



Technology Shaping the Future

Ultra Fast BroadBand Everywhere
Challenges and solutions

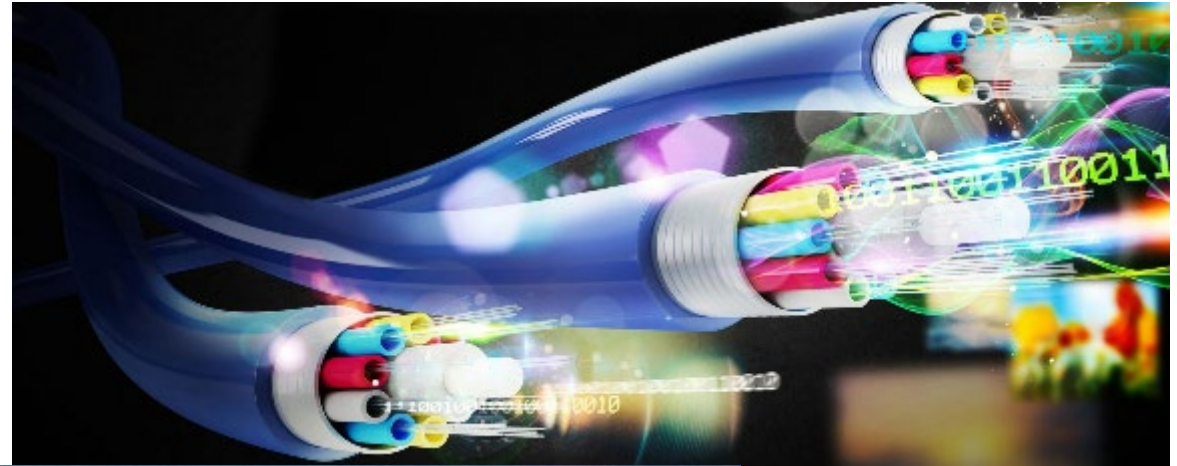
New EU telecom rules for a

Gigabit Society

- All European households, rural or urban, should have access to networks offering a download speed of at least **100 Mbps**, which can be upgraded to **1 Gbps**
- All schools, transport hubs and main providers of public services as well as digitally intensive enterprises should have access to internet connections with download/upload speeds of **1 Gbps**
- All urban areas as well as major roads and railways should have uninterrupted **5G** wireless broadband coverage

UFBB challenges

- New Telecom infrastructure with extended deployment of **Fiber** network (FTTH)
- **Universal coverage** in both rural and urban areas
- Support future **capacity upgrade**



...But

▪ Can Fiber reach everywhere ?



