

Connecting a Better World

Intersecting technology, application and
aspiration for a broadband enabled future

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Optical Access F5G to meet today's needs and support tomorrow's challenges

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Orange Labs
October 14th, 2020

Session BBWF (Day 2):
Seamless Connectivity
Panel: Use Cases and Applications for F5G

F5G





Outline

1. FTTH Market
2. Home LAN & FTTH networks
3. Passive Optical LAN
4. Conclusion





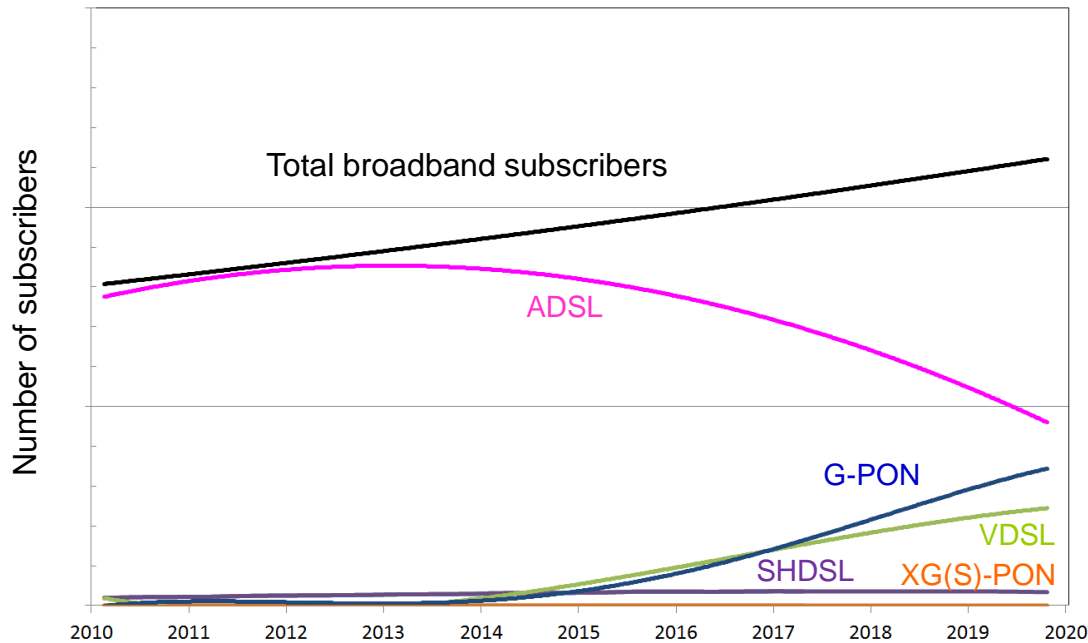
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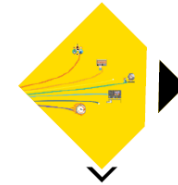


Orange FTTH market

Trends in fixed broadband access for Orange



- ADSL : Asymmetric Digital Subscriber Line
- VDSL : Very-high-bit-rate Digital Subscriber Line
- SHDSL : Single-pair High-speed Digital Subscriber Line
- G-PON : Gigabit capable Passive Optical Network
- XG(S)-PON : 10 Gigabit (Symmetrical) capable Passive Optical Network



FTTH

From
41 million*
today...



