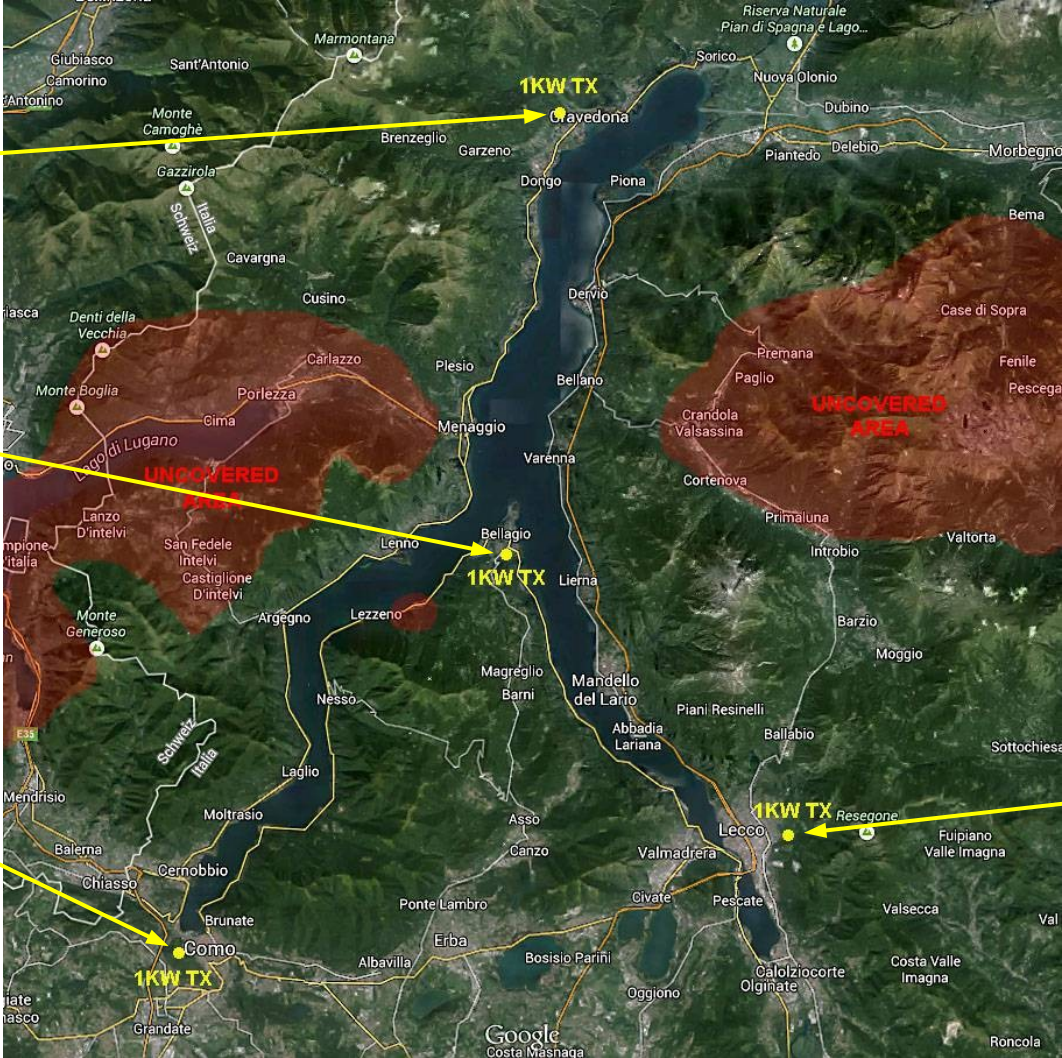




TECNOROLL BMB s.r.l.

FM Clever Radio Distribution Architecture

# Example of an **existing** high-power distribution network



Population currently not covered : 21,750 people

- Premana: 2,300 p.
- Casargo: 900 p.
- Crandola Valsassina: 250 p.
- Cortenova: 1,250 p.
- Primaluna: 3,000 p.
- Porlezza: 4,850 p.
- Carlazzo: 2,950 p.
- Lanzo d'Intelvi: 1,450 p.
- San Fedele d'Intelvi: 1,800 p.
- Castiglione d'Intelvi: 950 p.
- Campione d'Italia: 2,050 p.