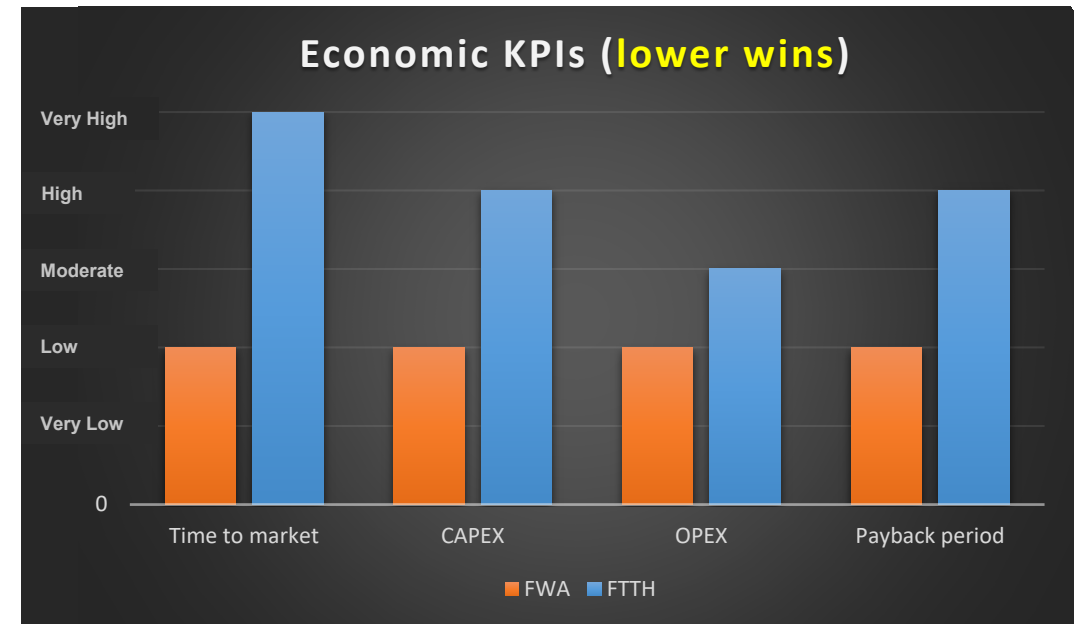
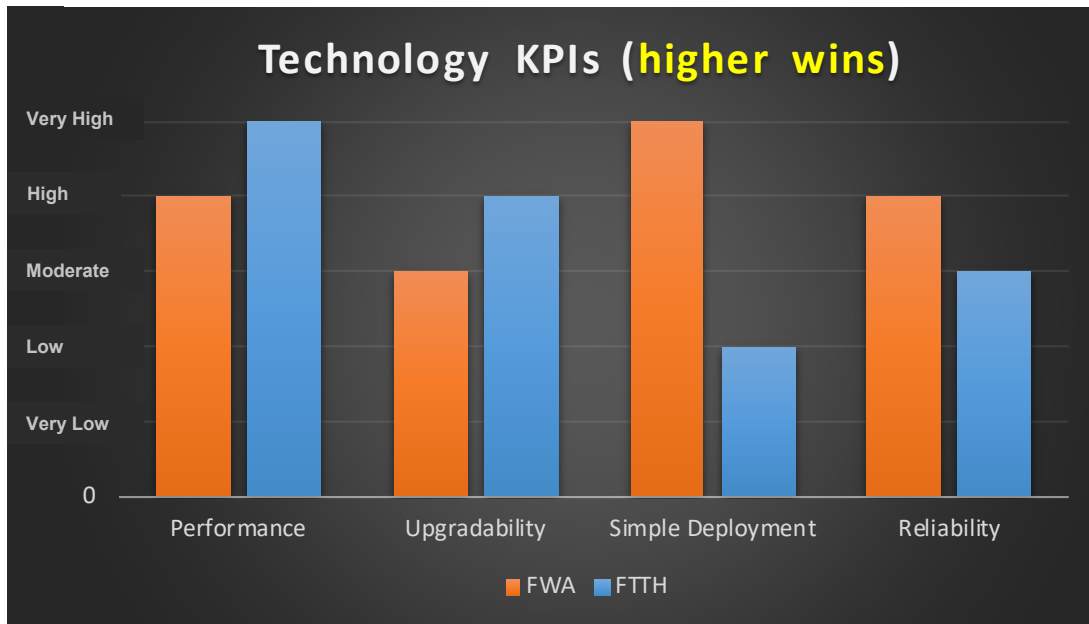
Mountainous village, Zagori Province, Epirus, Greece

Addressing the UFBB challenges

- Multiple Wireline & Wireless technologies should be engaged
- Fixed Wireless Access (FWA) is the key technology to deliver UFBB in rural and semi-rural areas
- Wireless PtMP supporting extended coverage is offering a solution to universal UFBB



How FWA compares to FTTH – KPI comparison



FWA

- More than 1 Gbps DL per sector
- smart antennas, additional spectrum, BS / TS replacement
- Hub & Terminals Installation
- Failure points only BS or TS

FTTH

- Multiple Gbps DL per OLT
- Upgrade OLT, ONT line-cards
- Digging, OLT, ONT, Splitters, Fiber
- Failure points: OLT, ONT, Splitters, Fiber Loss/Damage

