



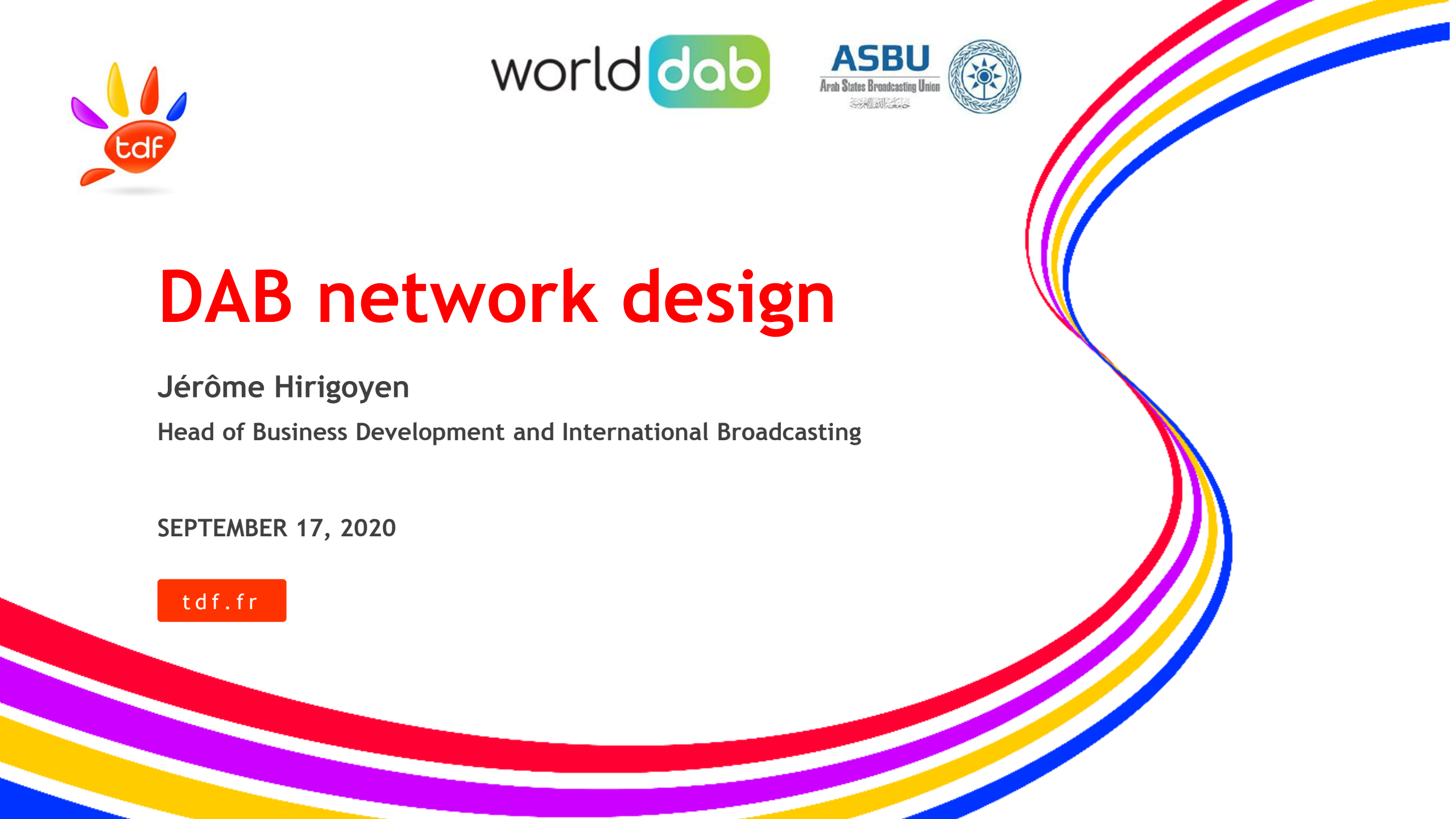
DAB network design

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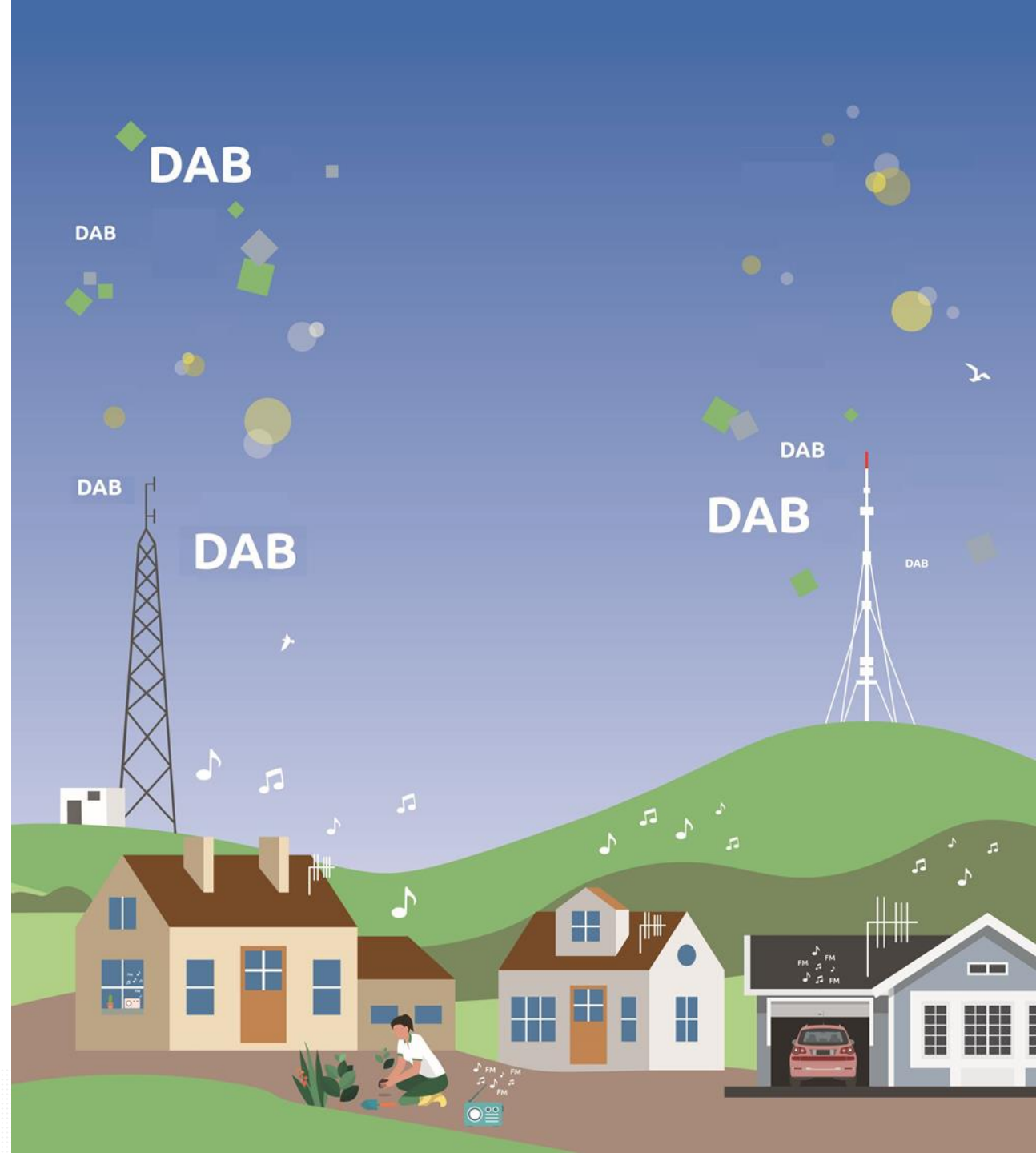
SEPTEMBER 17, 2020

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Agenda

- 01 Coverage Requirements and field strength reference levels
- 02 When to use MFN vs. SFN
- 03 High power vs. Low tower implementations
- 04 Network quality and control