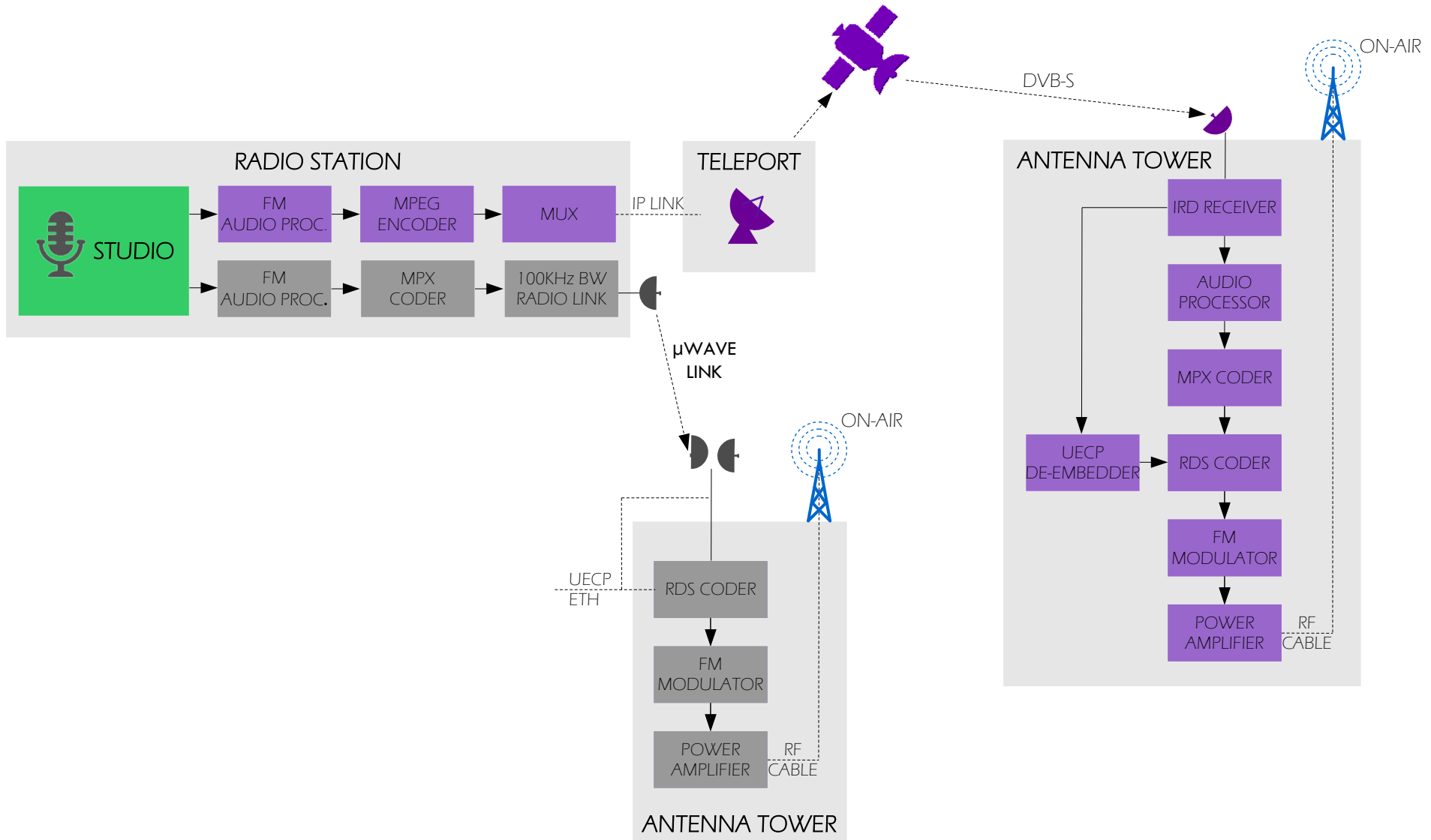


**HIGH INFRASTRUCTURE COSTS**  
 4x Towers and shelters  
 4x 1KW Tx + cables, etc...  
 Microwave links + licenses

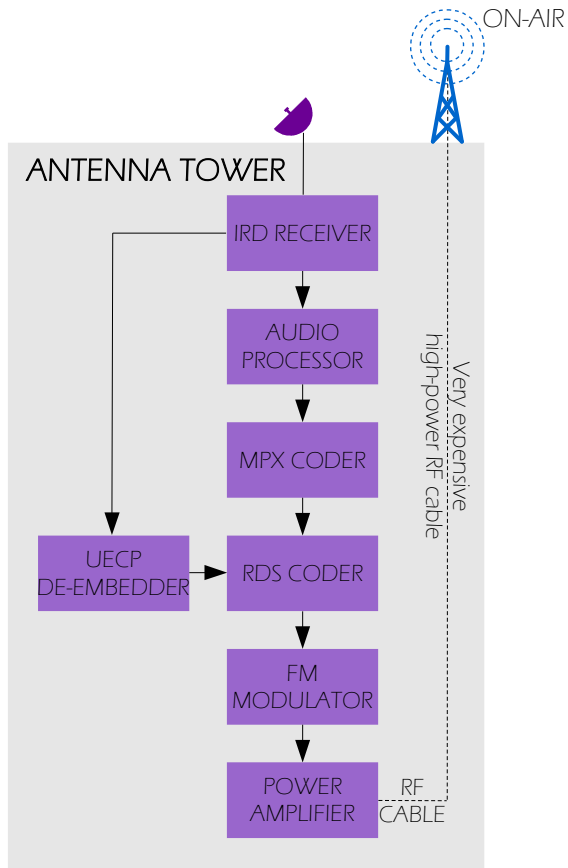
**HIGH MAINTENANCE COSTS**  
 High power consumption  
 High management costs  
 Very skilled staff required

**CRITICAL ISSUE**  
 Often placed in areas that are hard to reach

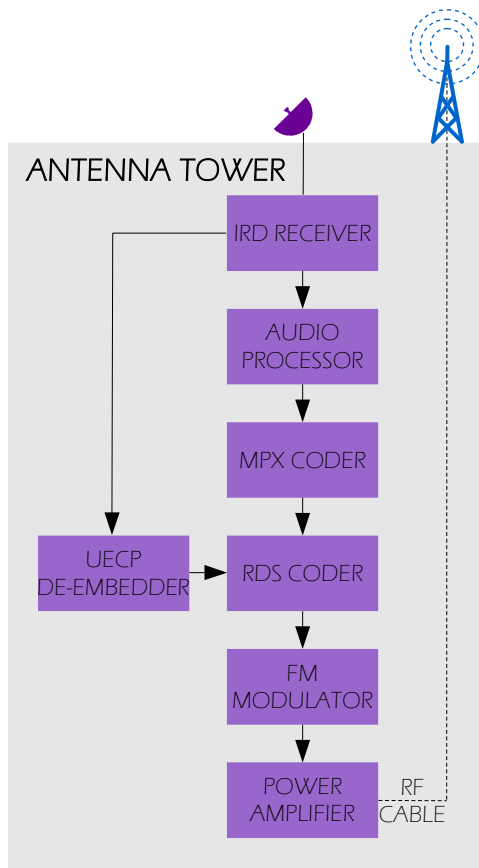
# Currently used **high-power** distribution infrastructure



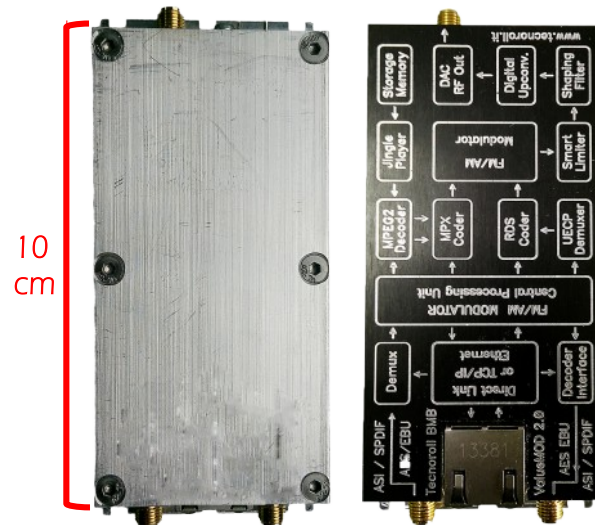
# Currently used **high-power** typical site configuration



