



Unleashing the Capabilities of Broadband Networks

Vassilis Argyriadis

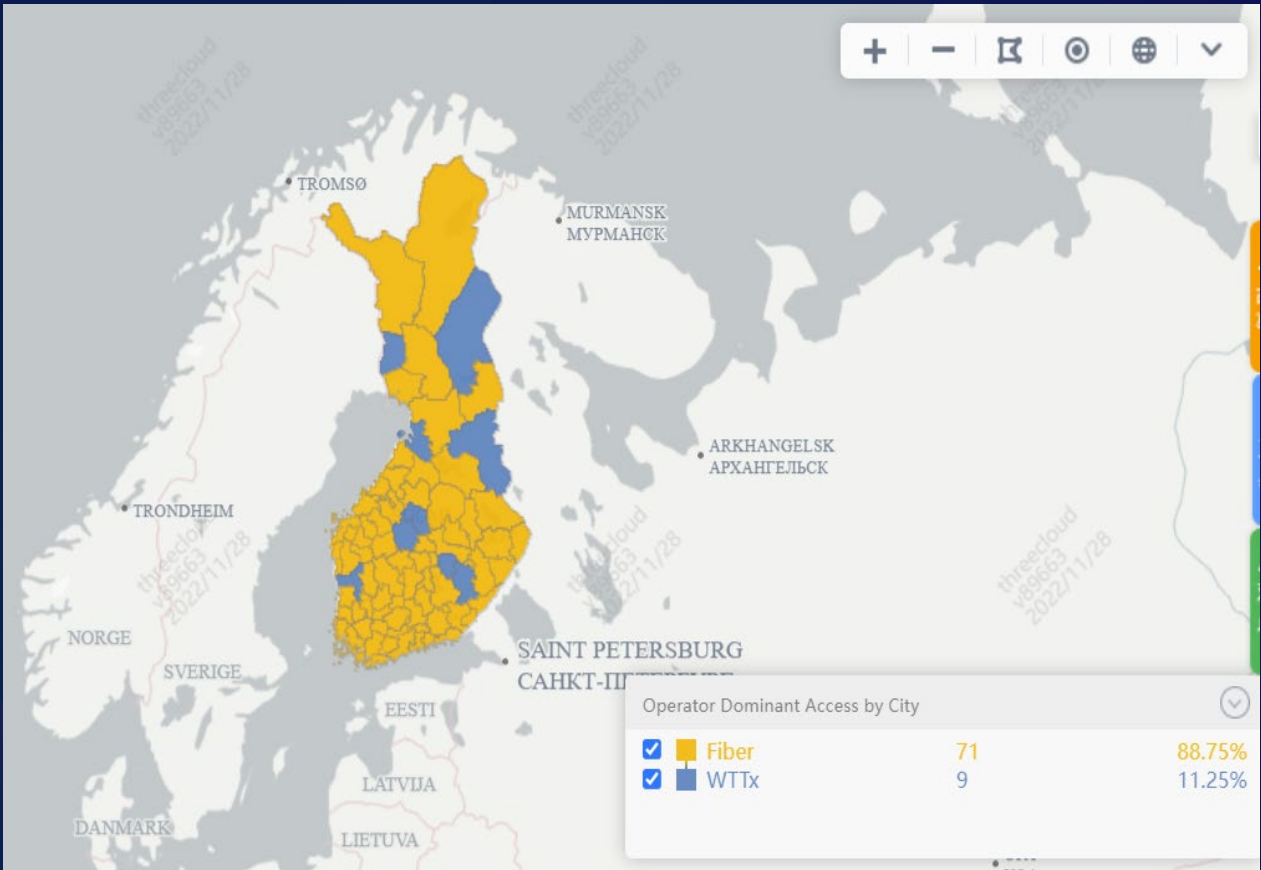
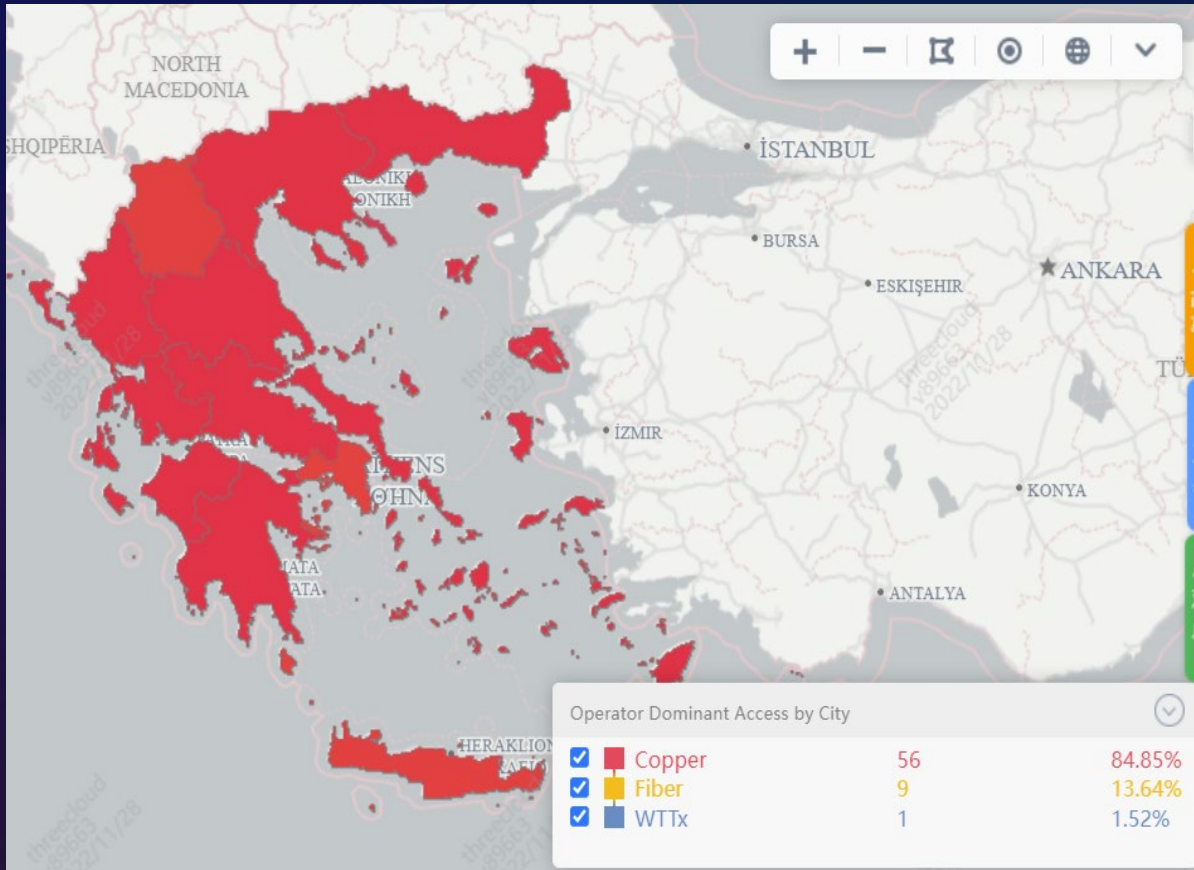
Chief Technology Officer
Solution Sales Director