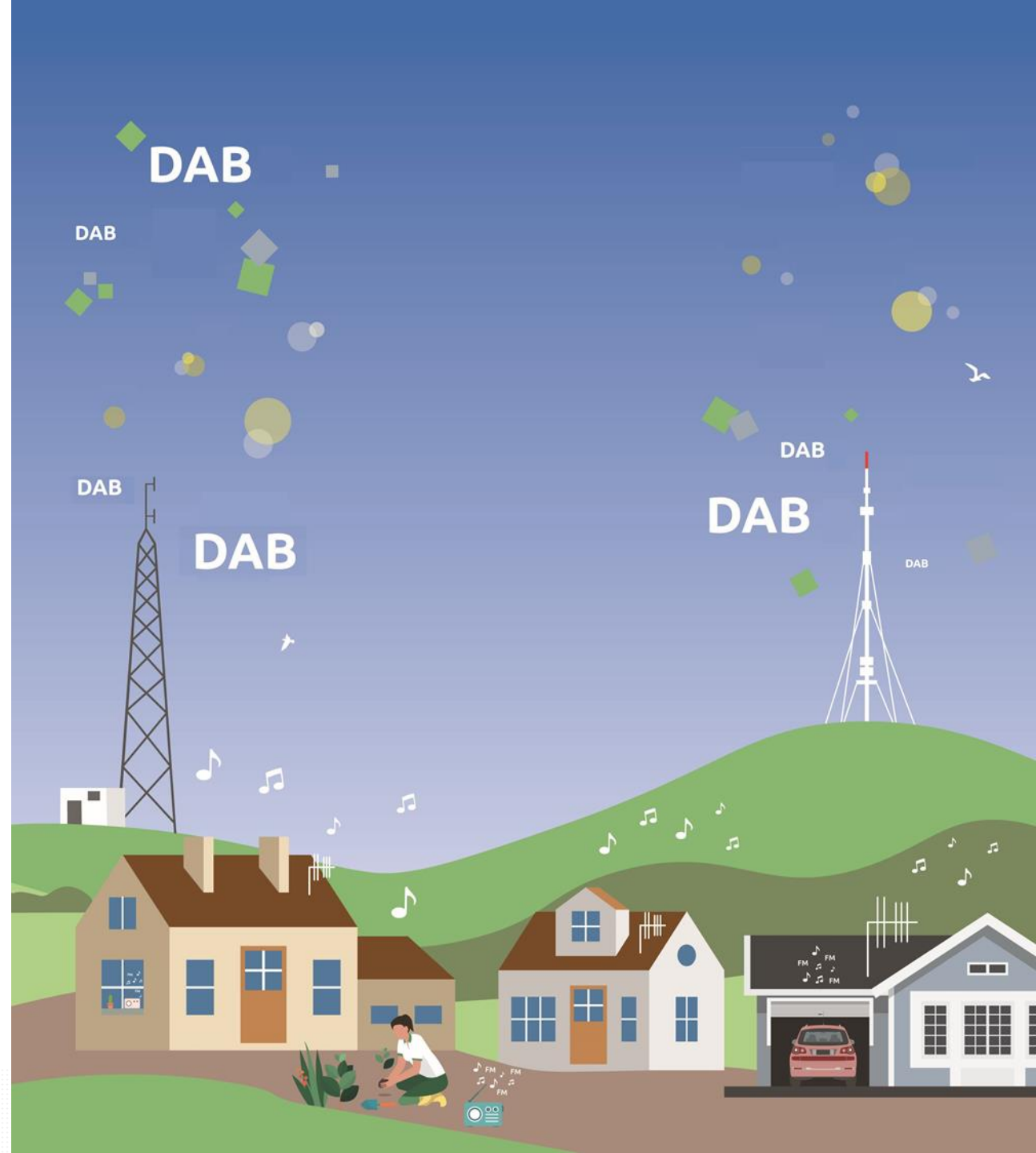
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Coverage - Field strength

Coverage requirements: starting point



Which type of area to be covered ?



Which receiver type to listen DAB ?



Coverage area : Receiving location

VHF propagation affected by time and location

- Outdoor reception (rural, mobile)
- Indoor reception - Suburban
- Indoor reception - Urban
- Indoor Reception - Dense urban



For each type of location,
% of location needs to be fixed :

Outdoor - Mobile
90% for “acceptable”
99% for “good”

Indoor Reception
70% for “acceptable”
95% for “good”