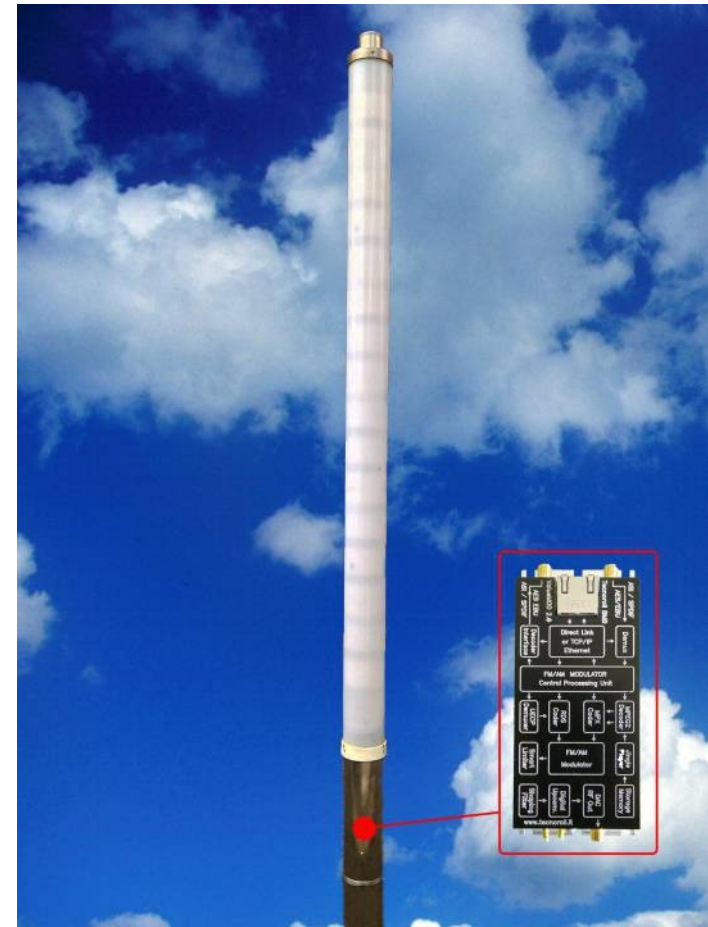
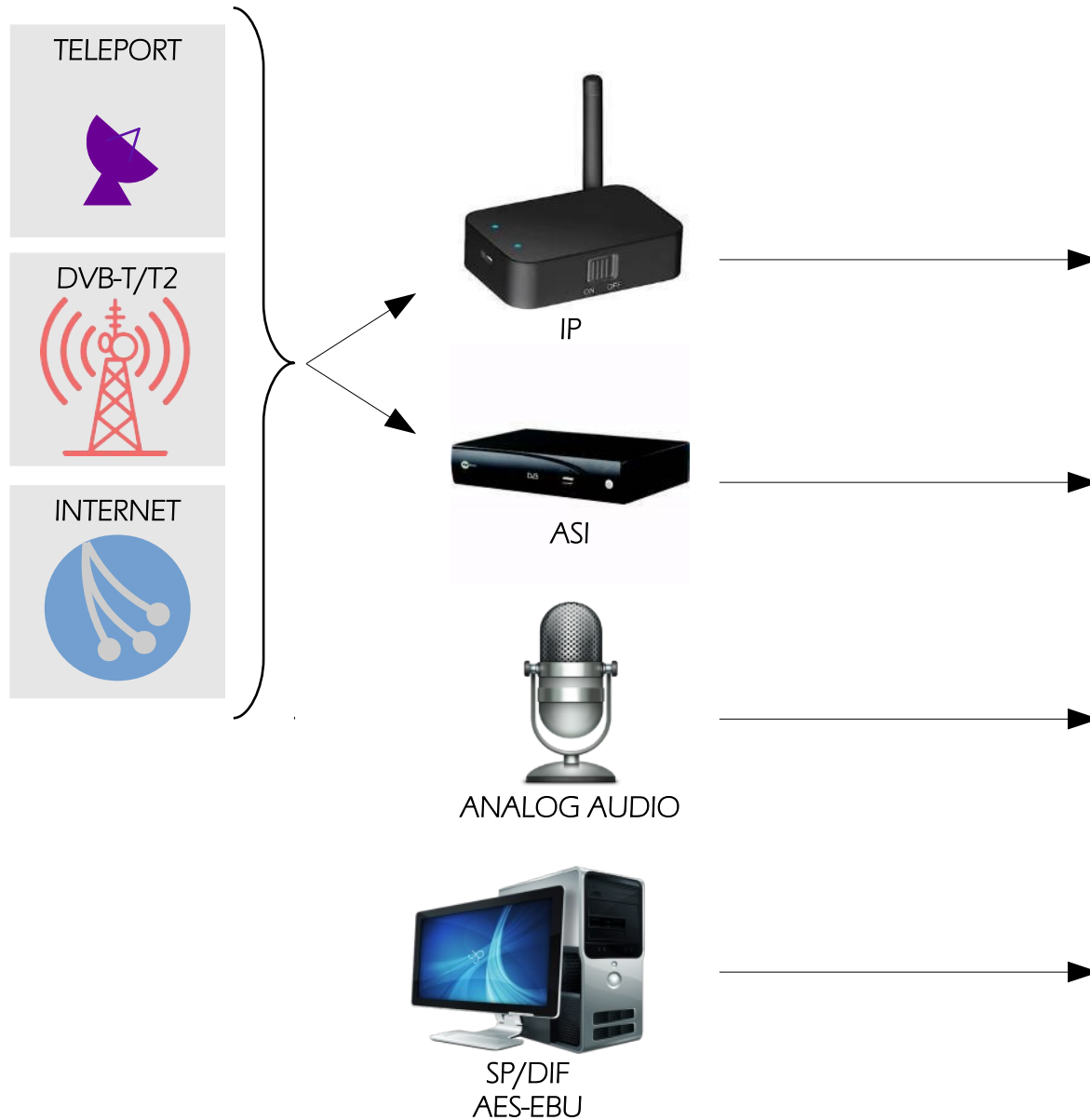
# Innovative signal distribution using our technology