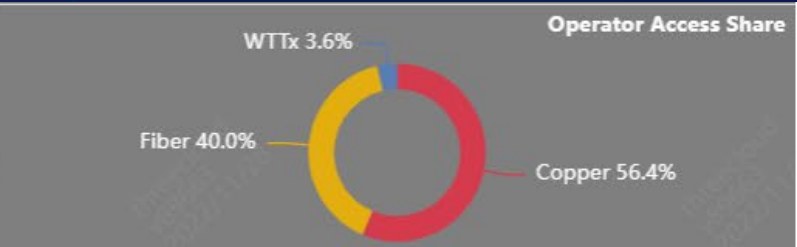
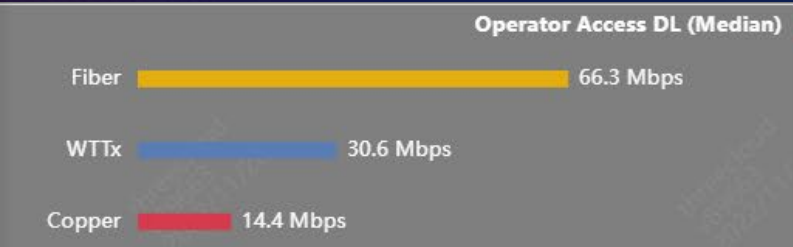
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Copper is Still Dominant Technology in all Cities



Fiber is considered to be FTTH & FTTC



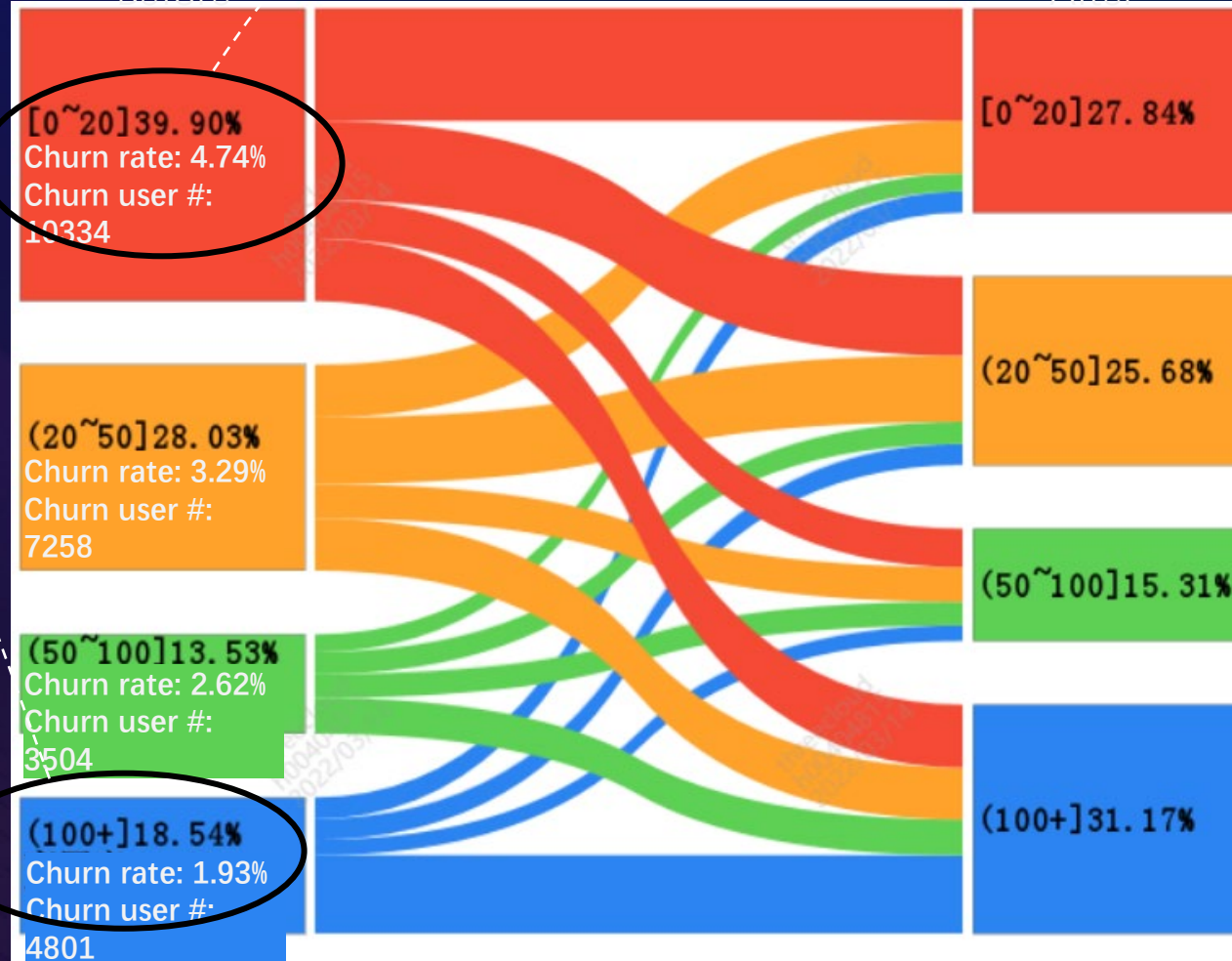
Churn Study: Low Speed=Higher Churn, FWA Opportunity in Slow DSL