Reception mode

❖ Fixed roof-top reception

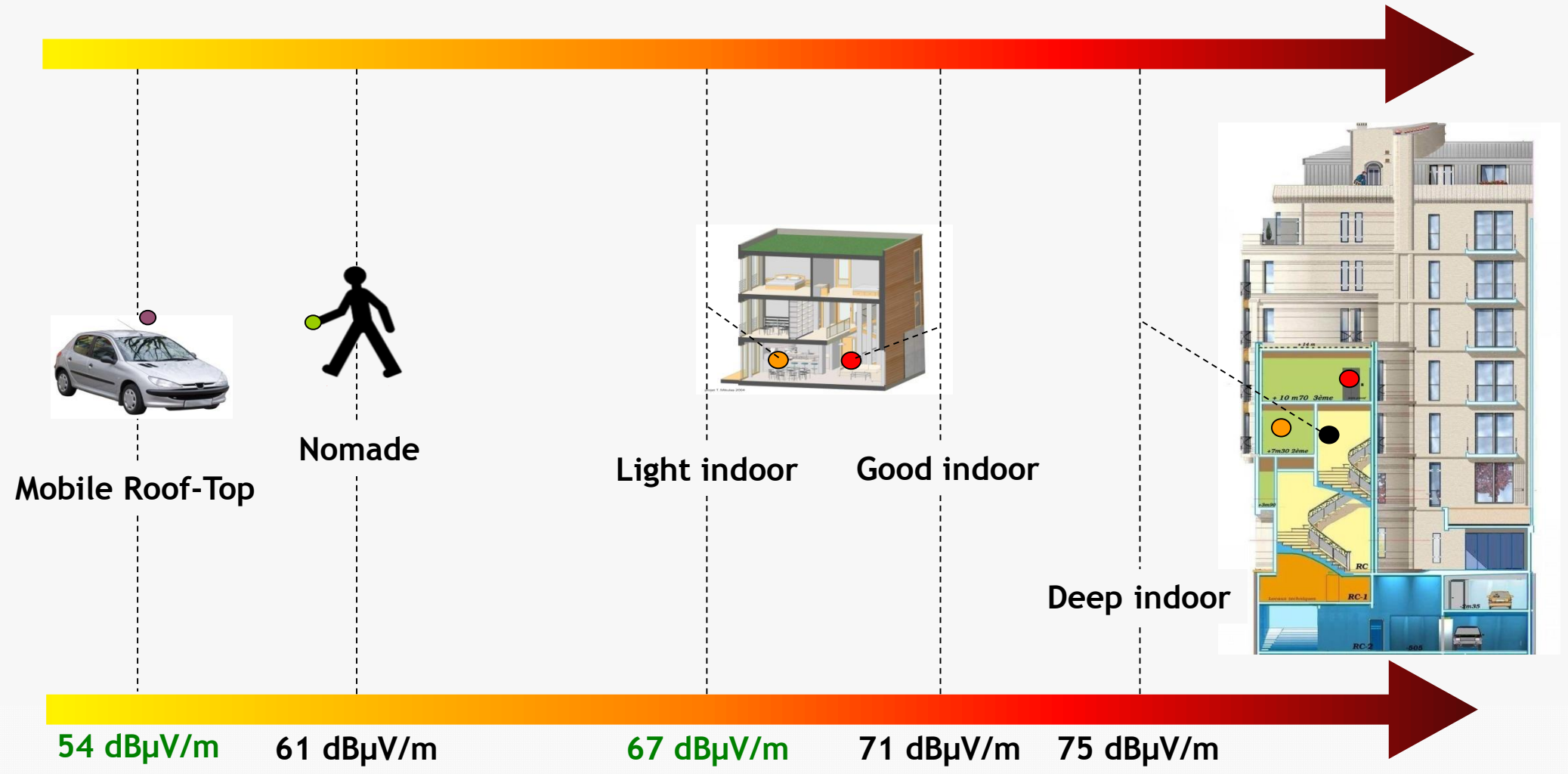
❖ Hand-held for mobile reception

❖ Mobile reception

❖ Portable reception



France : Field Strength reference

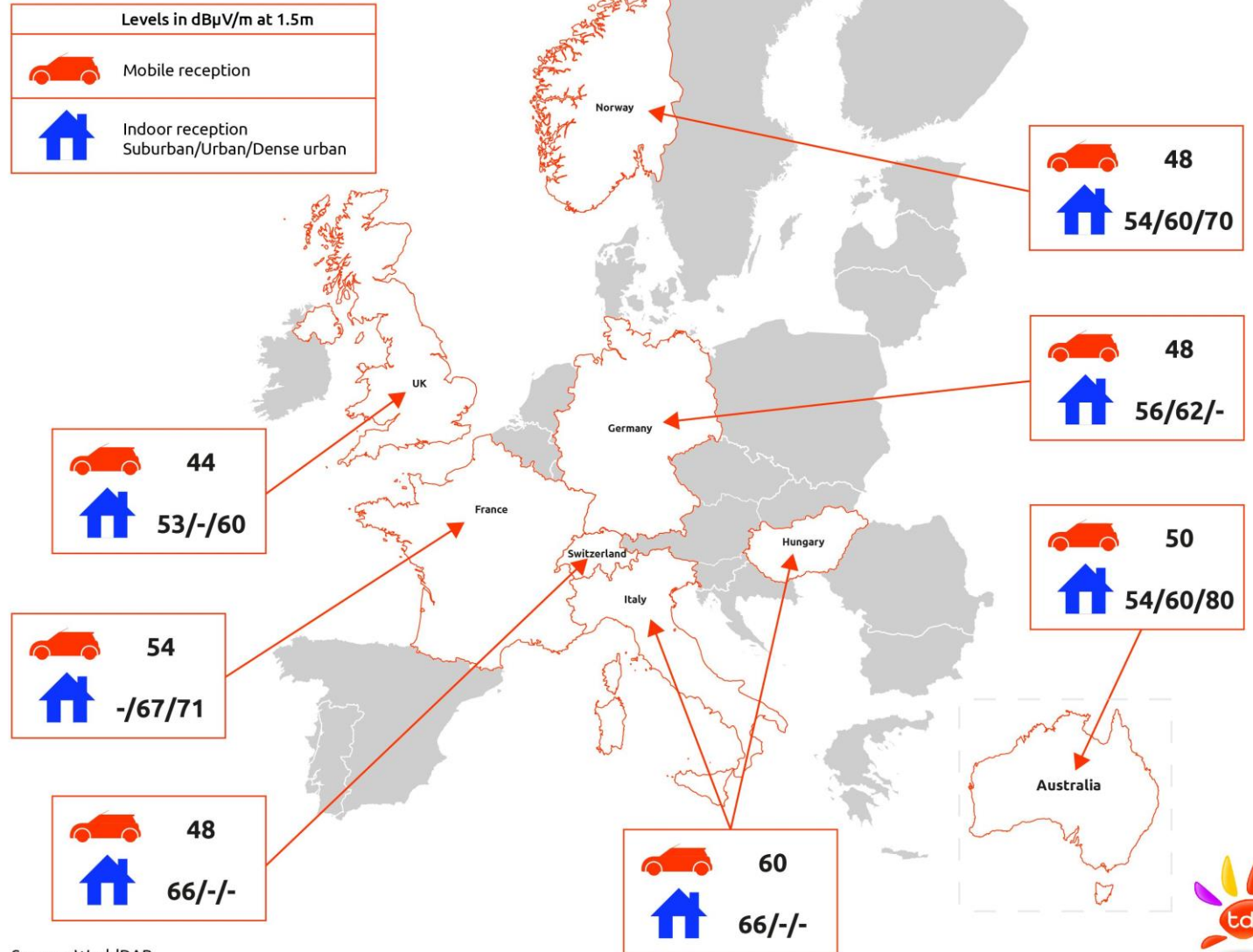




Comparison with other countries

Several references in Europe and Australia

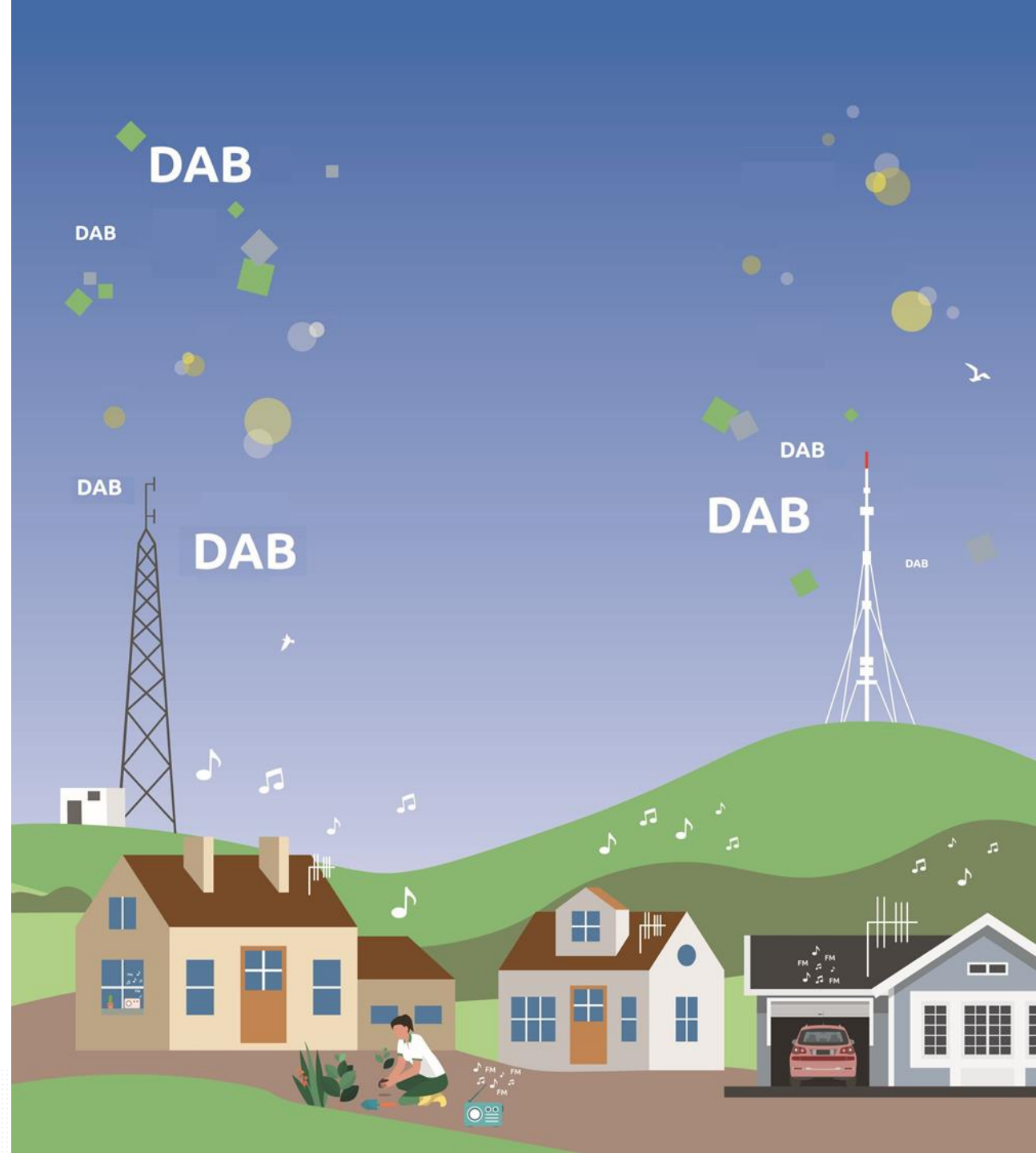
DAB Coverage Levels



Source : WorldDAB

Agenda