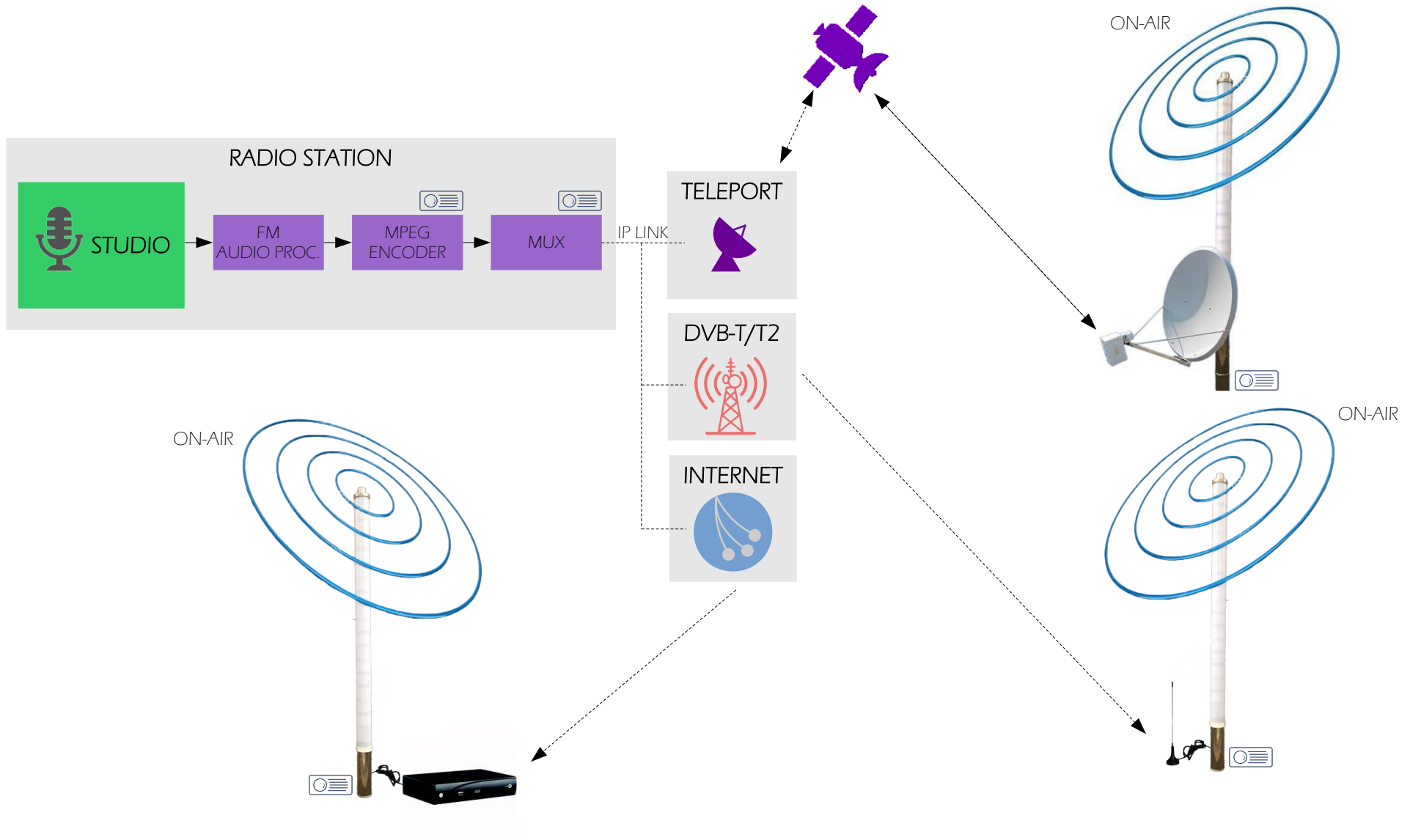
ALL-IN-ONE solution



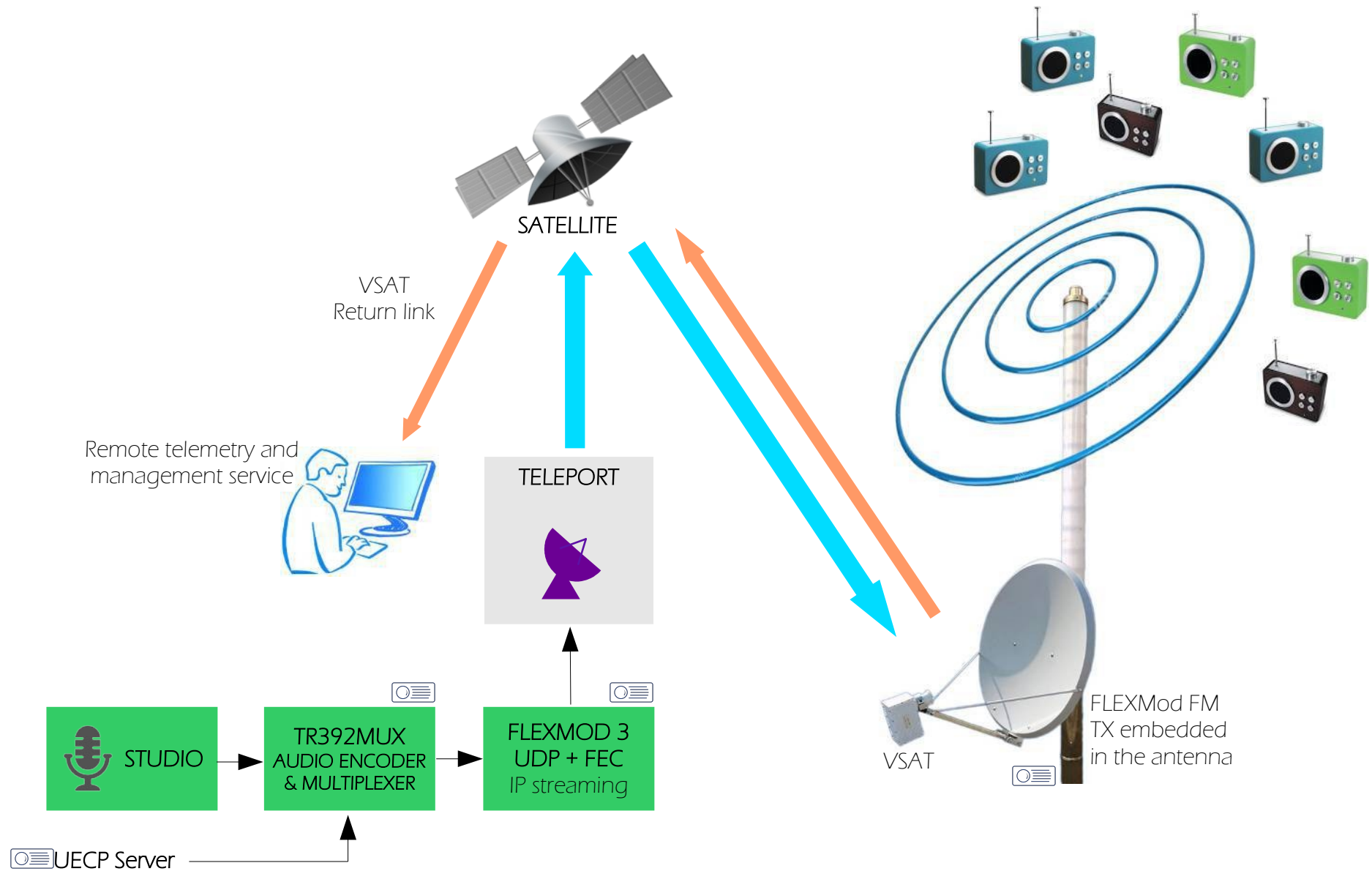
# Signal distribution possibilities with our technology