4.7% vs 1.9%

<20Mbps

>100Mbps

After



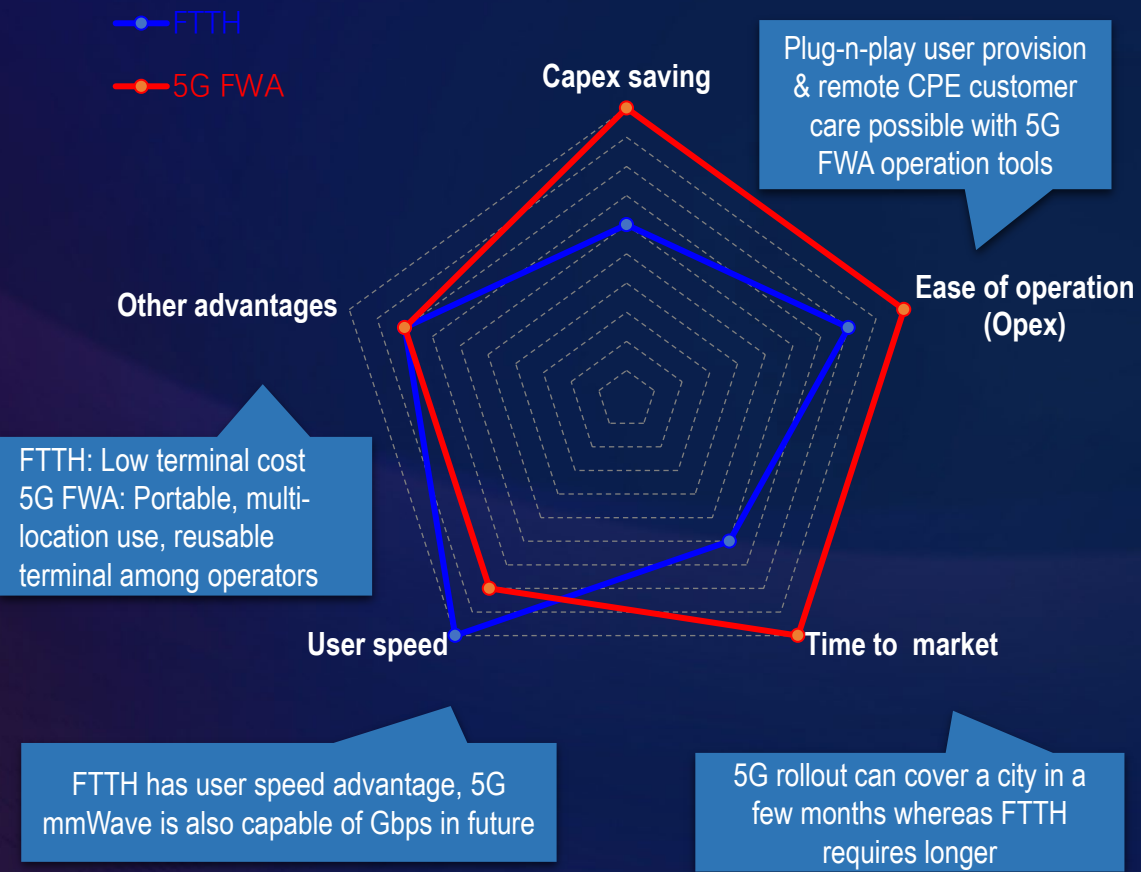
Poland broadband recent churn study

- Poland user are leaving slow network to high speed network
- Low speed user churn rate is 2.5x of High speed ones

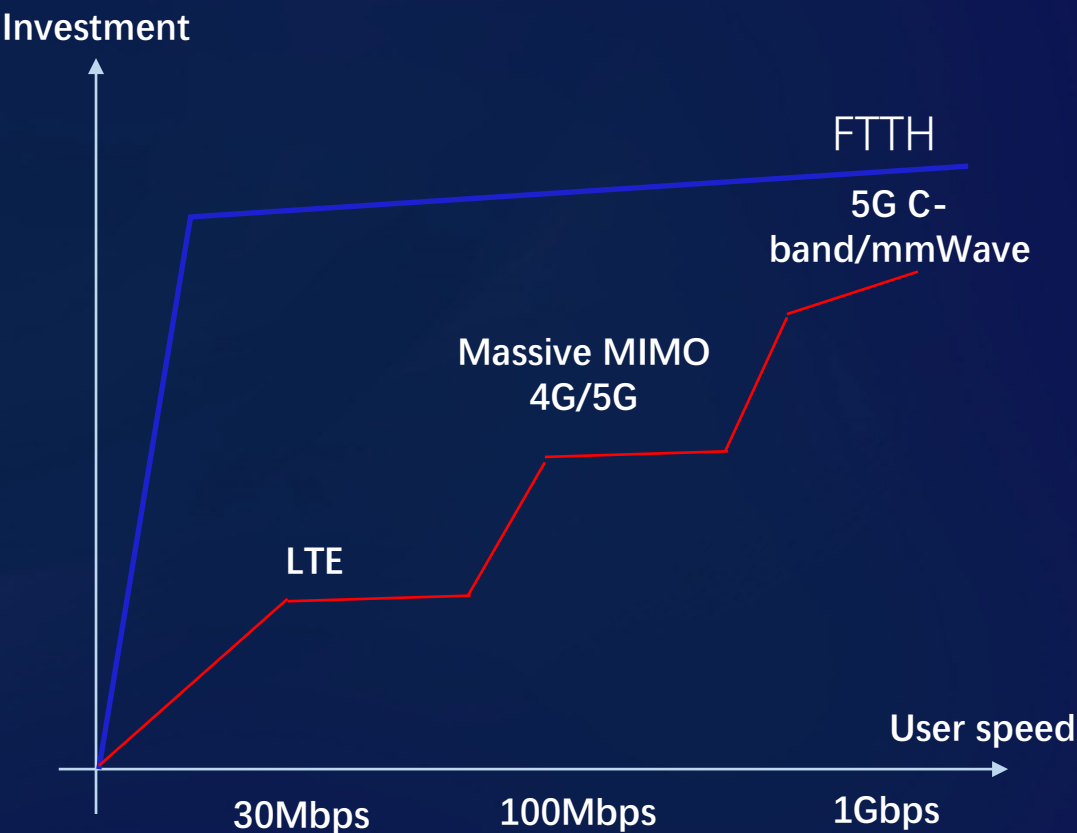
Source: Huawei 3-Cloud based on Ookla speedtest, 2021.03~2022.02