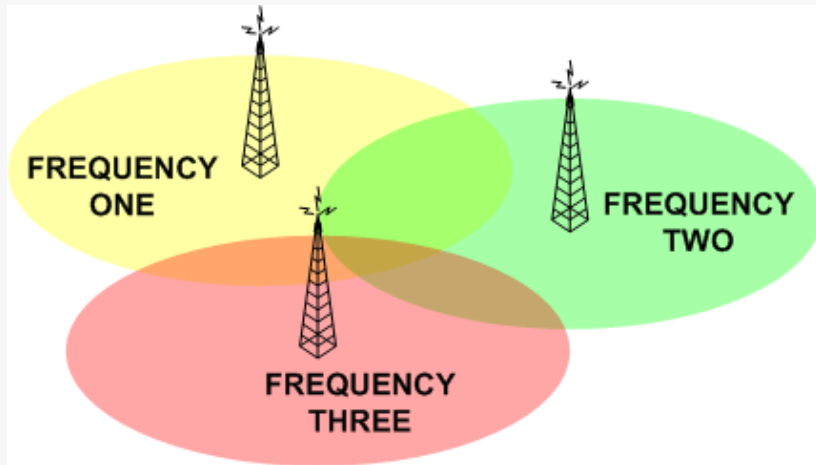
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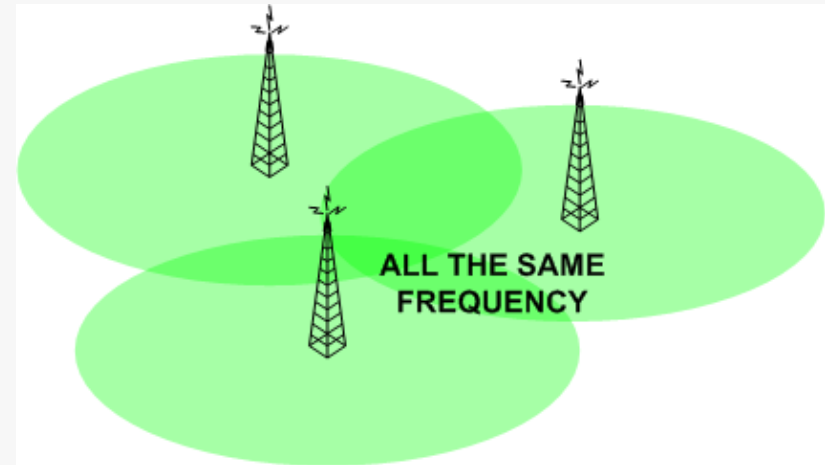
MFN vs. SFN

DAB VHF network can be design with SFN and/or MFN Network

MFN: Multiple Frequency Network

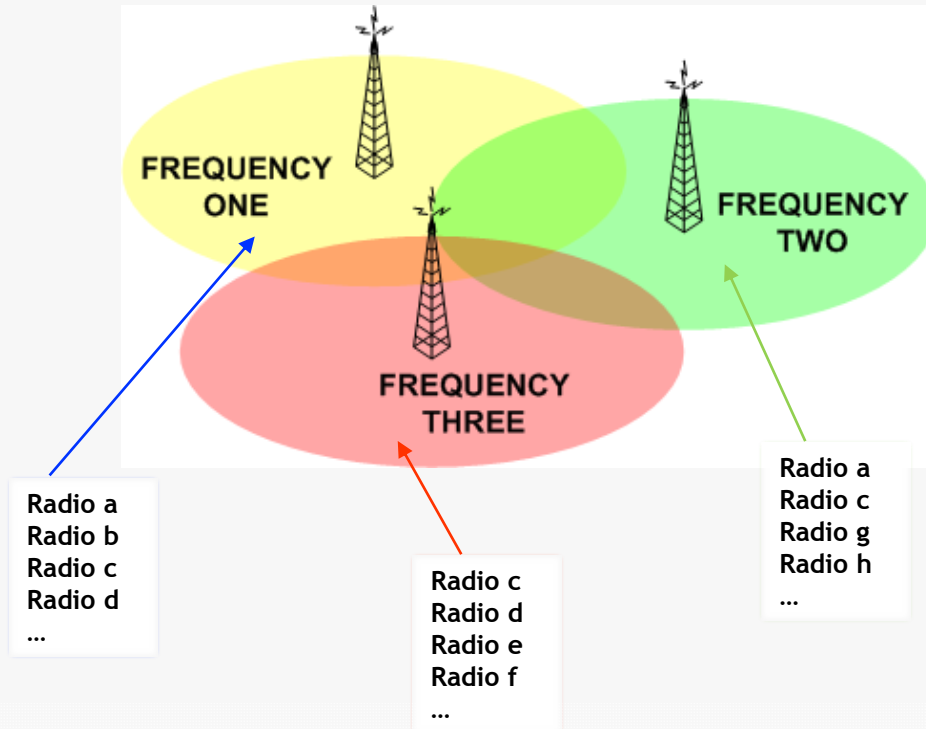


SFN: Single Frequency Network

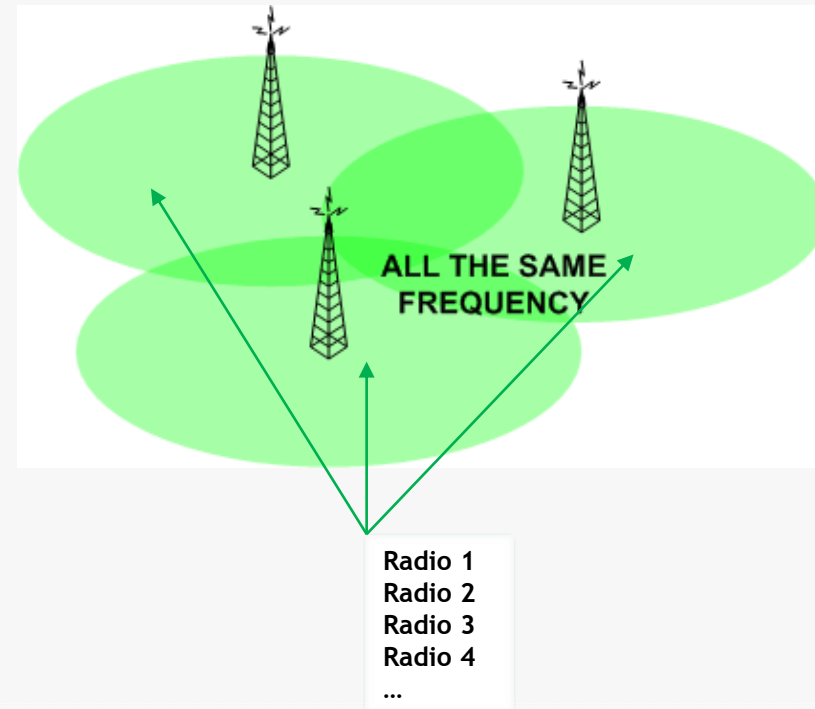


MFN vs. SFN: business case

MFN: several multiplex (different services)