# Clever transport infrastructure approach

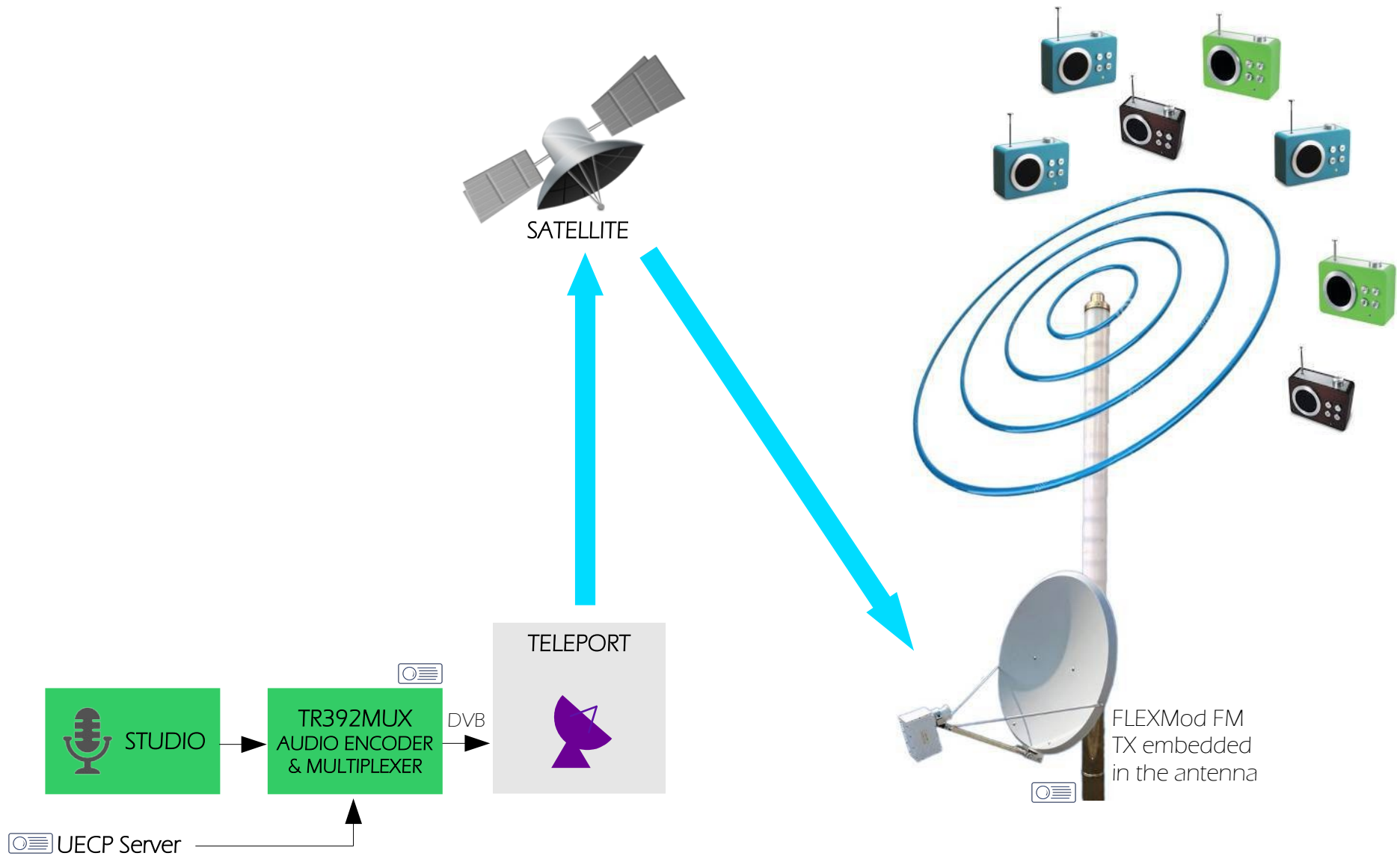


# CLEVER FM SAT-IP distribution

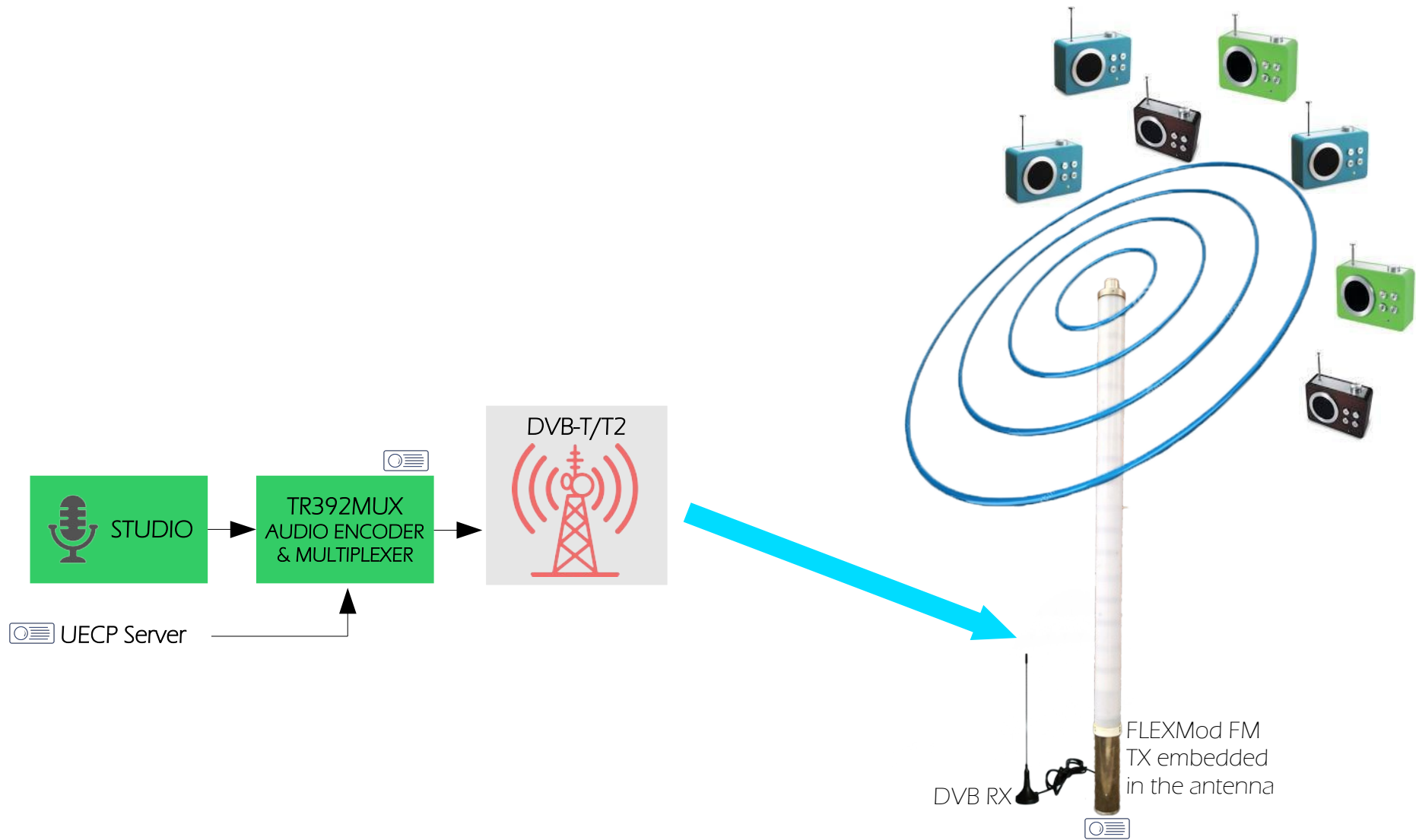




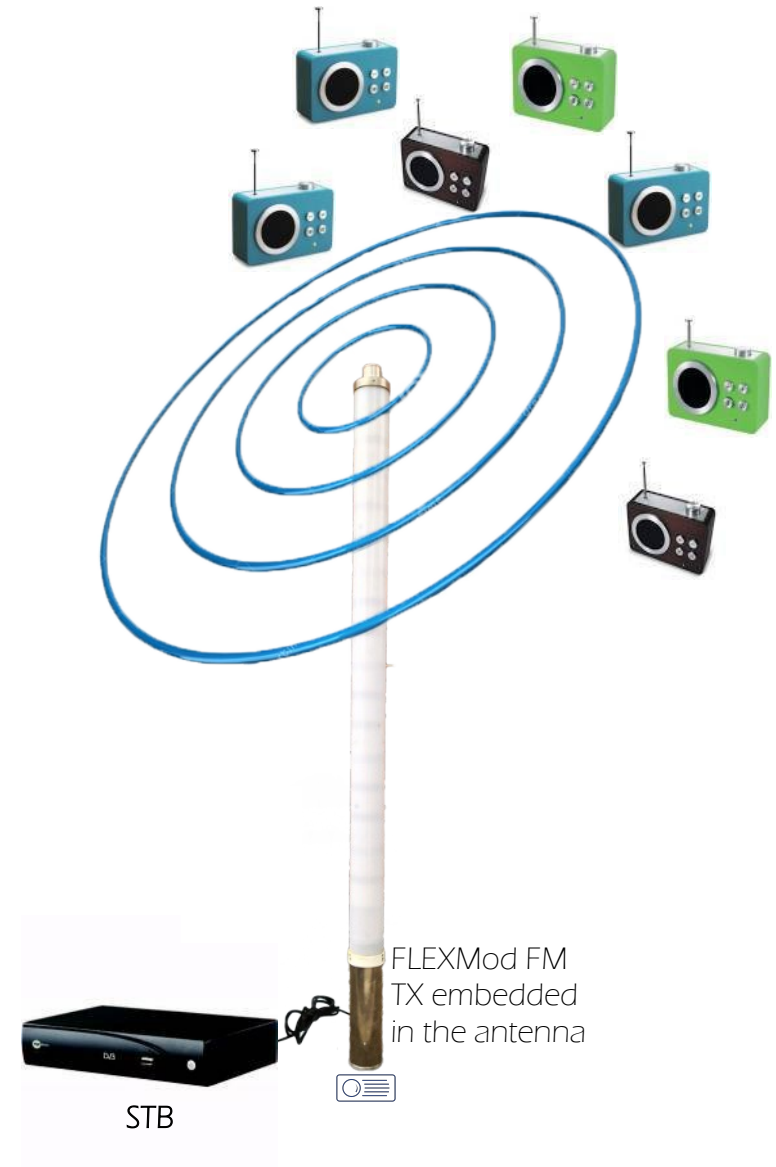
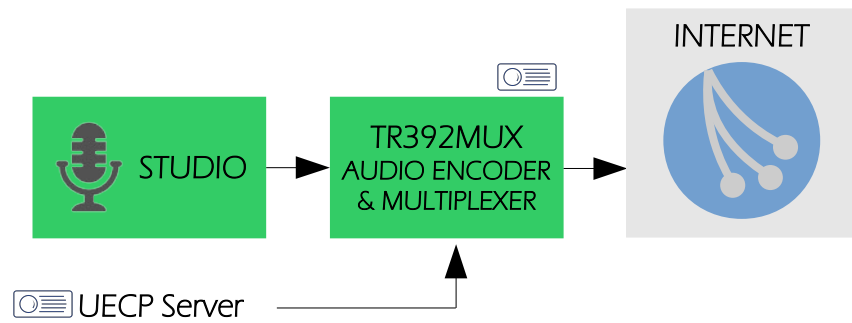
# CLEVER FM DVB-S distribution



