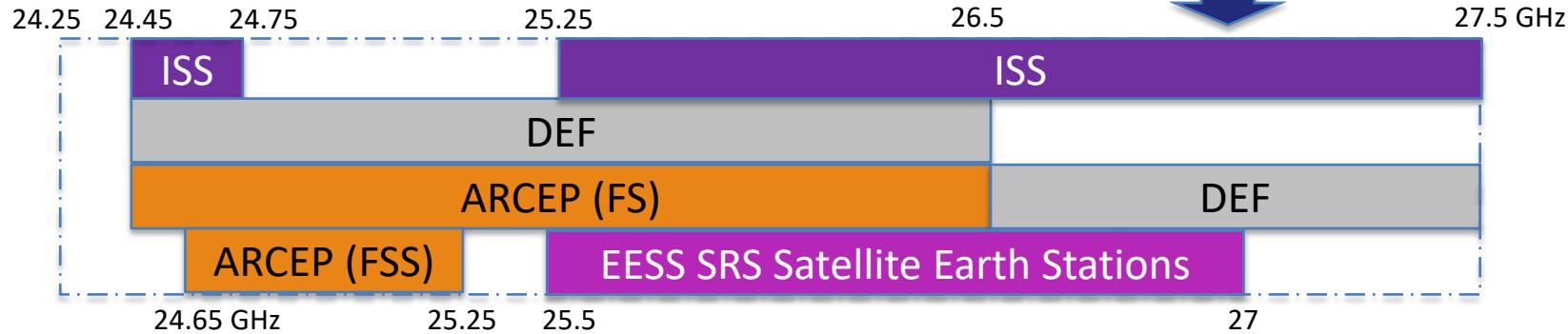
Satellite Earth Stations : “phasing out” (expiry of current authorizations) below 3800 MHz, migration above 3800 MHz

WLL: defragmentation ?

26 GHz Under preparation



EECC obligations (before end 2020) : at least 1GHz



Existing and future earth stations to be shared with



Higher spectrum means easier sharing (see [ANFR study 09/18](#))

National process : location of satellite earth stations / short term plan ?

FSS : national demand ?

DEF (26.5-27.5 GHz) : 1 GHz no usage



Fixed Service (FS) to be migrated or shared with ?

NFAT (under process) : update in a short time frame



Spectrum Refarming Fund ? to accelerate migration DEF (FS) ?

Verticals ?

Cars



Industry 4.0



26 GHz ?

Mobile operators
Services (5G slicing) ?