FWA

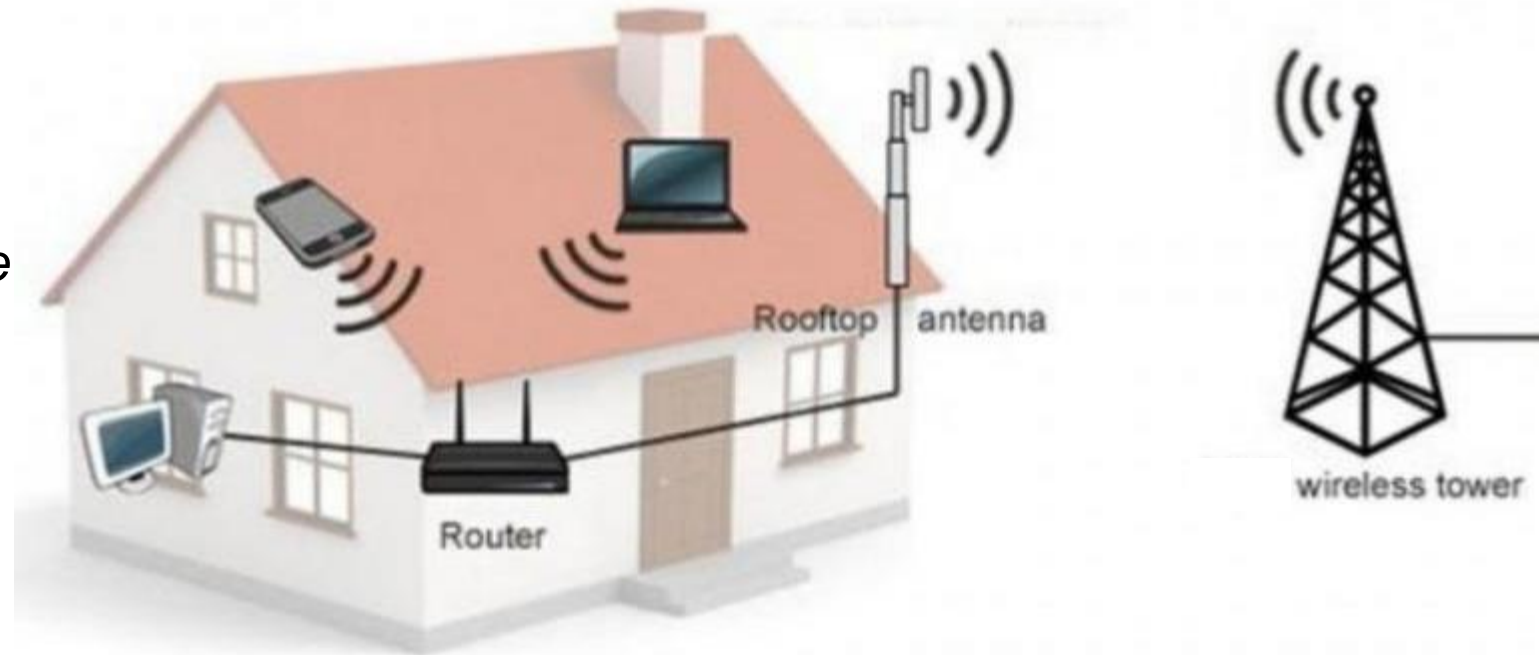
- Fast rollout, simple installation
- Cost Effective Radios inexpensive deployment process
- Maintenance of BS and TS
- Low CAPEX/OPEX lead to faster time to market