# CLEVER FM DVB-T distribution



# CLEVER FM Internet distribution

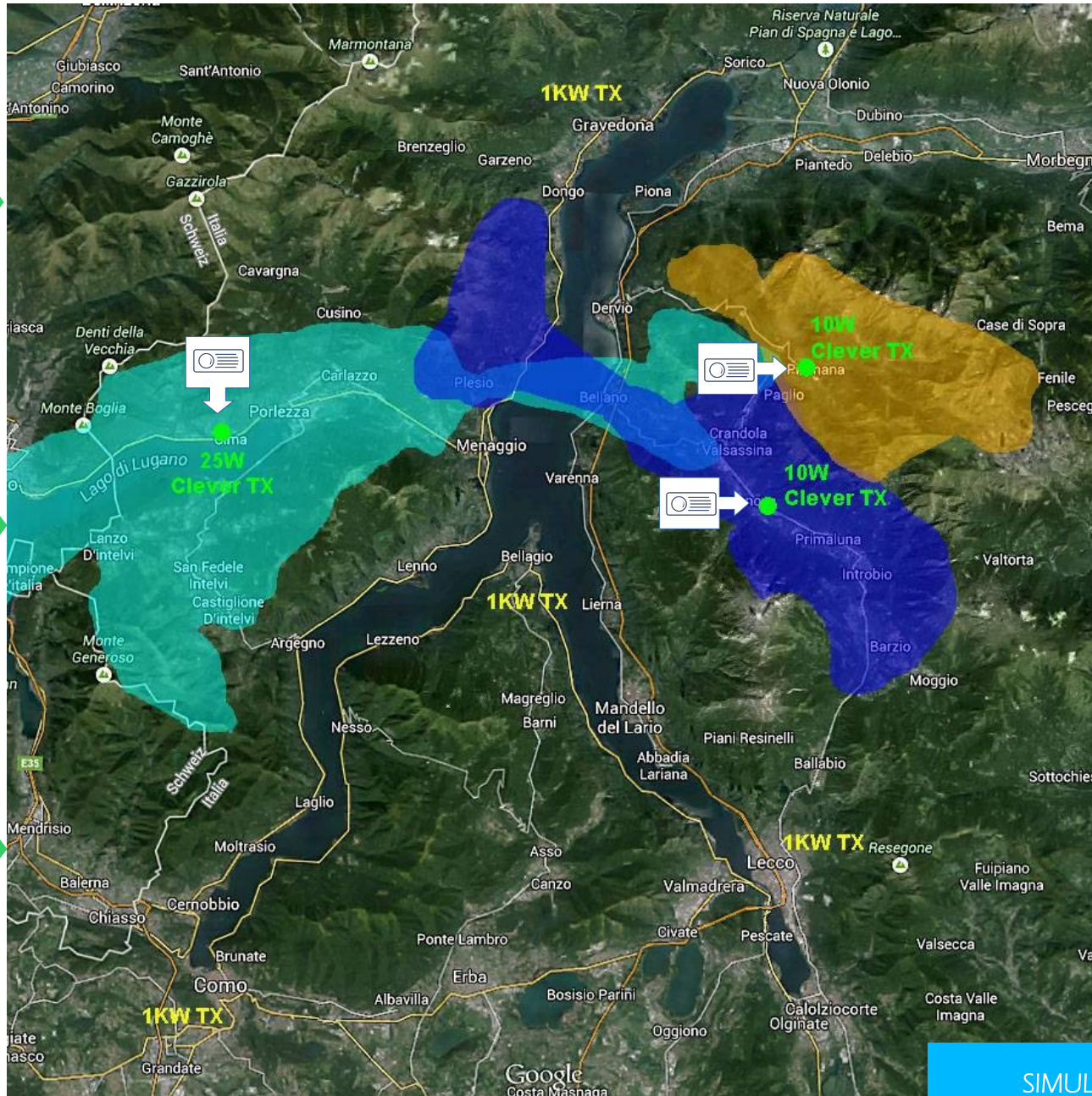


# Example of a network gaps filling using CLEVER LP TX

Widespread gap filling

No need for microwave links

Low power consumption



No investments for new towers: can be installed on existing building roofs or bell towers

22,000 people reached with low investments

Easy maintenance

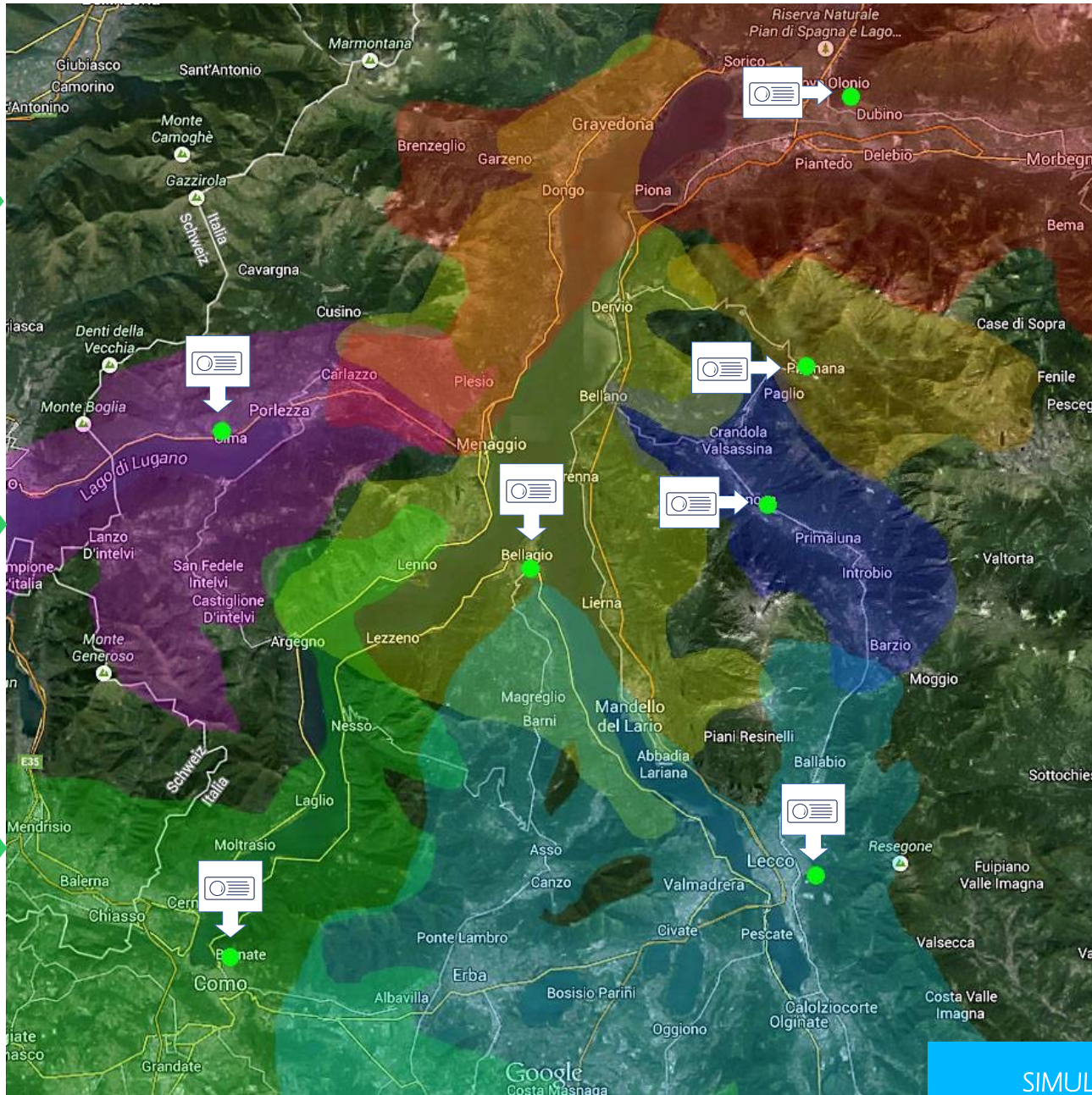
SIMULATION

# Same network, but entirely based on CLEVER technology

Widespread coverage

No need for microwave links

Low power consumption



No investments for new towers: can be installed on existing building roofs or bell towers