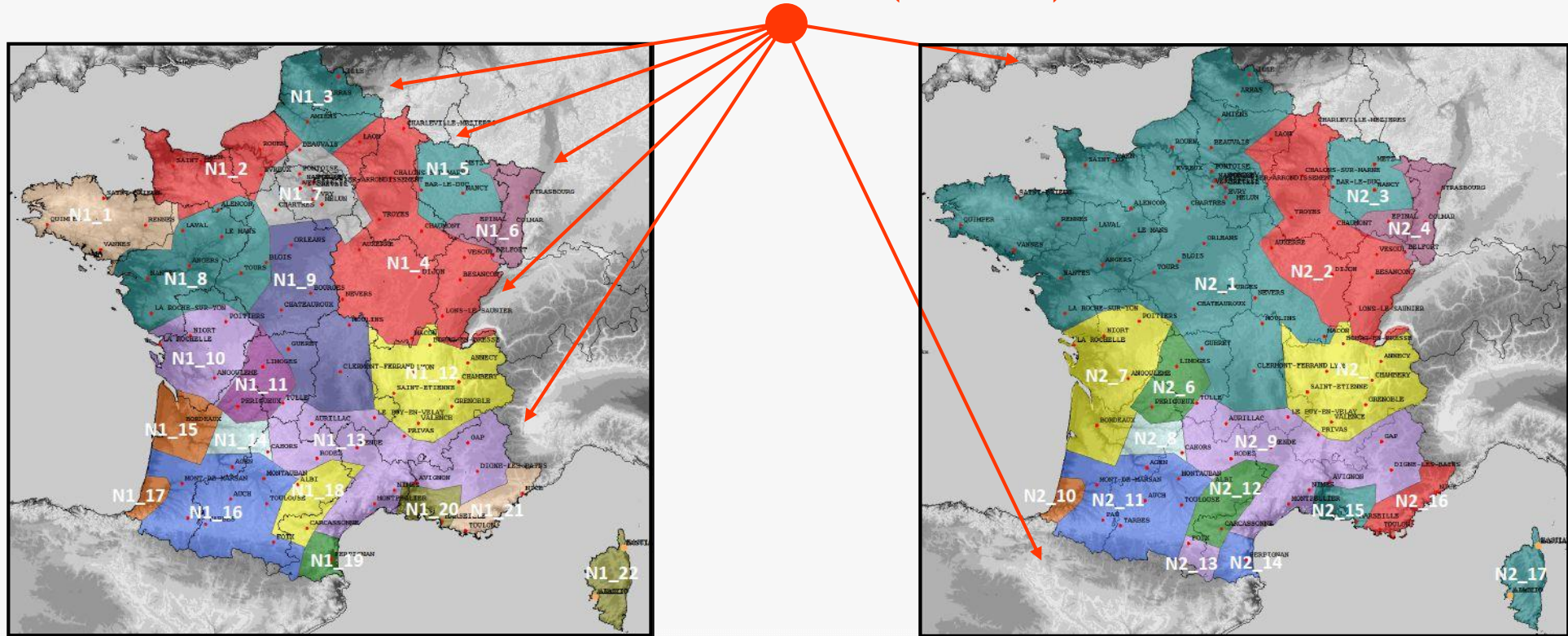
SFN: Same multiplex, same services



MFN vs. SFN: Coordination constraints

Use case: 2 national layers in France

International coordination (Geneva 06)



MFN vs. SFN: complementary coverage

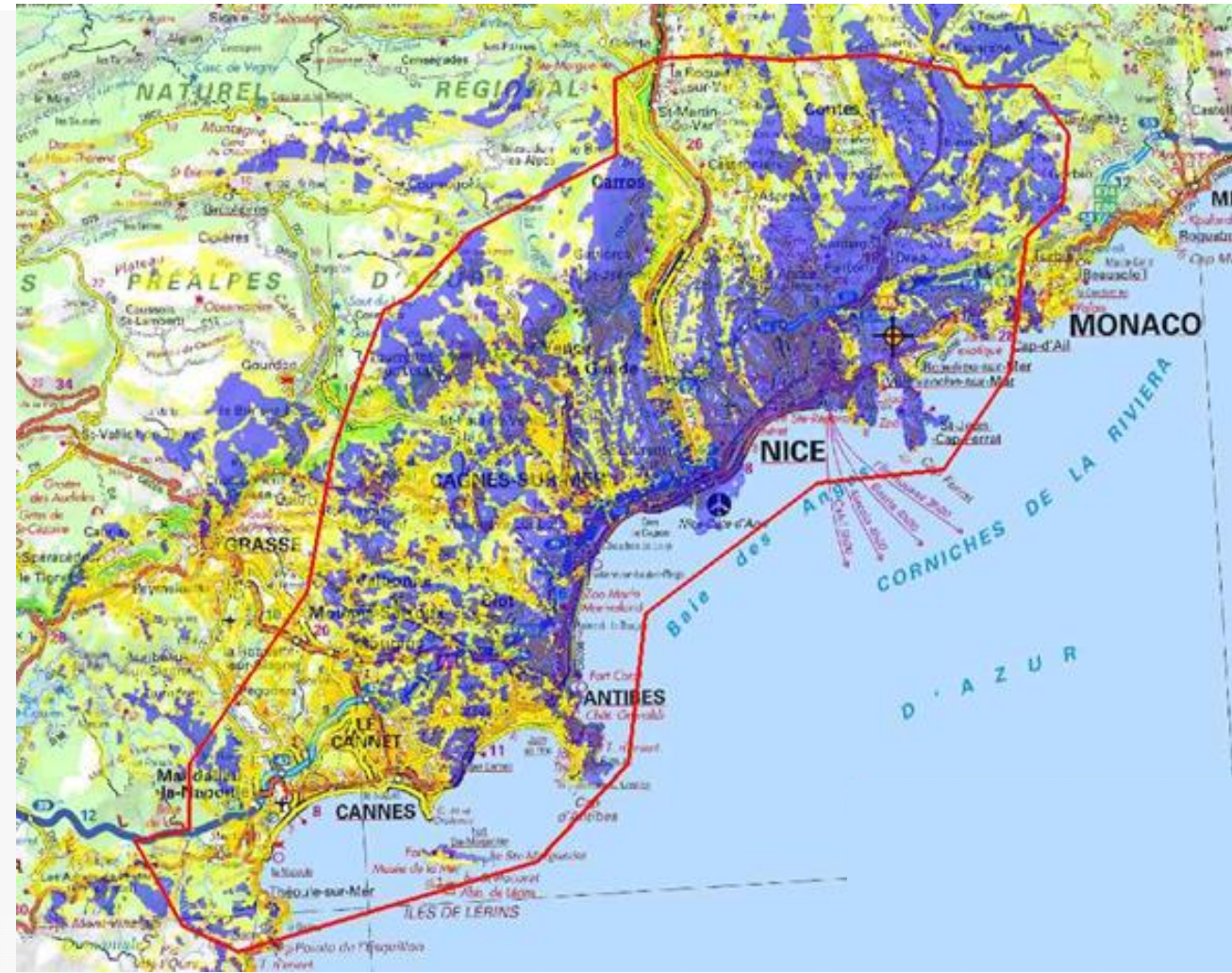
SFN: an opportunity to extend or enforce the coverage of an allotment : Nice

Local allotment (red line)

Main transmitter : Mont Leuze (Nice area)

6kW ERP

~ 60% pop. covered



MFN vs. SFN: complementary coverage

SFN: an opportunity to extend or enforce the coverage of an allotment: Nice

Local allotment (red line)

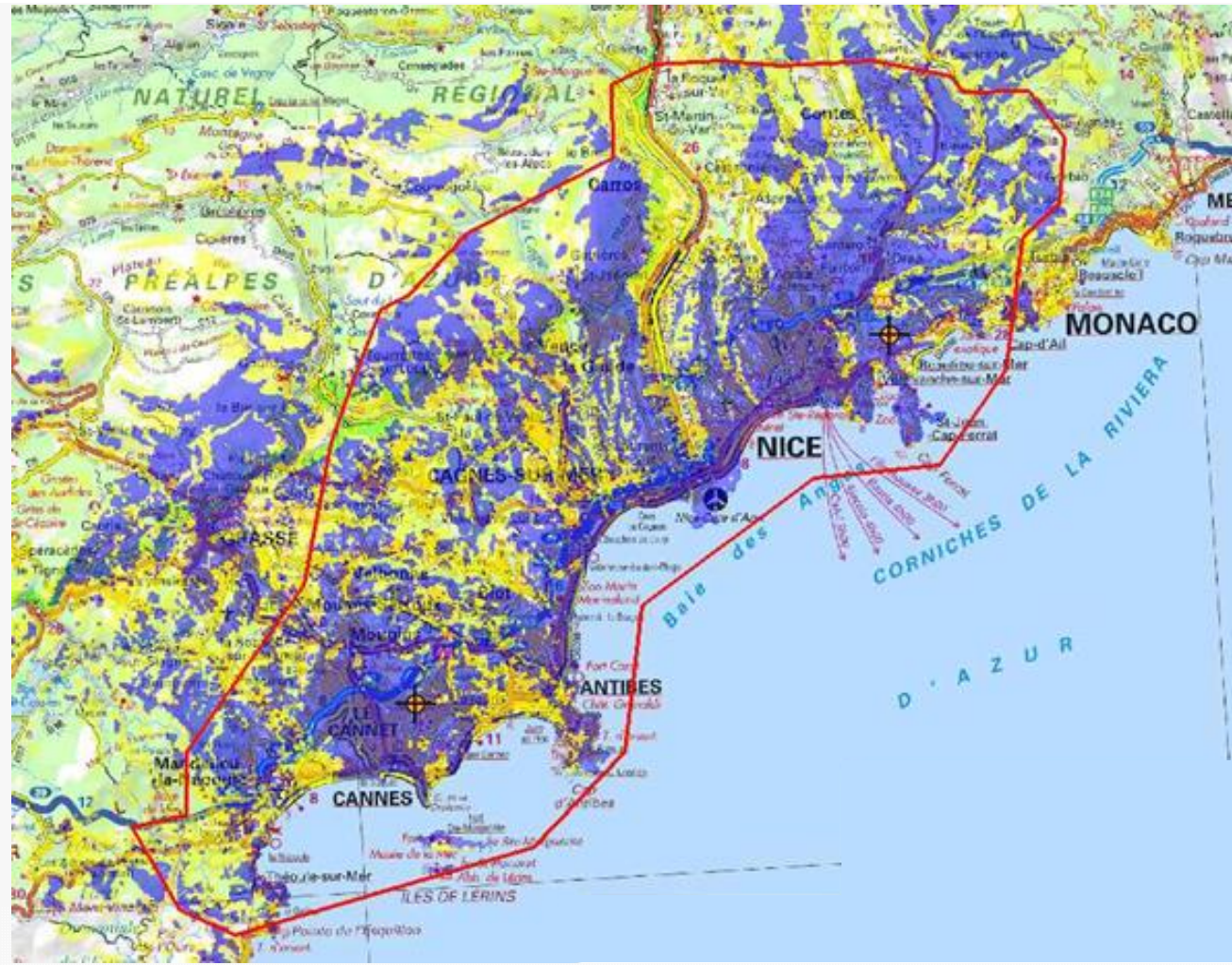
Main transmitter : Mont Leuze (Nice area)