Fixed Wireless Comprehensive Comparison with FTTH

Comprehensive comparison between Fixed Wireless & FTTH-Rural Areas

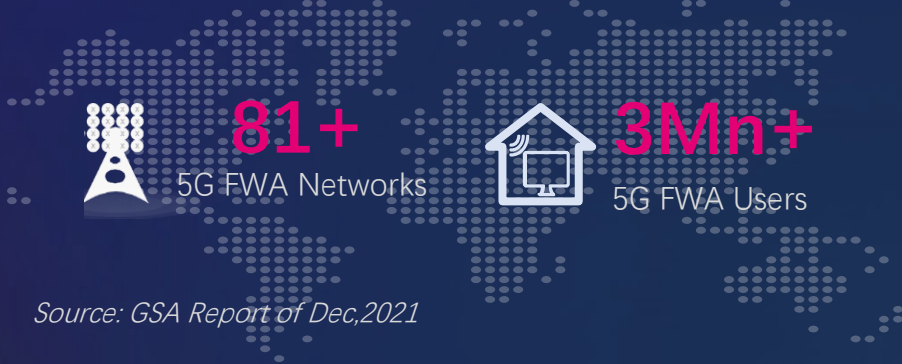


Speed on-demand & investment on-demand

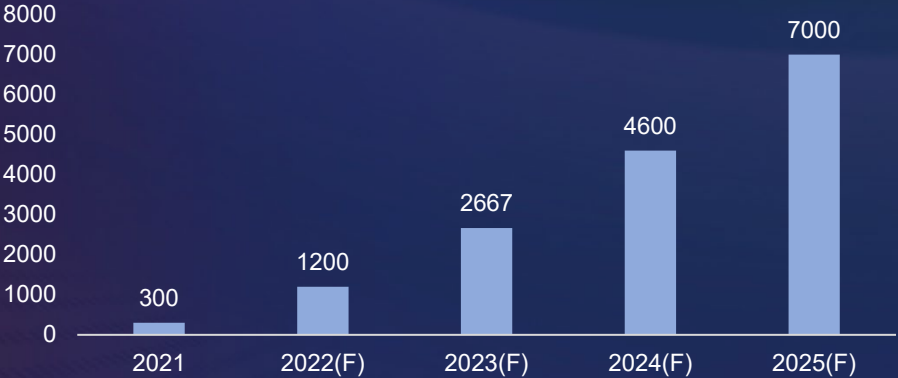