Low environmental impact and minimum electromagnetic pollution

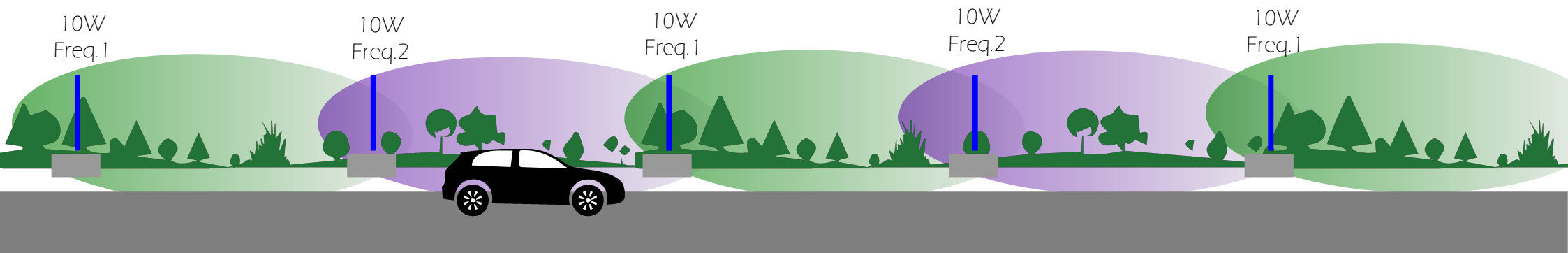
Easy maintenance

SIMULATION

# CLEVER FM Selective coverage on motorways

## Multi Frequency Network

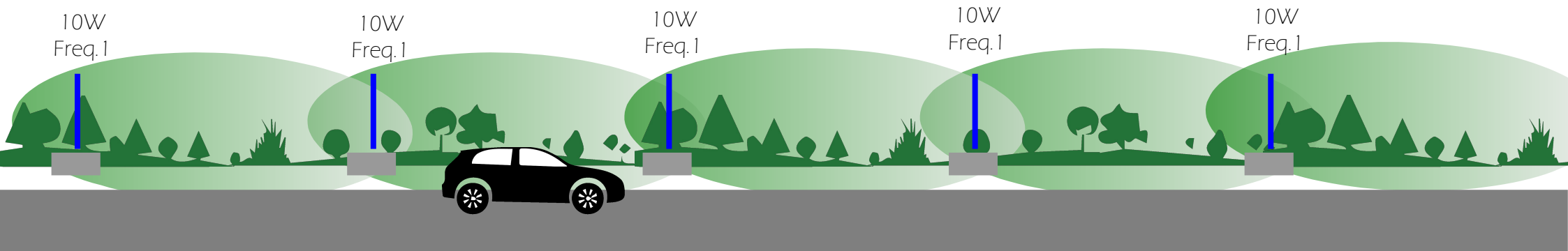
Thanks to the embedded RDS coder and the Alternate-Frequency autoswitch feature of the receiver, very long motorway sections can be easily covered in a cost-effective way.



# CLEVER FM Selective coverage on motorways

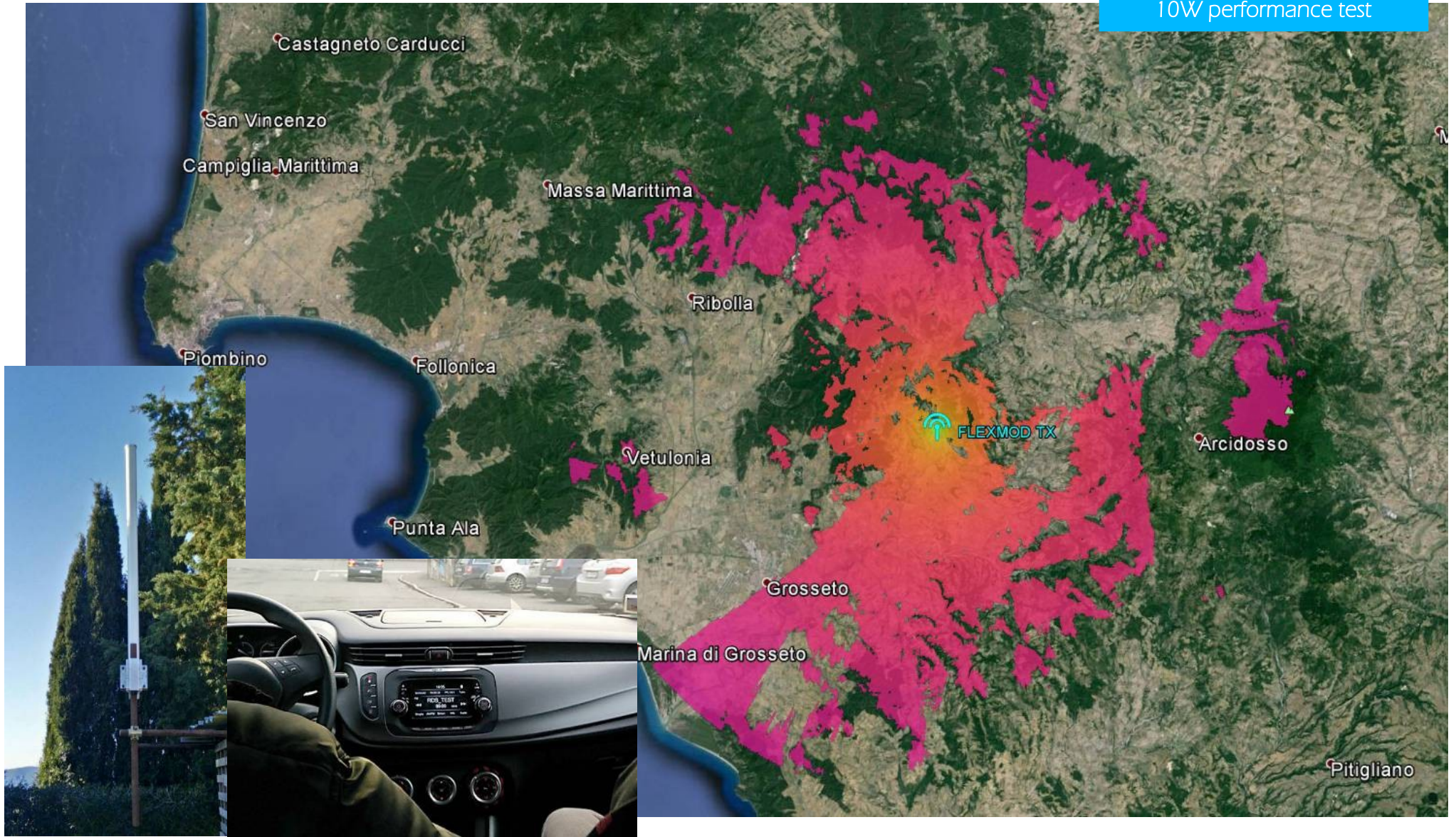
## Single Frequency Network

Thanks to our *unique synchronous MPEG decoder*, very long motorway sections can be covered using a single frequency carrier even though the transport signal is based on a compressed MPEG stream.