6kW ERP

Complementary with Cannes Valauris

4kW ERP

~85% pop. covered

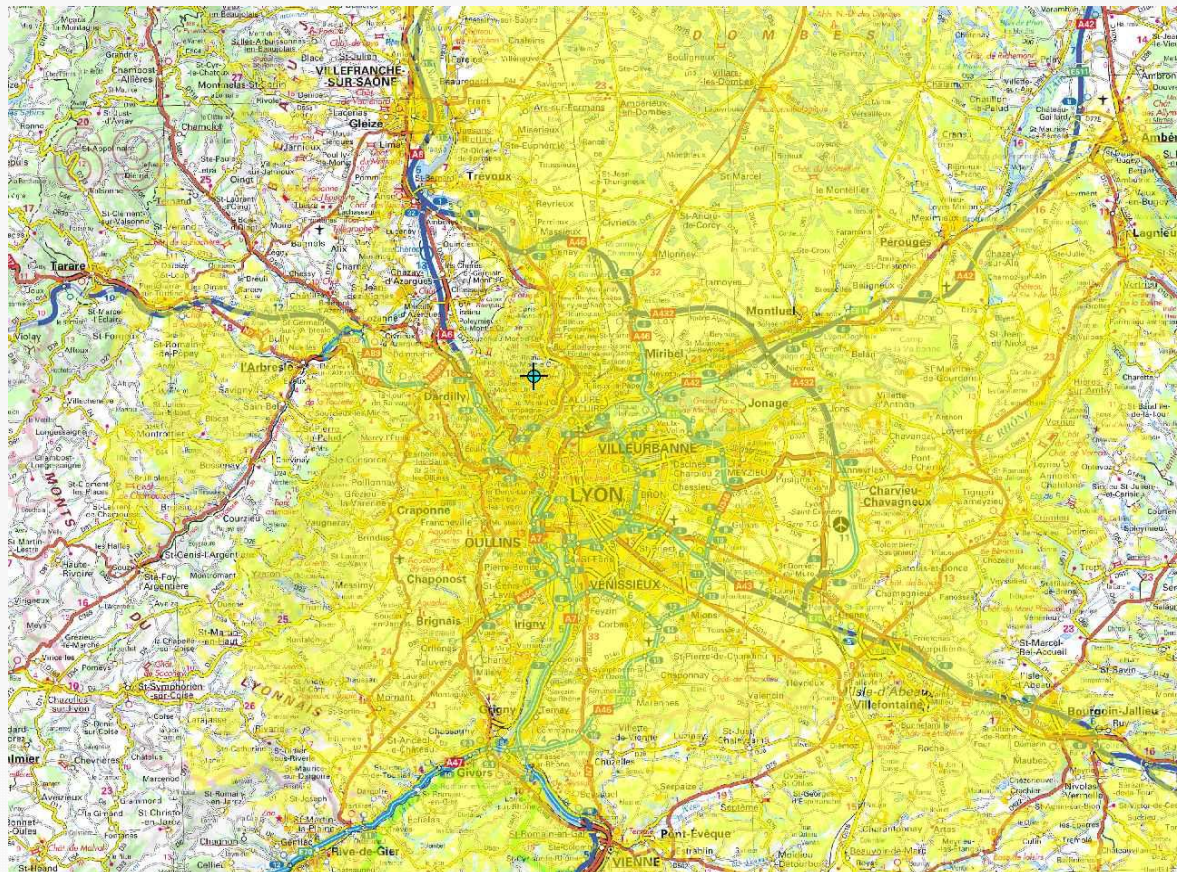


MFN vs. SFN: complementary coverage

SFN: an opportunity to enforce the indoor coverage: Lyon

Main transmitter : Saint Cyr au Mont d'or, 7kW ERP

Located on the mountain 7-10km from main city of Lyon

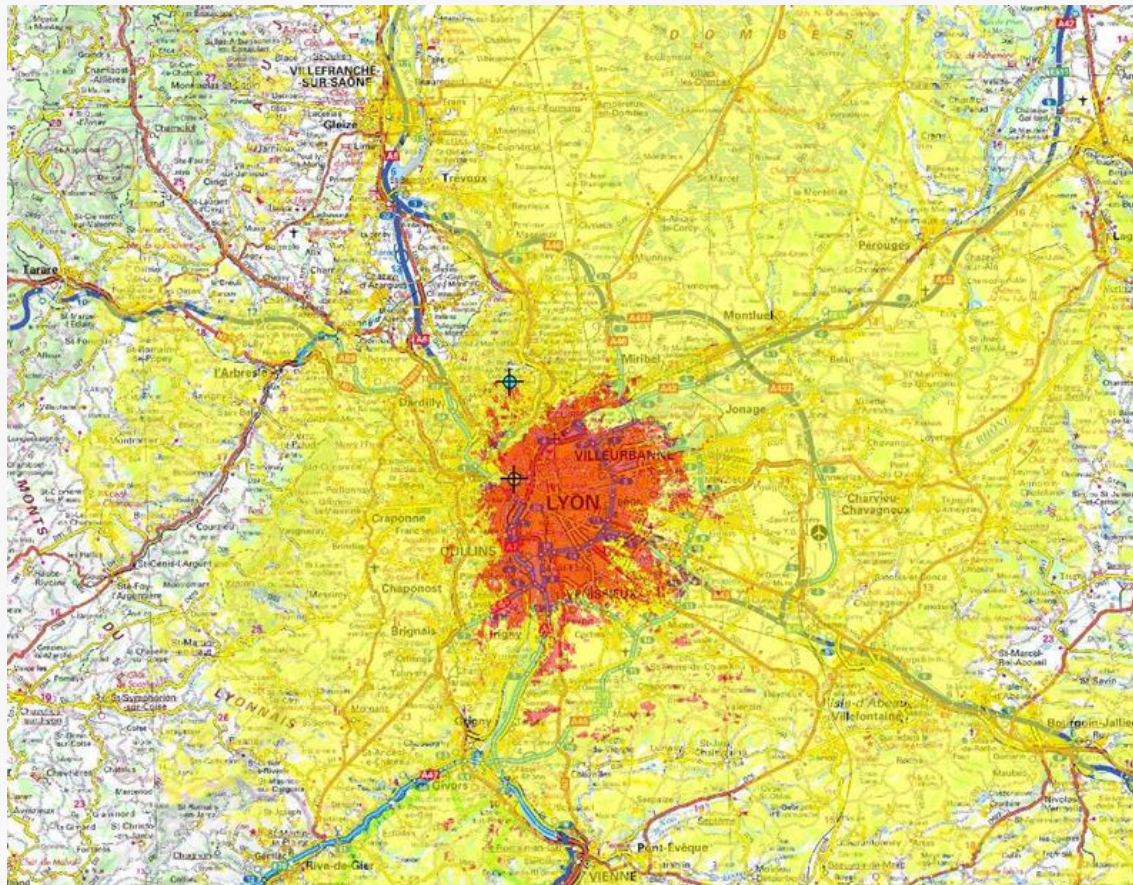


MFN vs. SFN: complementary coverage

SFN: an opportunity to enforce the indoor coverage: Lyon

Main transmitter : Saint Cyr au Mont d'or, 7kW ERP

Complementary with Fourvière for indoor coverage



MFN vs. SFN: Guidelines

SFN : Single Frequency Network ->

- Multiplex must be same (same services, radio) on SFN zone
- High spectral efficiency for large network
- Easy licensing process on the SFN zone
- Opportunity to improve the indoor coverage
- Technical network adjustment and monitoring to avoid interference