5G FWA Accelerates Home Broadband Users Growth

5G FWA Subscribers on the Fast Track

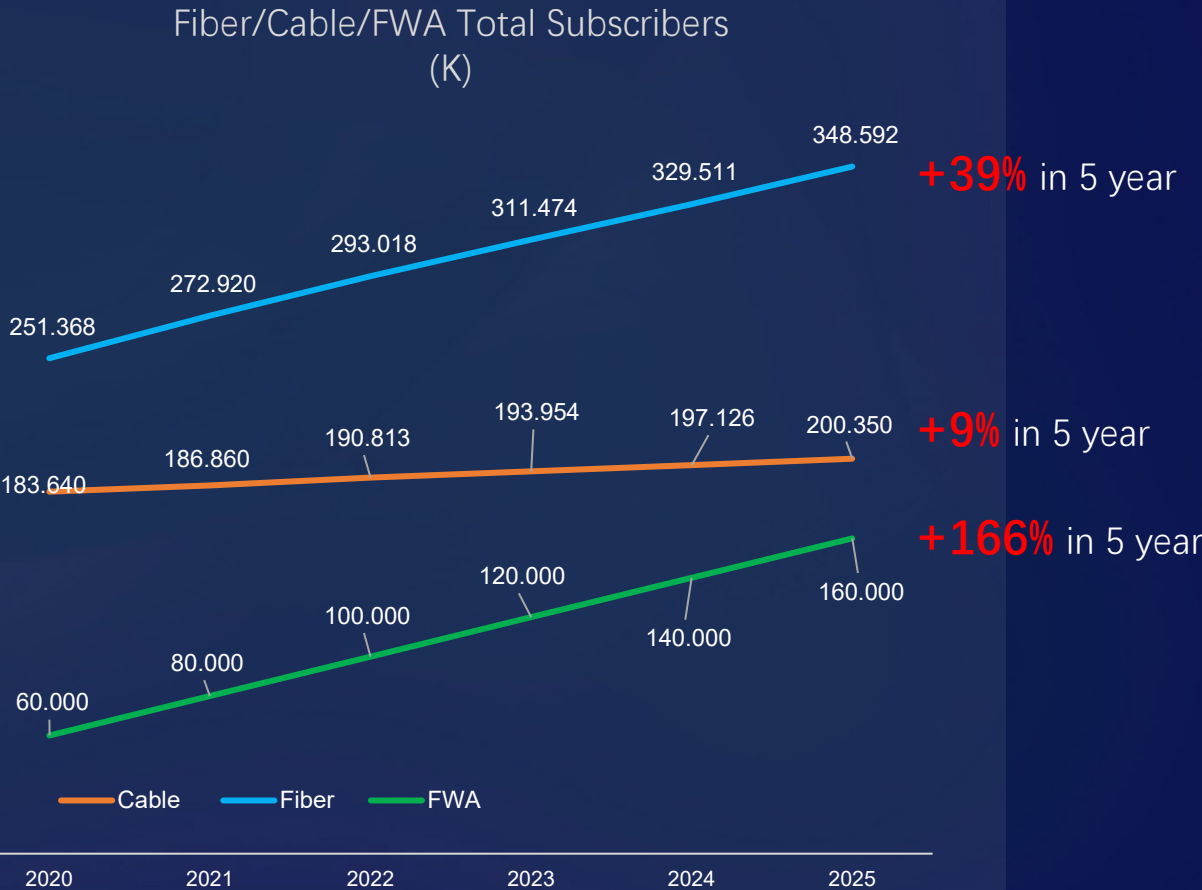


Global 5G FWA Subscribers (10K)



Source: Huawei MI

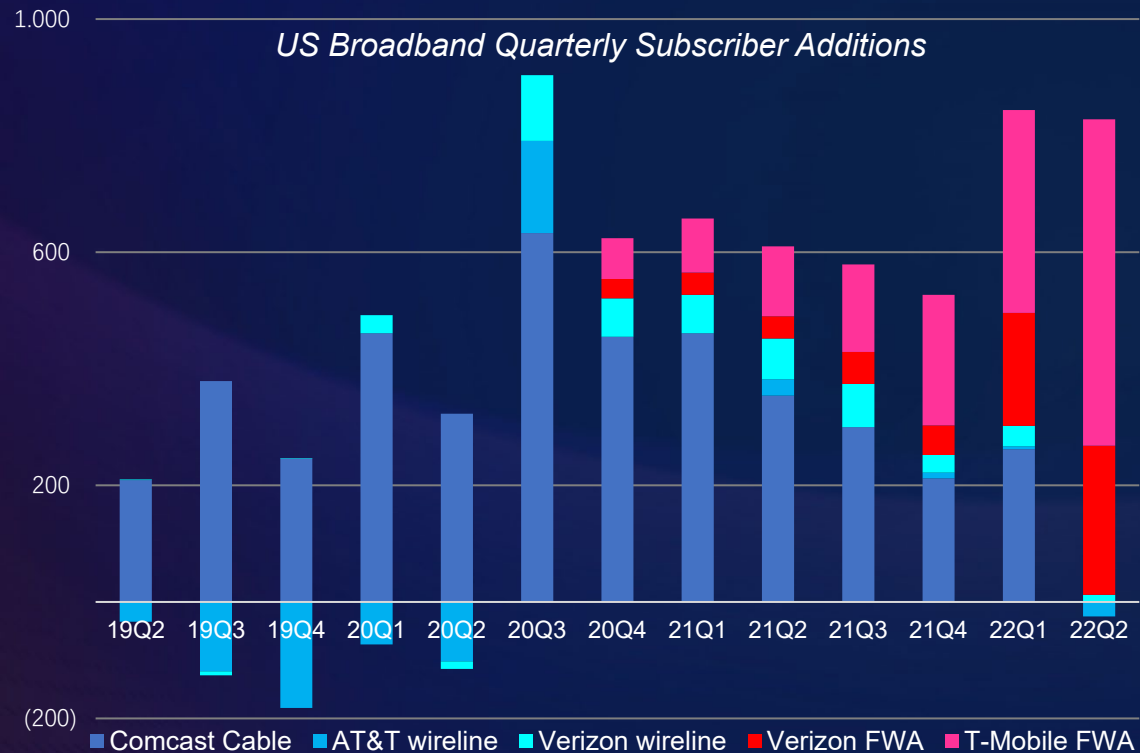
FWA Yearly New Subs Exceed Fiber and Cable