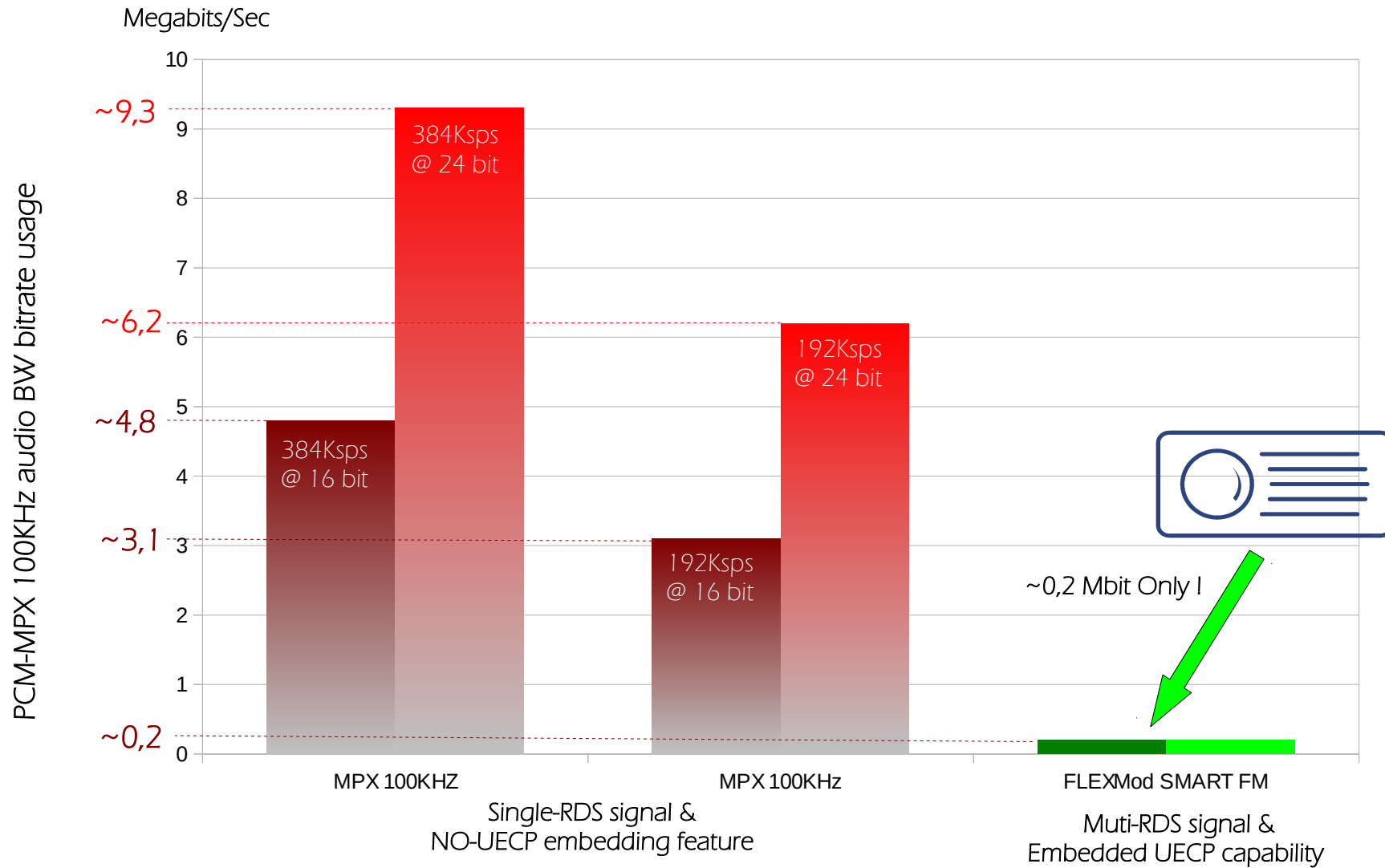
# Real-case scenario: CLEVER FM broadcast station

Location: TUSCANY - ITALY  
10W performance test





# FM PCM-Multiplex (MPX) Vs CLEVER bitrate comparison



# Current High-Power Vs CLEVER network comparison

Current High power TX stations

Low power TX stations

LARGE COVERAGE WITH  
A SINGLE TRANSMITTER

NO NEED FOR  
MICROWAVE LINKS

SCALABLE INVESTMENTS

LOW PURCHASE AND  
OPERATING COSTS



NETWORK WITH MODULAR  
AND SCALABLE DESIGN

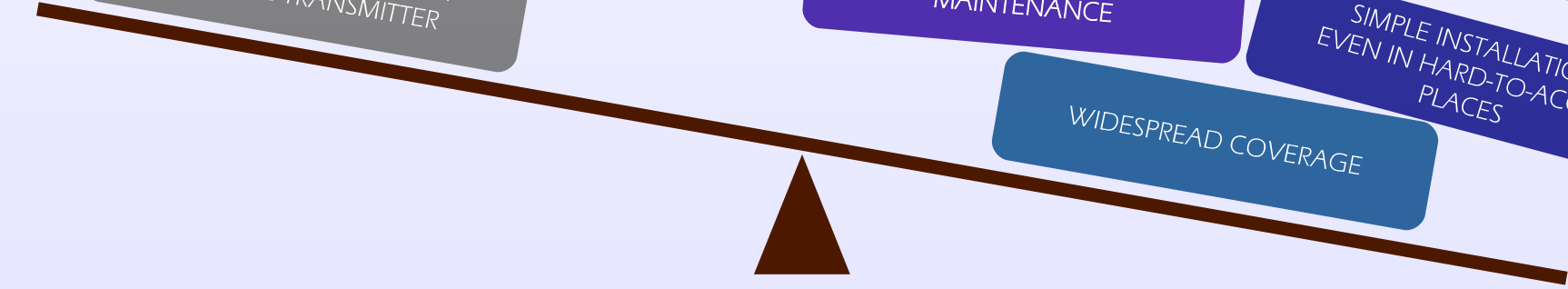
LOW ENVIRONMENTAL IMPACT  
AND MINIMUM  
ELECTROMAGNETIC POLLUTION

EXTREMELY LOW  
POWER CONSUMPTION

EASY AND FAST  
MAINTENANCE

SIMPLE INSTALLATION  
EVEN IN HARD-TO-ACCESS  
PLACES

WIDESPREAD COVERAGE



# Current HP TX Vs **CLEVER** FM investment comparison

High power TX		Clever FM TX	
Tower (basic infrastructure only)	Around 200K € each	Tower (basic infrastructure only)	NOT NEEDED
20KW transmitter (with cables & accessories)	Around 80K € each	10/20/50W transmitter (with cables & accessories)	Around 5K € each
Microwave link (with licence)	Around 20K € each	Microwave link (with licence)	NOT NEEDED
Power consumption	High: several KW for each transmitter	Power consumption	Low: only a few KW for the whole network
Technical staff	Highly specialized and skilled, at high costs	Technical staff	Only general technical knowledge required



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