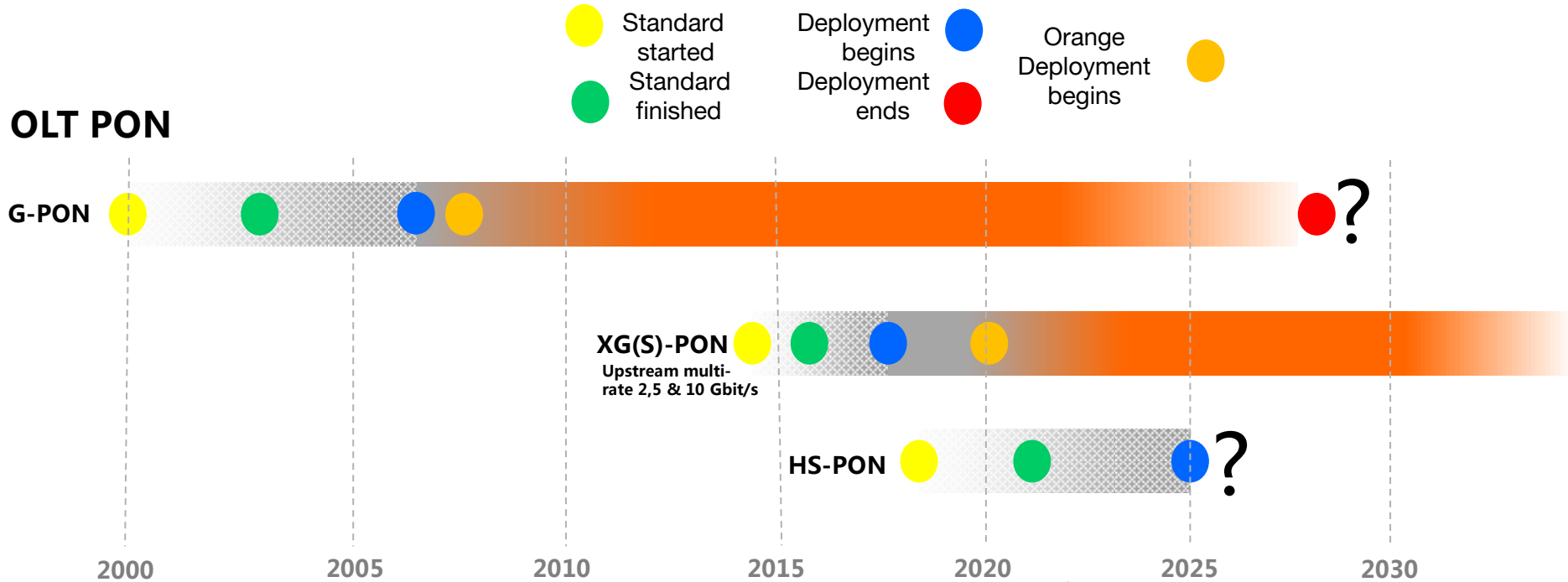
to **69M**
in 2023 connectable
households