Railways



Utilities



Domotic



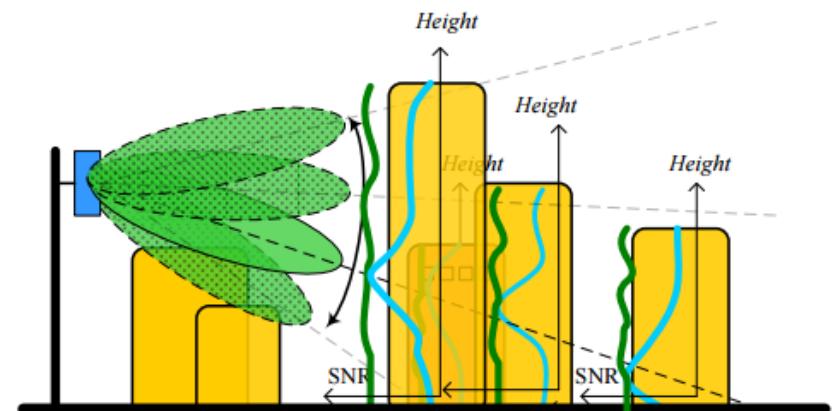
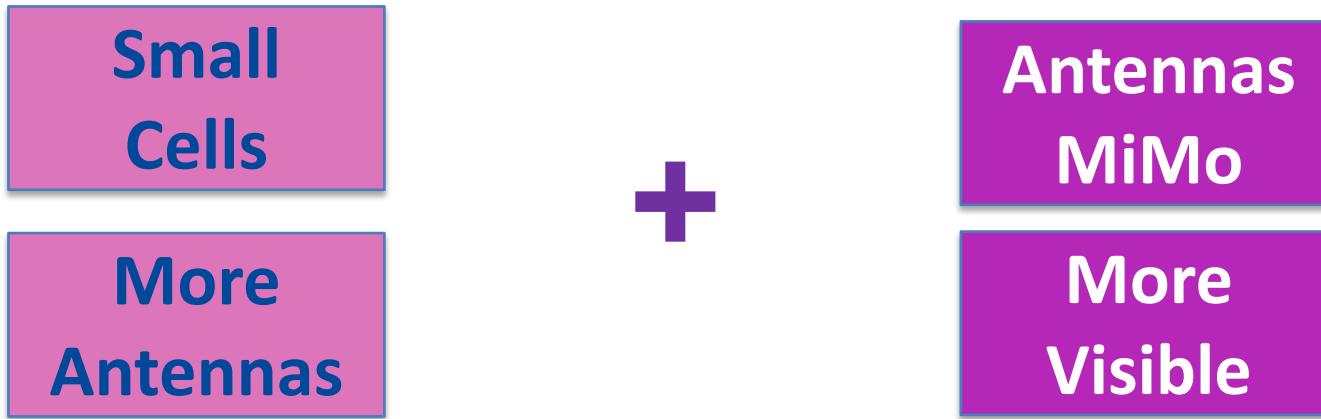
Public security



Dedicated band
PPDR (700 MHz),
GSMR/FRMCS (900 MHz + x?)
ITS (5,9GHz) ?

Dedicated PMR : 2.6 GHz TDD
in France

Information to the public/citizen and dialogue (4)



5G towards commercial launches

EU policy objectives ✓

EU Framework supporting investments : EECC the regulatory “tools” box ✓

Concrete national objectives ✓

An ambitious national action plan ✓

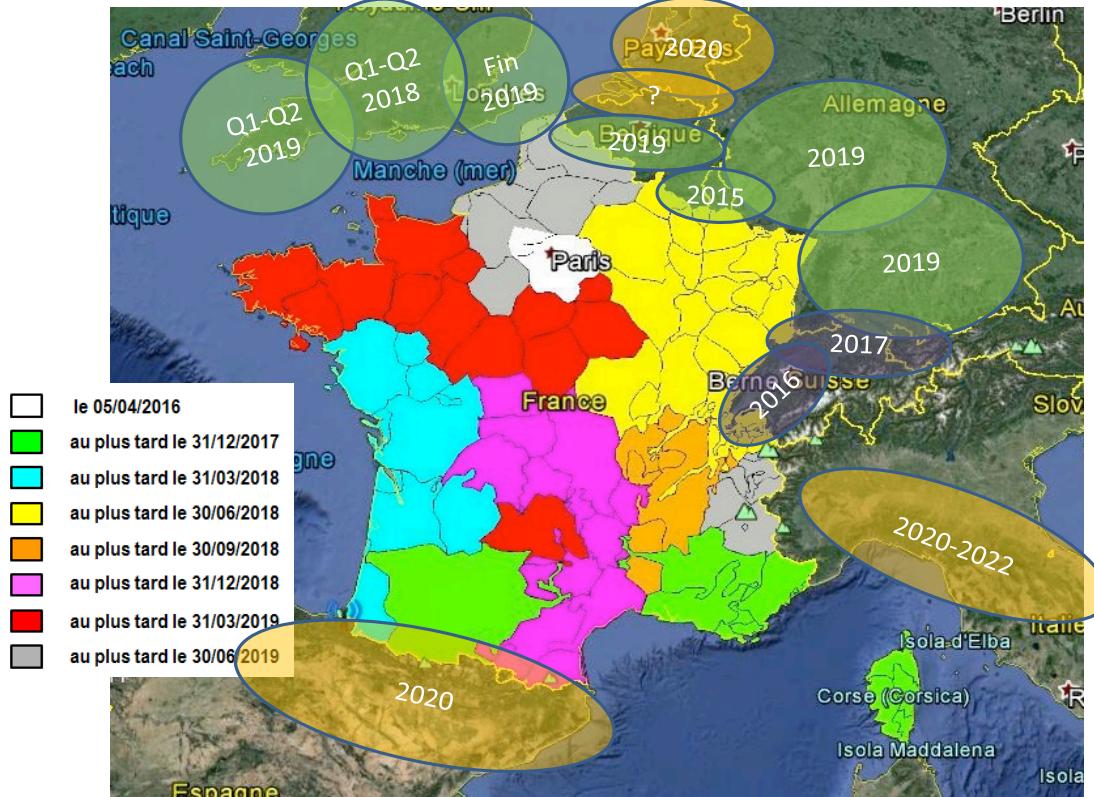
- Concrete actions
- Who is doing what, when