Source: OVUM, World excluding China

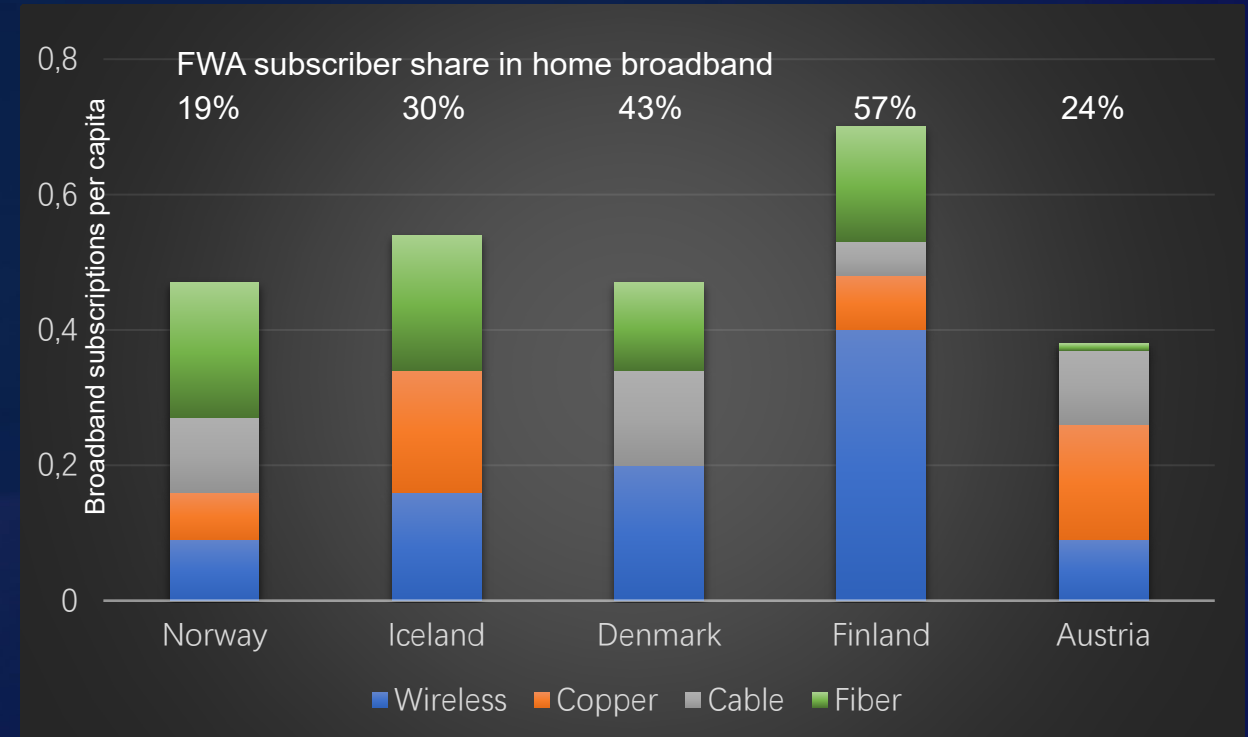
FWA Empowered by 5G is Going Mainstream in Both Europe & US

FWA empowered by 5G now accounts for 100% New broadband user growth in US market!



Source: Tefficient, Operator financial reports

Similar trend in Europe
FWA goes mainstream (selected countries)



Source: Finnish Regulator, Ovum

Affordable Terminal Fast Growing, Various Chipset Platforms Boosting Performance



Terminal: 120+ model now, ASP <200\$, Lowest <150\$

4G/5G FWA
Device Ecosystem
Company Directory
October 2021
GSA

ERICSSON, HUAWEI, NOKIA, QUALCOMM, ZTE, and many other logos.

GSA FWA Forum

Ecosystem: 40+ vendors, CPE need to IoT with Network

Timeline: 20, 21, 22

HISILICON
Balong 5000
SUL/NR CA(200M)

Qualcomm

X55, X62 NR CA (2CC,120M), X65 NR CA (3CC)

MEDIATEK

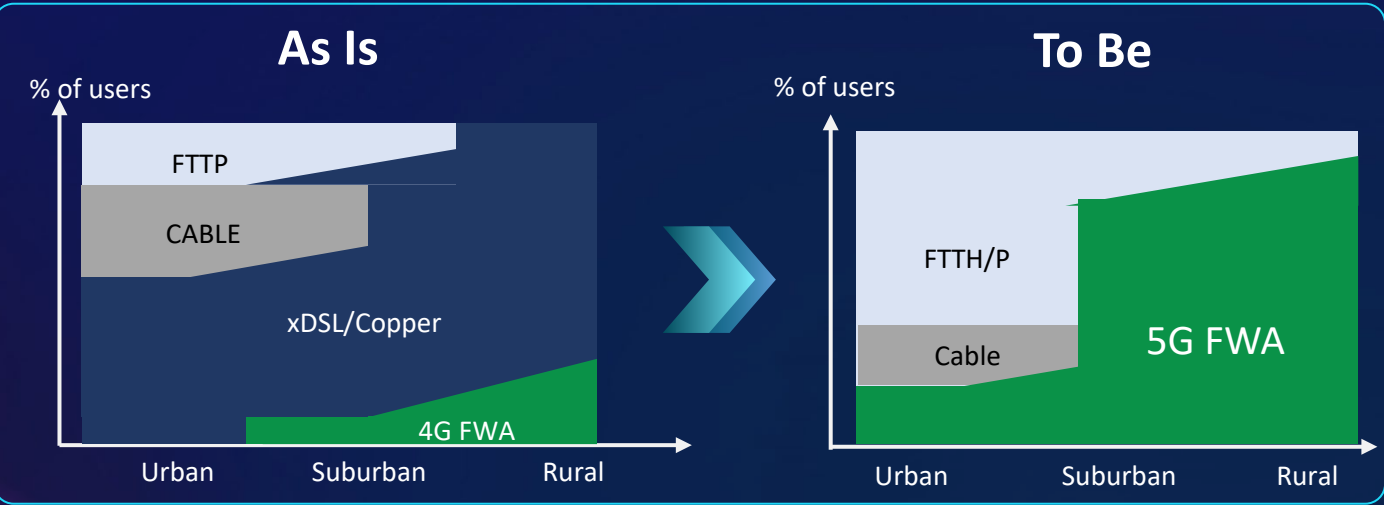
T750 NR CA(200M), T850(M80) NR CA(3CCM)/3T

UNISOC


V510 SUL, V520 SUL/3T

Chipset: All have FWA platform, NR CA widely available 2022


5G FWA and Fiber will Dominate the Home Broadband Market



5G FWA + Fiber for Copper Sunset




Norway Telenor: 5G FWA + Fiber for Copper Sunset



- 1. **OPEX Saving:** \$140Mn Saving/Y (~12% of fixed revenue)
- 2. **Duration:** 4 years, 2019.06~2022.12
- 3. **Progress:** 100K FWA users; Remaining 83K copper users

Czech Operator Quick win with FWA, and FTTH follow up in the city



Customer voice: "FWA is still an important HBB growth engine."