*FY19 estimated





The right technology to maintain high quality access at lowest cost



F5G is an enabling initiative to improve and complement PON technologies

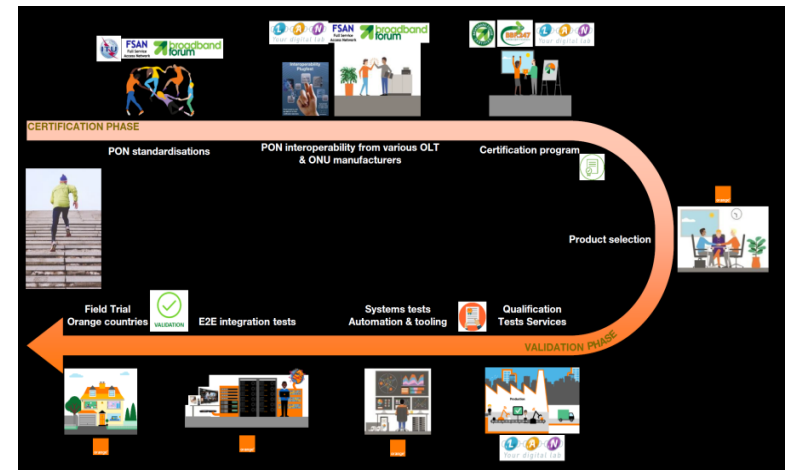
F5G





For coming FTTH technologies

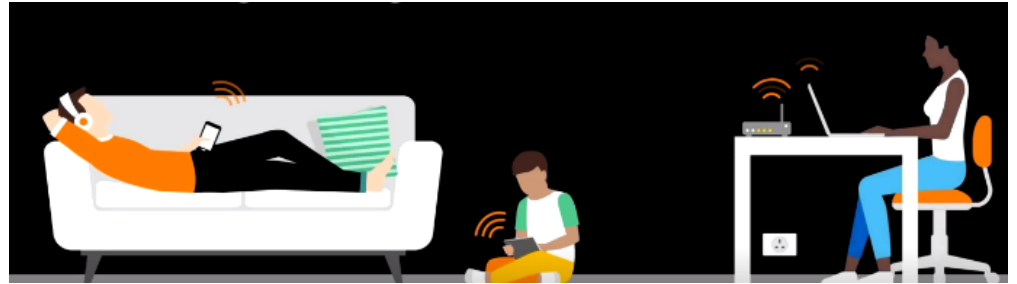
- Future technologies beyond G-PON shall ensure backward compatibility with installed base:
 - to ensure that next generations of technologies can be deployed preferably WITHOUT or WITH **minimal impact on** installed elements and no impact on outdoor passive infrastructure
 - to preserve ongoing **investments**
 - to ease **adoption** of new technologies for additional use cases & shorter ROI
- Coming market of **post G-PON** technologies will be primarily a **replacement market**
 - G-PON : adoption driven by physical **medium replacement** (copper limitations→optical fiber)
 - XG(S)-PON and other future PON technologies:
 - Adoption related to **appetite** for services
 - Operators' competition
 - Market size related to the **cost, in comparison to G-PON**
 - Certification & qualification test service** : interoperability, reduced time to market, vendor responsibility reinforcement
 - By using **Combo** cards to ease migration





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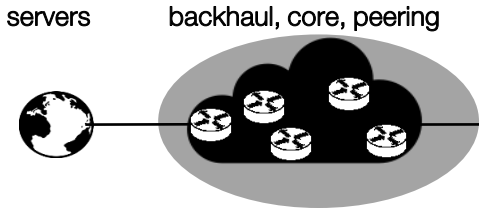
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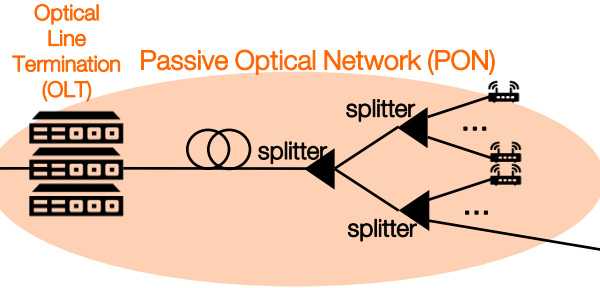


Bonding Home LAN & FTTH networks

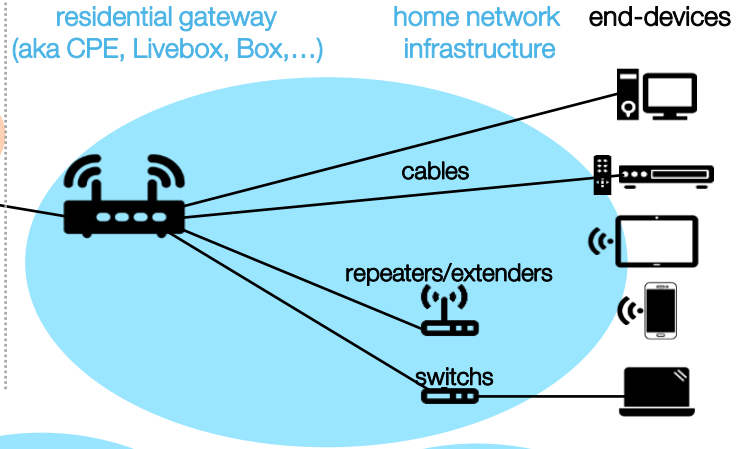
IP Routers



FTTH network



Home network



Dimension backhaul network to sustain higher bit rate
New higher speed interfaces

G-PON or XGS-PON technology at OLT
Multiplex XGS-PON with legacy G-PON signal for migration (COMBO)

New 2.5 Gps or 10Gbps capable box (WAN interface, routing capabilities)

New LAN interfaces able to transport traffic to customer's devices
Improved Wi-Fi (additional external access points, smart Wi-Fi features)