> for national networks

MFN : Multiple Frequency Network ->

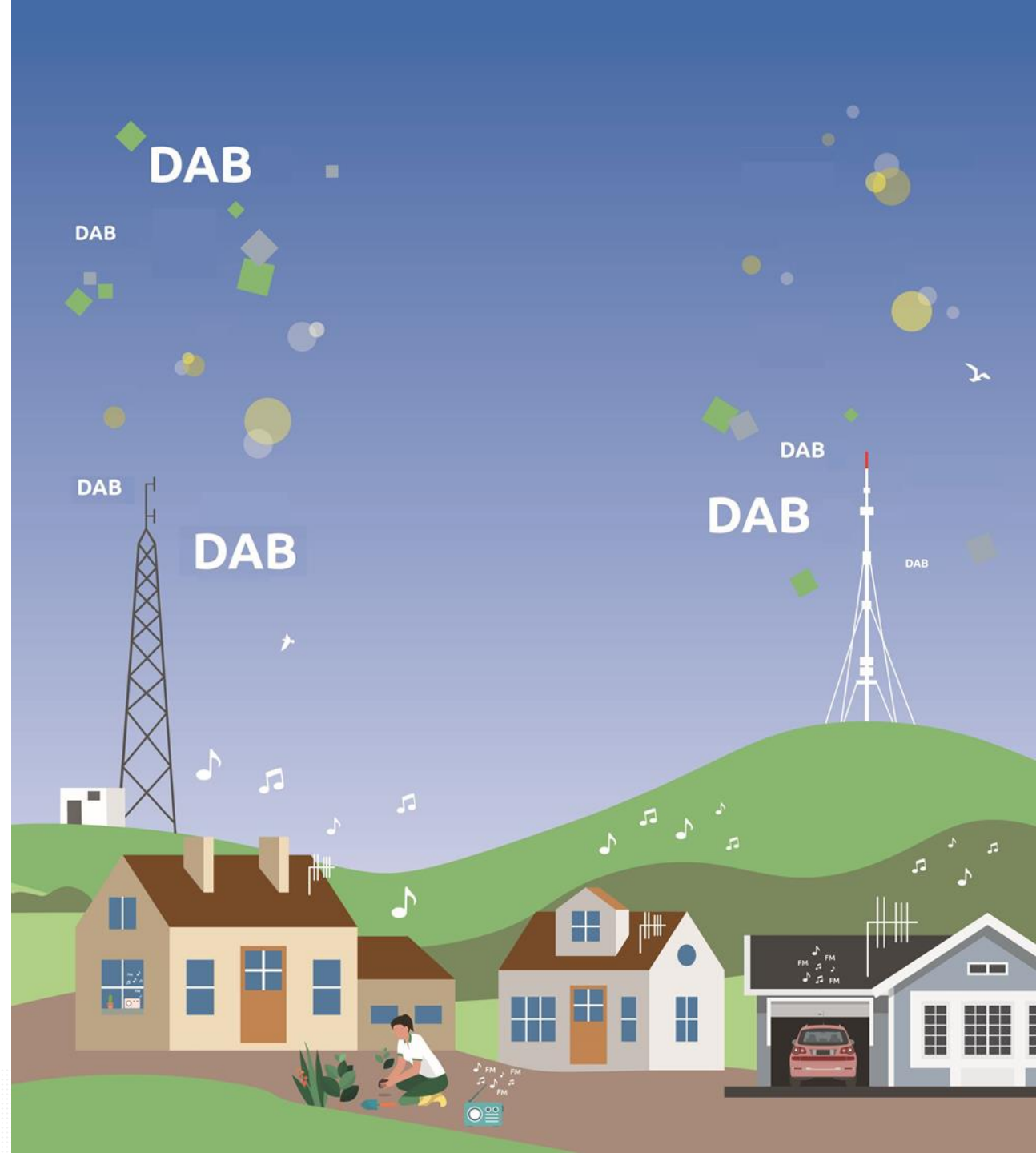
- Multiple multiplex (multiple services, radio): can be modified for each frequency
- Compliant with international coordination
- Easy to design and to manage

> for local and regional networks



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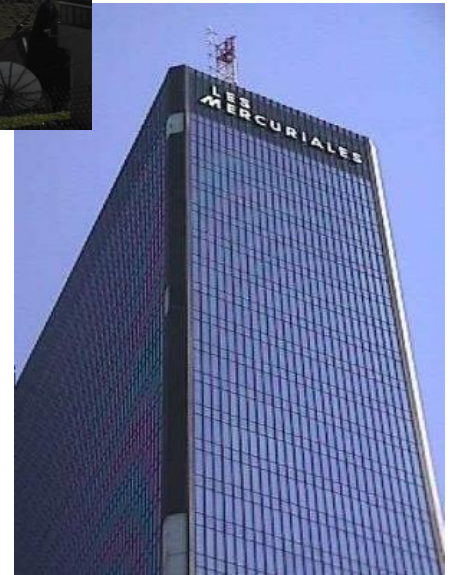
High power vs. Low power implementations

High power transmitter

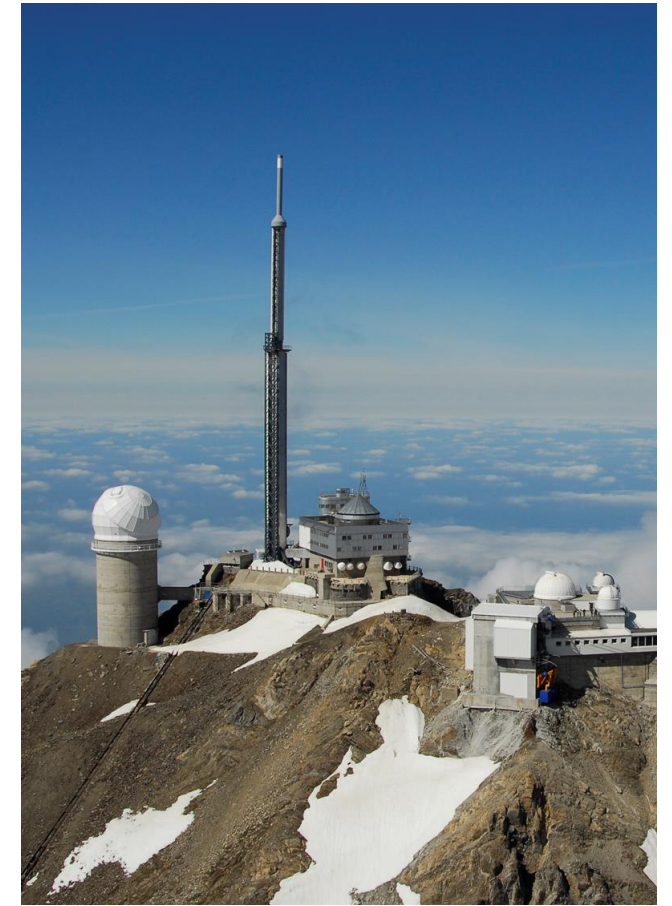
- Large coverage
- Efficiency
- Liability, security
- Limited number of transmitter
- Long range interference
- High level of radiation : city implementation

Low power transmitter

- Coverage adjusted to the need
- Limited interference
- Large number of transmitter for large coverage
- Synchronization constraints, technical management