FTTH

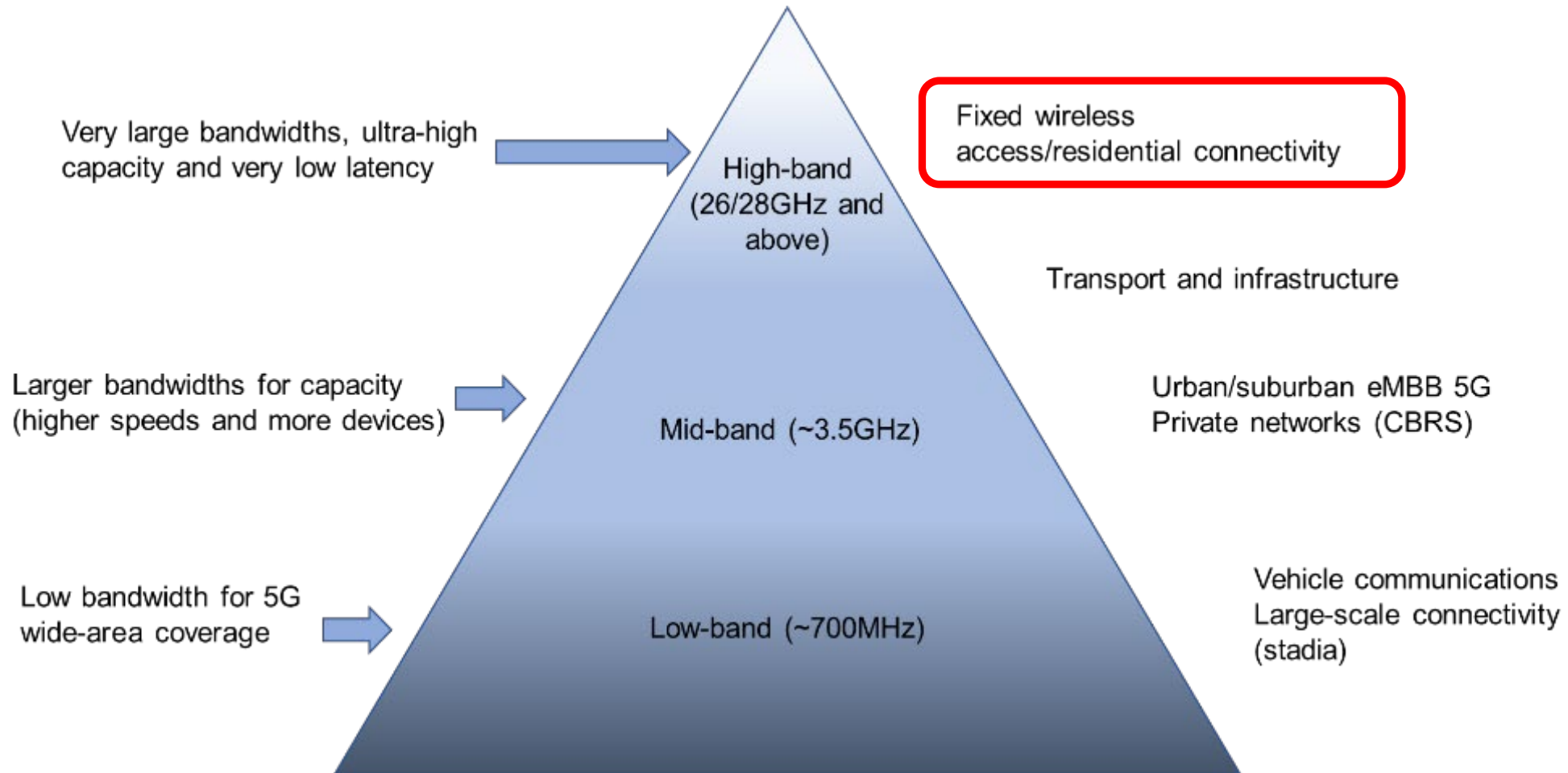
- Multiple building blocks & digging
- Expensive civil works + Electronics + permit process
- Operation of a complex network
- High CAPEX/OPEX lead to longer time to market

- *LTE capacity capped FWA*
- *Unlicensed, WiFi 802.11-based*
- *Satellite, basic connectivity service*
- *WiGig 802,11 ad/ay based, short range technologies*
- *5G Fixed Wireless Access*
- *Multipoint at MW Licensed spectrum*