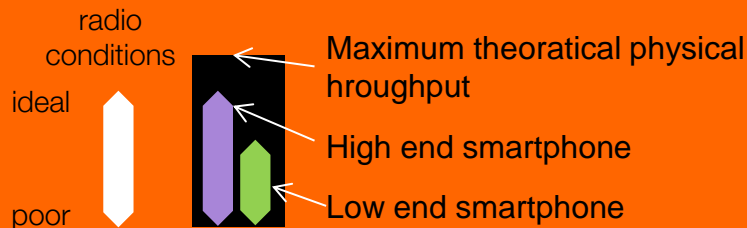
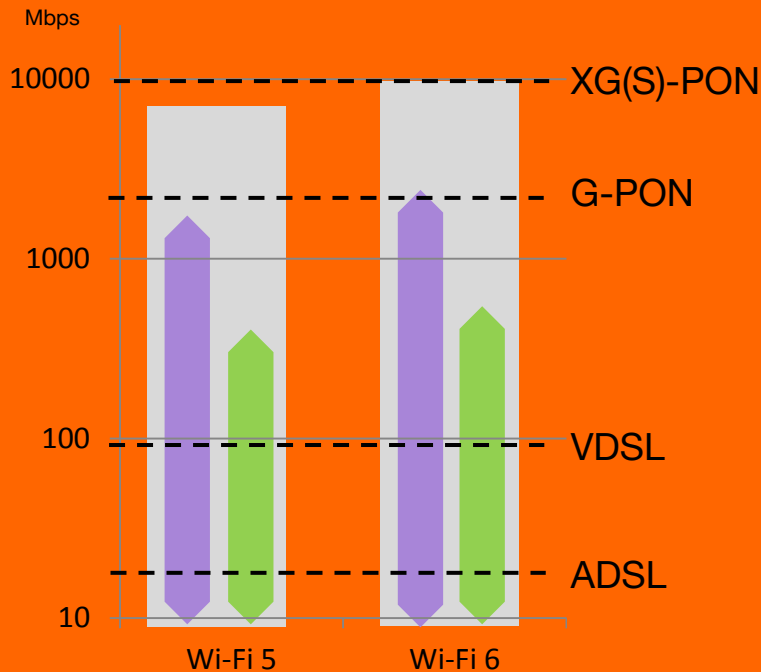




Bonding Home LAN & FTTH networks



Wi-Fi performances versus fix access



- Wi-Fi is the most used connectivity at home, and it will be for many years
- Wi-Fi complaints are on the rise even on fiber and increase drastically customer service calls
- Wi-Fi will remain the major connectivity at home
 - Wi-Fi 6 will reach high deployments volume quicker than 5G and will be the standard in consumer's electronic
- Wi-Fi 6 suits well with G-PON
- Wi-Fi 7 is coming with a development cycle ending in 2024. XGS-PON could be the FTTH companion for optimal operation.





Bonding Home LAN & FTTH networks



- Two boxes: ONU G-PON + Home Gateway (2006)
- One Box: Home Gateway + SFP (ONU G-PON) (2016)
- Optical Box: Home Gateway with BOSA on board G-PON (2017)
- The future: Gateway with XG(S)-PON with smart Wi-Fi to introduce a relevant customer experience