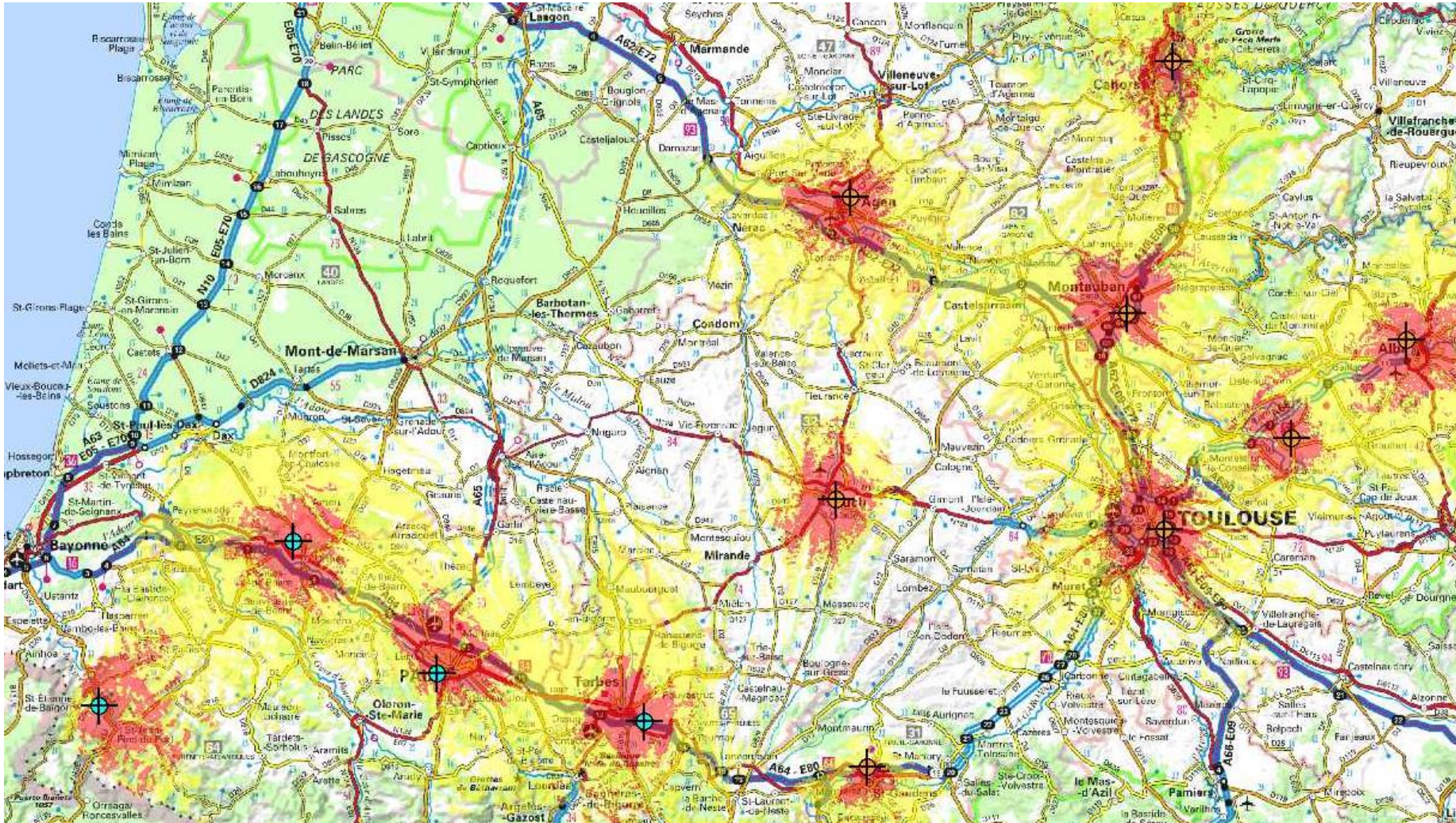
Use case : High power Implementation



Pic du Midi

Toulouse Pic du midi : 20kW ERP, 2877m altitude
 100 - 150 km, large mobile coverage
 High reliability site and transmitter

Use case : Low power Implementation

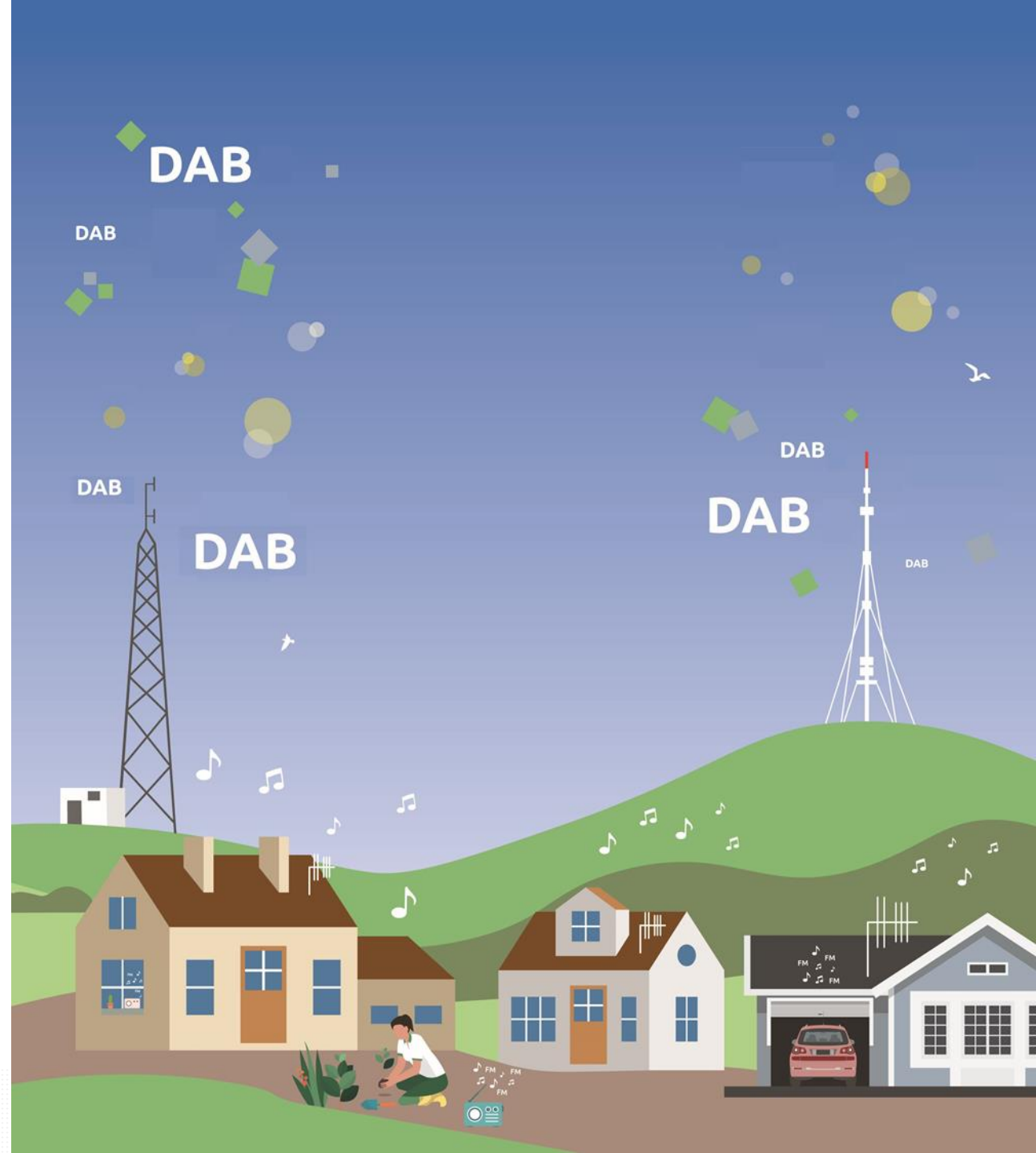


Similar coverage as Pic du midi with low power implementation

12 low power transmitter

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Network Quality and control

SFN network needs fine design for effective synchronization DAB

SFN networks needs a specific control to avoid jamming between transmitters

See next présentation from Dr Les Sabel « **RF Planning - Single Frequency Network Design** »





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Thank you !

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