Step 3: Fiber deployment start from Dense urban

Step 2: Network firstly, build 5G network with capacity 3~5 years in advance, no need to worry capacity, aggressive 5G FWA launch, xK+ CPE / week now

Step 1: Accumulate home broadband user with 4G FWA + xDSL

5G FWA Cover Full Scenarios

Copper phased-out




- OPEX saving

Connect unconnected & Fiber Substitution in High CAPEX Area



- Develop New User



Bulgaria Telenor

Mobile only operator, aggressively develop user users

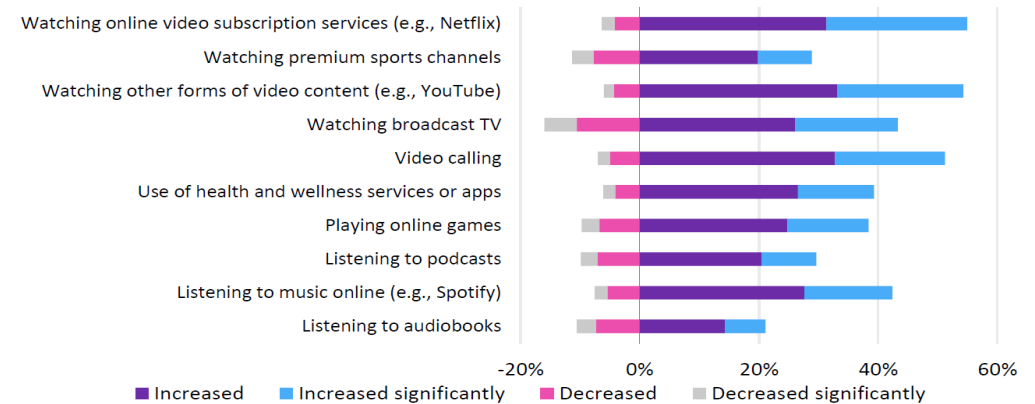
- Speed based, Unlimited Traffic Volume
- 50Mbps/100Mbps/300Mbps
- 5G CPE: €12 / €24

	up to 300Mbps	up to 25Mbps	
	Internet for home 50	Internet for home 100	Internet for home 300
No Bundle	€10	€12	€17
Bundled with Mobile	€8	€10	€15
Maximum download speed	up to 50 Mbps	up to 100 Mbps	up to 300 Mbps
Maximum upload speed	up to 10 Mbps	up to 20 Mbps	up to 50 Mbps
National MB per month	∞ (unlimited)	∞ (unlimited)	∞ (unlimited)
CPE Price	€1	€1	€1
One-time activation fee	€10	for free	for free
Online protection	for the term of the contract	for the term of the contract	for the term of the contract
Term of the contract	12/24 months	12/24 months	12/24 months

Improve Fixed Broadband Experience

Figure 1: Reliance on digital applications continues to grow

Change in use of digital applications, 2021



Note: Survey of 13,285 consumers in 13 countries

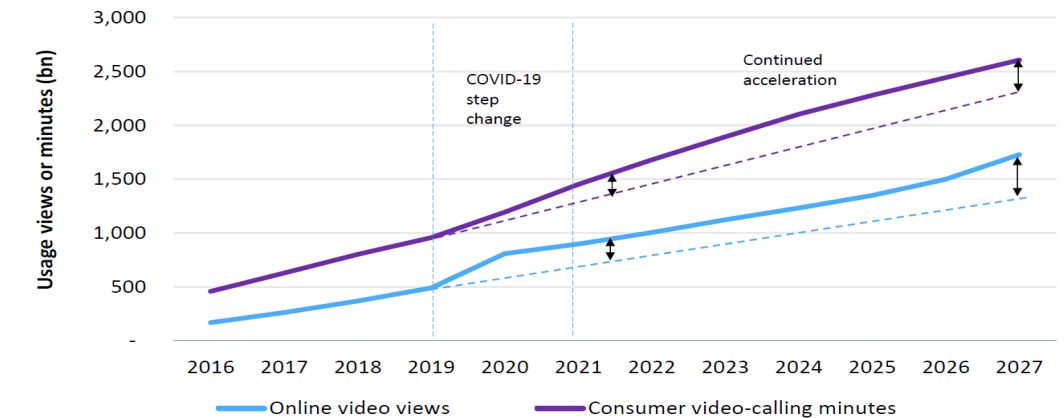
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Source: Omdia Digital Consumer Insights 2021

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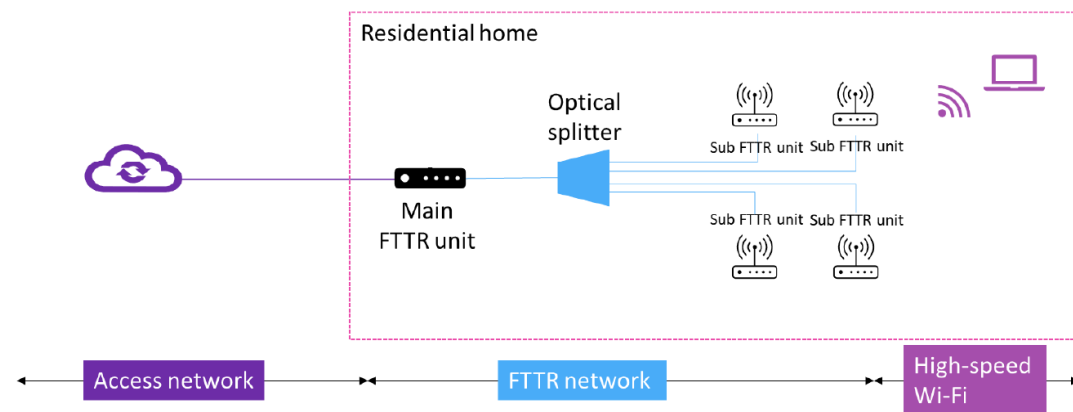
Figure 2: Growth in use of digital video applications continues through 2027

Global, online video views and consumer video-calling minutes, 2016–27



Source: Omdia

Figure 3: FTTR network schematic



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Source: Omdia

Table 1: Huawei's FTTR solution compared with a well-known retail mesh Wi-Fi product