not suitable for
universal UFBB



5G spectrum band and use cases



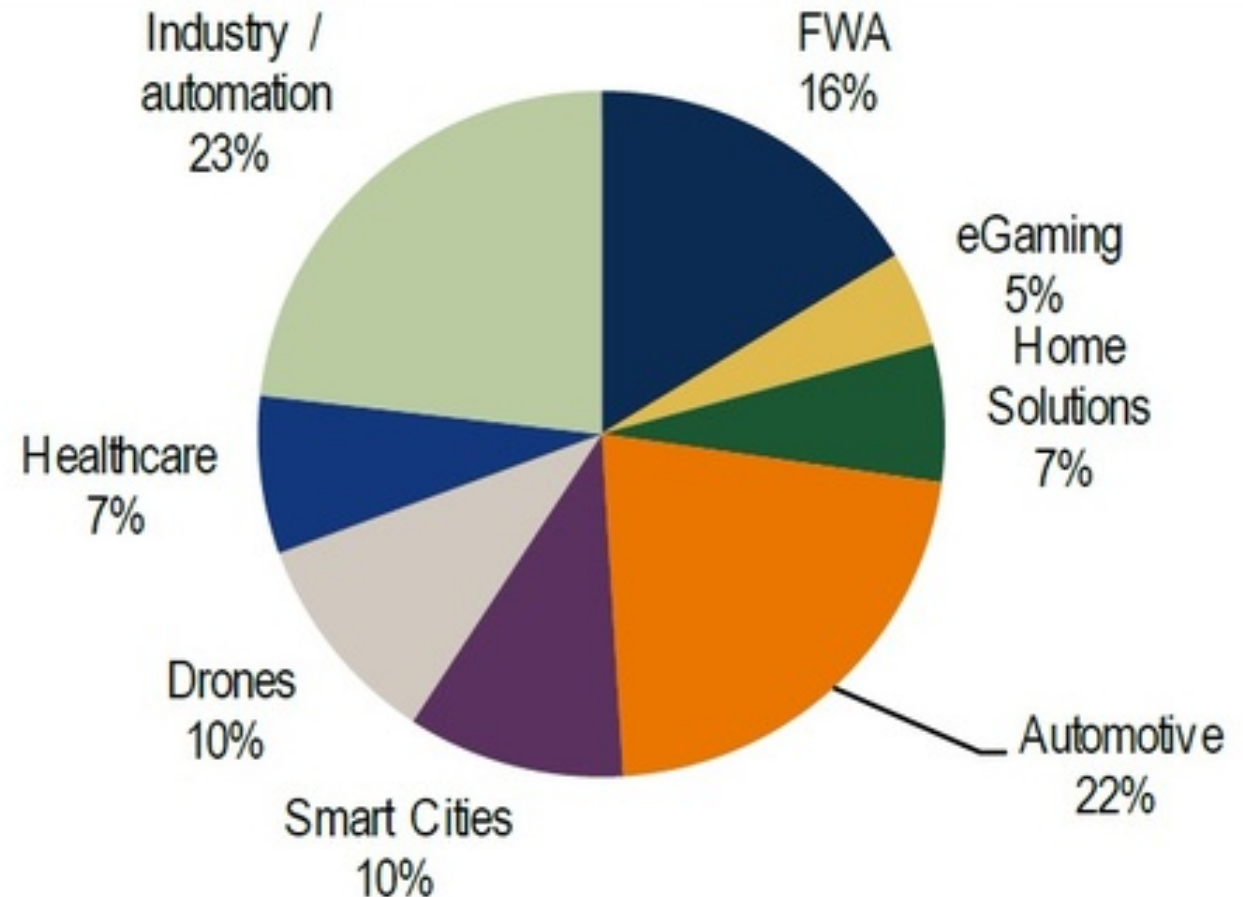
5G FWA at millimeter bands exhibits limited range of 2000 to 1000ft.

5G FWA ... one of the many use cases

- 5G is expected to address the needs of multiple use cases on top of eMBB
- 5G use cases are expected to add **15 %** on top of Mobile market for the global mobile industry by 2024.

5G is not built for FWA ... a purpose-built technology is required to address efficiently the FWA requirements

5G revenue opportunities breakdown by verticals



Source: BofA Merrill Lynch Global Research estimates

WiBAS Proposition for UFBB Wireless Access ... today



The Best Approach to UFBB Objectives

- ▶ Purpose-built technology for FWA applications at 10,5/26/28GHz
- ▶ Fibre-like service (6,8Gbps/ 4-sector BS, 1Gbps/terminal)
- ▶ Fully Outdoor Compact Radio, easy installation at house roof
- ▶ Extended more than 8Km Coverage, addressing rural & semi-rural
- ▶ Easy installation with Zero-Touch Provisioning
- ▶ Affordable User Equipment

The Rural Italy Case of **eolo**

- ✓ **Ultimate Target: Ultra-Broadband Rates in 21 Regions**
- ✓ **DL: 100 Mbps / UL: 50 Mbps**
- ✓ **Frequency Spectrum: Blocco L, 2x112 MHz**
- ✓ **Subscriber density: 45 (target is 90-120)**



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2016 Sub 6GHz system
Unlicensed



2019 28 GHz
Licensed



meeting the “Gigabit Society” objectives in Italy



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WiBAS™ 26 / 28 GHz platform is used to provide Ultra Broadband FWA to more than **13,8m** citizens in **9,3m** households at rural and semi-rural areas (cluster C & D) of **19 Italian Regions**. FWA is deployed in conjunction with FTTH and it will provide UFBB service to more than **15%** of the households in cluster C & D

- Multiple Wireline & Wireless technologies should be engaged to achieve **UFBB everywhere**
- **Purpose-built FWA** is required to address efficiently the challenges
- Intracom's Telecom's FWA Broadband Solution provides **UFBB wireless Access today**
and
- It is proven with several successful networks **deployed worldwide**
while
- research activities ensure **evolution** of the **WiBAS** FWA solution

thank
you



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