Outline

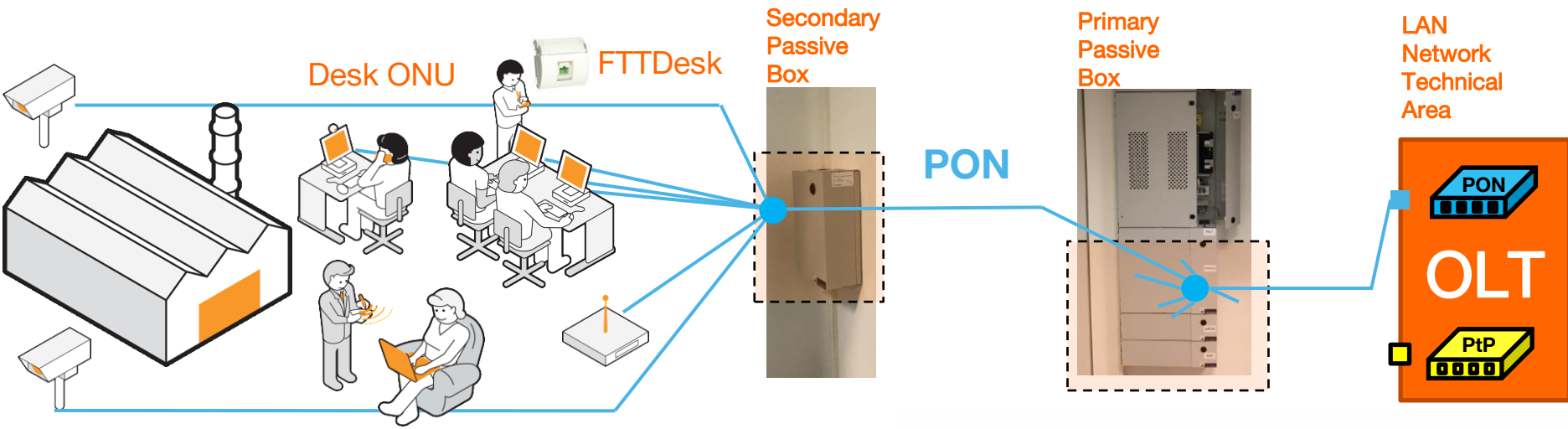
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Fiber for smart Cities & Factories: Passive Optical LAN

- Deeper **fiber** to connect everything: Fiber inside the building (Passive Optical LAN), Fiber to the Machine
- **Passive Optical LAN** (G-PON based) launches over new buildings Orange France (19 buildings / 21 000 workstations, including Orange's headquarter):
 - Laptop,
 - VoIP Phone + Laptop,
 - WiFi Access Point,
 - Printer,
 - Video-camera,
 - Control access equipment



F5G
Uses cases

ETSI
World Class Standards

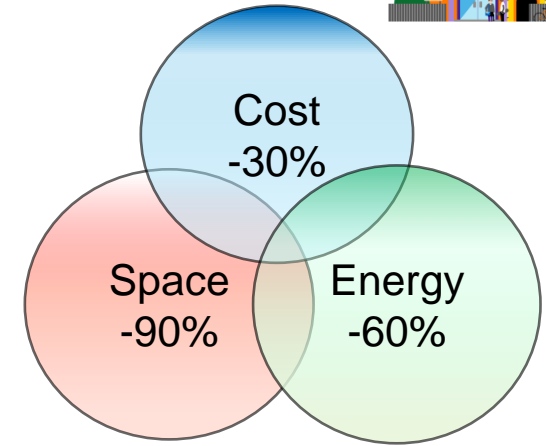




POL has only benefits!

Main impacts of POL technology

- Building Network Room simplified
- Floor Network Room suppressed
- Active equipment centralized within Building Network Room
- Optimisation of OPEX and centralized exploitation from OLT
- POL is Green: reduces the power consumption, perennial infrastructure



POL G-PON is a mature technology

- Major Decision Orange France in 2018 all new building France will have POL based on G-PON!