Strategic tools, as ✓

- National Frequency Allocation Table: first national legal basis for spectrum
- Spectrum Refarming Fund : to speed up spectrum reallocation
- A collaborative work : national committees
- Pilot projects
- Public consultations
- Monitoring : Market (Thanks to observatories : ANFR, Arcep), tools
-

And sharing “best practices” : Thanks to RSPG ! ✓

700 MHz Re-allocation to mobile



Update of NFAT

June 15



Phase 0 –April, 5 2016
Transition to MPEG-4
DVB-T (HD)



Phases 0 to 13
April 2016 – June 2019
Frequency rearrangement

DVB-T Migration (thanks to SRF !)



An on-going phases approach



Cross-border coordination agreements



Reframing fund
to be reimbursed
by the mobile operators
~67 M€

700 MHz 4G Roll out ... and ready for 5G !

INFR
INSTITUT NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE

Mobile & PPDR Frequency arrangements



End of the migration DVB-T below 694 MHz : June 2019

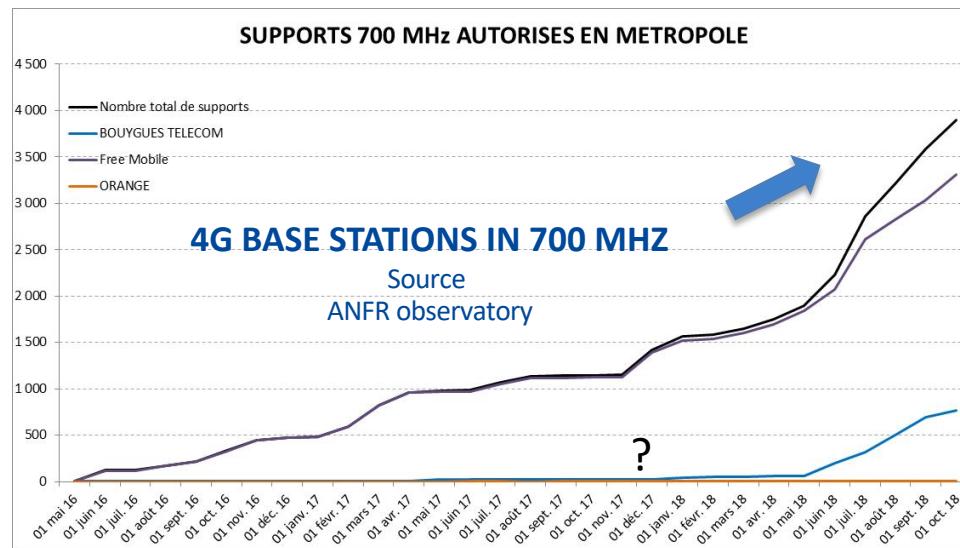
NFAT



End 2015: Award process for the 2x30 MHz
4 Authorisations



Auction
2.8 b€



2 mobile operators targeting 5G ?

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