Lab test	Mesh Wi-Fi solution	FTTR solution	Notes
Roaming signal strength change (score out of 20)	18	20	The signal difference before and after the FTTR roaming is small, which only affects the user bandwidth slightly and therefore has minimal impact on the experience
Roaming handover time (score out of 5)	4	5	The FTTR switching time is slightly lower and more stable than with the mesh Wi-Fi solution
Roaming game delay (score out of 15)	11	15	The maximum latency of the FTTR solution is 25% lower than that of mesh Wi-Fi
Video freeze during roaming (score out of 10)	6	10	Using QQ video as the test source, the test using FTTR froze four times less than it did with mesh Wi-Fi
Impact of mesh on rate capability	Attenuation 30%+	No obvious change	Rates of comparison nodes in the home coverage test
Mesh wireless speed test (score out of 10)	8	10	In the home coverage test, the FTTR performance was 60% better than that of mesh Wi-Fi

Source: Huawei

Extend to Differentiated Service: FTTR is the New Growth Engine for HBB

FTTH → FTTR Service Upgrade

Fiber Home Networking for Committed Gigabit Experience



FTTR: Fiber to the Room

+60%
ARPU

300/500M

FTTH

New Services
FTTR Design & Installation
FTTR Networking
Gigabit

FTTR

2.5M subs
end of Q3'22

31days >> **4**days
Time of 10K new users

Giga MBB

Giga FBB

Giga Wi-Fi

Carrier M
Asia **↑ 18.7%**

Carrier T
Asia **↑ 7.1%**

Carrier U
Asia **↑ 4.3%**

Overseas: 8 operators will launch FTTR service



Carrier A
Asia

Carrier T
Asia

Carrier C
Asia

Carrier G
Asia

Carrier O
Middle East

H1 Launched

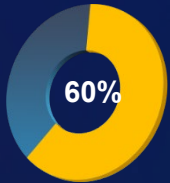
H2 to be Launched

Source: Internet

Improve High Quality of HBB, With 1Gbps Everywhere

Traditional HBB Challenge

Poor User Experience



BW: 100 M ↓



- Insufficient Wi-Fi coverage
- 60% Complaints Related to Wi-Fi

High OAM costs

\$50/time

- Wi-Fi not manageable
- Relying on home visit

Homogenization Competition

Now >90%



?%

Open Market (100+)

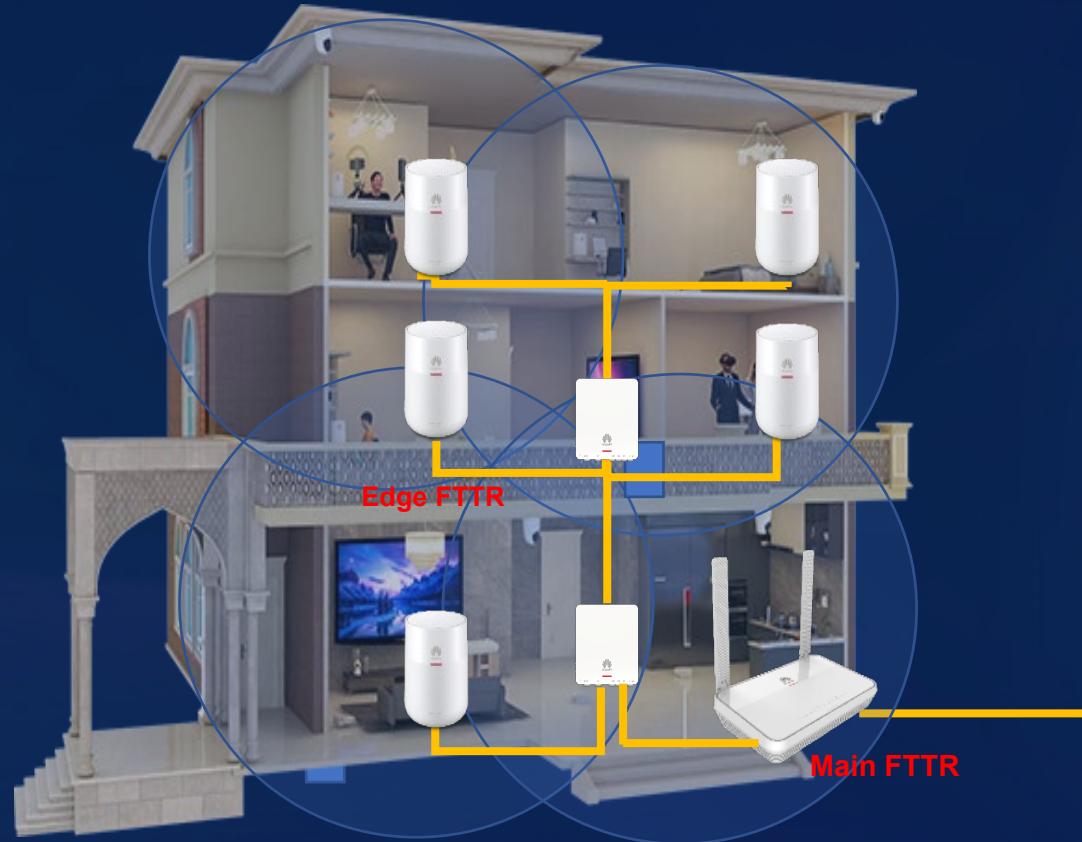
Operators Market

PLC / ETH Cable
Networking

FTTR
Networking

Huawei FTTR (Fiber To The Room) Solution

GIGA Wi-Fi Everywhere, Extreme Experience



Connections: 32 → 128

Wi-Fi >1 Gbps

Roaming: 200ms → 20 ms

Benefits with FTTR

Improving ARPU
0 churn

40% ↑

Lower OPEX
Fewer home visits

30% ↓

Lower Power
Consumption
Fiber vs PLC/ETH cable

30% ↓

Thank you.



Bring digital to every person, home and organization for a fully connected, intelligent world.

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