La Défense Agora

2019
950 persons



Bagneux Résonance

2020
1000 persons



Rennes Atalante

2020
865 persons



Bridge Orange HQ

Q4/20
2800 persons

➤ 15 others new building scheduled until 2025

POL unifies the jobs for FTTH access and LAN technicians

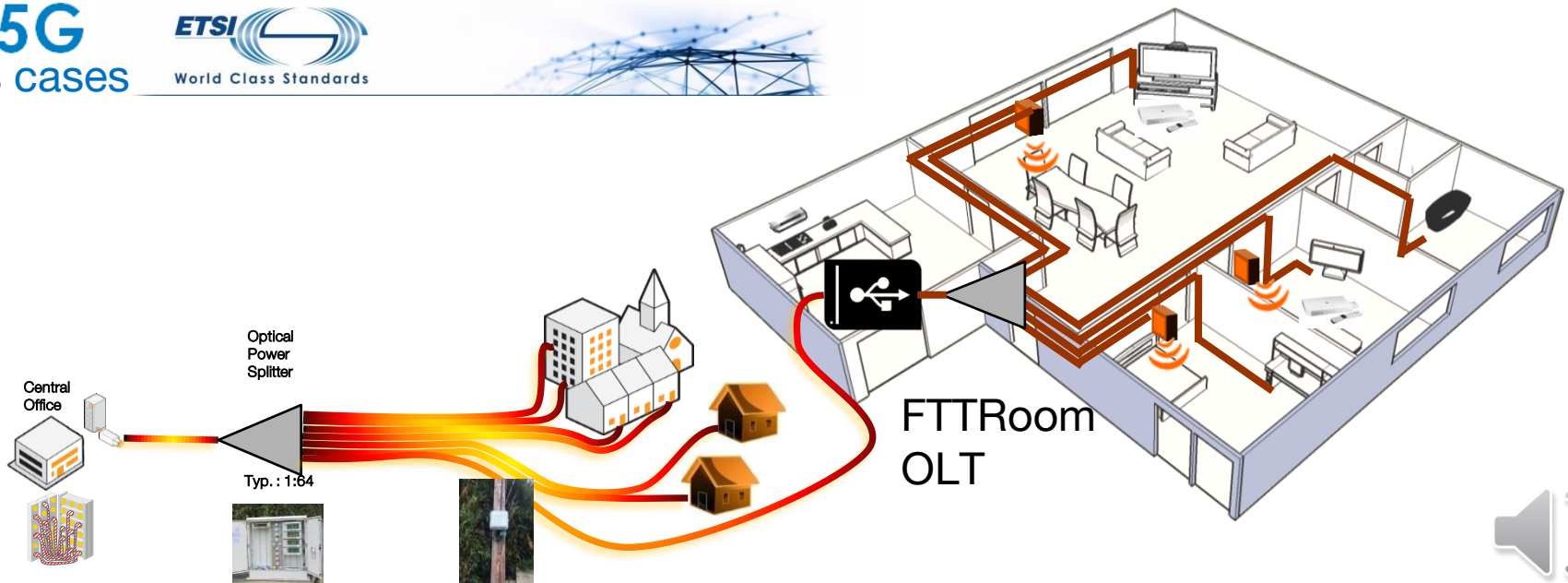




Fiber for smart Home: FTTRoom

- Deeper fiber to connect everything at Home: Fiber to the Room
- A cost effective, Home network infrastructure associating optical fiber and radio for a wireless end connectivity to the very high bit rate services everywhere in the home
- **Fiber To The Room (G&XGS-PON based)**
 - OLT inside Home Gateway (cascaded PONs with coordination)
 - New class of optical budget (0-15dB?) and reach (<1km)
 - OLT & ONU prices driven by consumer market

F5G
Uses cases



Conclusion

4 key points

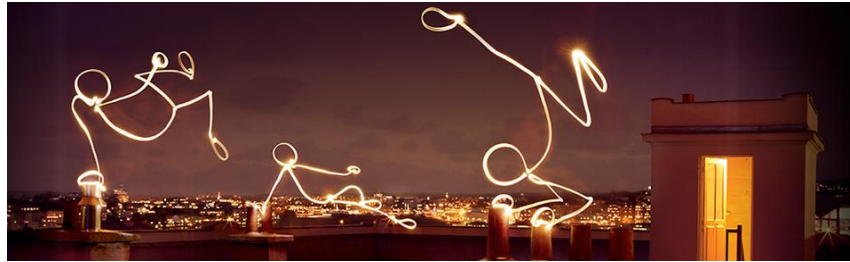
1 Preserve B+ passive infrastructure (ODN)

2 G-PON → XG(S)-PON → ?
with smooth migration (Combo)

3 FTTH but not only:
POL now, and in future
FTTRoom, FTTRMachine
(Industry 4.0), ...

4 Interoperability and
certification are a must





Thank You.

