January 2022

Qualcomm

Reshaping mobile experiences

The Year of 5G mmWave

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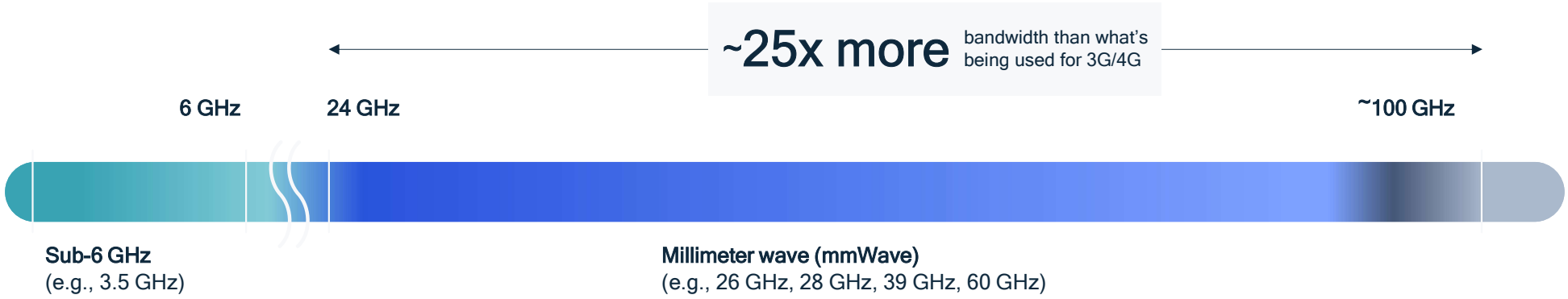
New frontier of mobile broadband — mobilizing 5G mmWave for vast bandwidth



Multi-Gbps data rates
With large bandwidths (100s of MHz)

Much more capacity
With dense spatial reuse

Lower latency
Bringing new opportunities

5G mmWave growing presence

Countries and regions with commercial mmWave deployments or spectrum allocation

Growing global momentum to deploy 5G mmWave

40+

Global mobile industry leaders commit to support 5G mmWave

United States
AT&T
Casa Systems
Motorola
UScellular

Latin America
Telecom Argentina
WEG

Europe
Deutsche Telekom
Elisa
Ericsson
Fastweb
HMD Global
Nokia
Orange
Telia Finland
TIM
Vodafone

India
Airtel
Jio

Japan
KDDI
Kyocera
NTT DOCOMO
Rakuten Mobile
SoftBank

Korea
ETRI
Informark
Innowireless
Partron
Samsung Networks

Mainland China
China Unicom
Honor
Oppo
TCL
vivo
Xiaomi
ZTE
Fibocom
Gongjing
MeiG
Quectel
Sunsea

Australia
NBN
Optus
Telstra

Rest of Asia Pacific
Chunghwa Telecom
Singtel
True Corporation

Source: Press release: "Global Mobile Industry Leaders Commit to Support 5G mmWave": https://www.qualcomm.com/news/releases/2021/06/28/global-mobile-industry-leaders-commit-support-5g-mmwave

GSMA mmWave Accelerator Initiative

Drive awareness of 5G mmWave technology

Share mmWave intelligence, best practices and use cases

Explore everyday business implementations and increasing education efforts around mmWave benefits

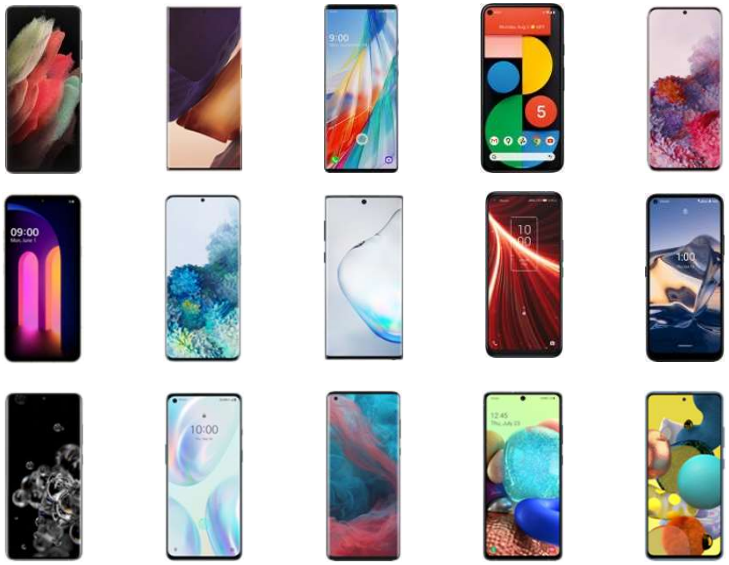
Steering Group Members

China Unicom
Ericsson
NTT DOCOMO
Qualcomm
Telstra
TIM
Verizon

Source: Press release: "GSMA Announces Formation of 5G mmWave Accelerator Initiative as part of Continued 5G Global Support": https://www.gsma.com/newsroom/press-release/gsma-announces-formation-of-5g-mmwave-accelerator-initiative-as-part-of-continued-5g-global-support/

Qualcomm Technologies continues to pave the way for 5G commercialization

5G smartphones



PCs

Hotspots

Modules

CPEs

Snapdragon is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.

* Source: GSA, Jun. '21. Includes pre-commercial and commercial devices. Complemented with Qualcomm Technologies' data when chipset information was not available from GSA.

5G Snapdragon

120+ 5G mmWave devices*

virtually all powered by Snapdragon ® Platform

Meet users where they are
& maximize returns and cost-efficiency

The high throughput and network capacity of mmWave can lead to near-term cost-efficiency in key environments:

5G mmwave

Superb monetization and ROI

From cost-effective deployment to monetization and new, incremental business potential, 5G mmWave can help drive growth and realize significant return on investment

mmWave scenarios' relative value proposition

↑8%
Incremental annual revenue

↑20%
Average ROI[1]

258M+ USD
New opportunity per year with FWA and laptops in offices

Up to 75% Savings
Cost/GB Savings for mmWave in hot zones compared to mid-band

94M+ USD
Monetization potential per year of `incremental traffic

<4 Years
Payback period[2] assuming marginal revenues

Source: Bell Labs Consulting, Sep. '21. Analysis for typical UK operator.
[1] Internal Rate of Return (IRR) over 4/8 years
[2] Except fixed wireless access, for which the payback period is ~5 years

Strategically deploy mmWave at high-density “hot zone” locations

Enabling significant revenue uplift opportunities

1M **Homes & SOHOs**

Underserved Homes/SOHOs

7,200 **Offices**

Offices w/ >70 Employees

150 **Train Stations**

>10k Daily Passengers

2,300 **Outdoor hotspots**

>5,000 sq. m GLA + other venues

400 **Indoor malls**

>5,000 sq. m GLA

85 **Stadiums**

>20K Seating Capacity

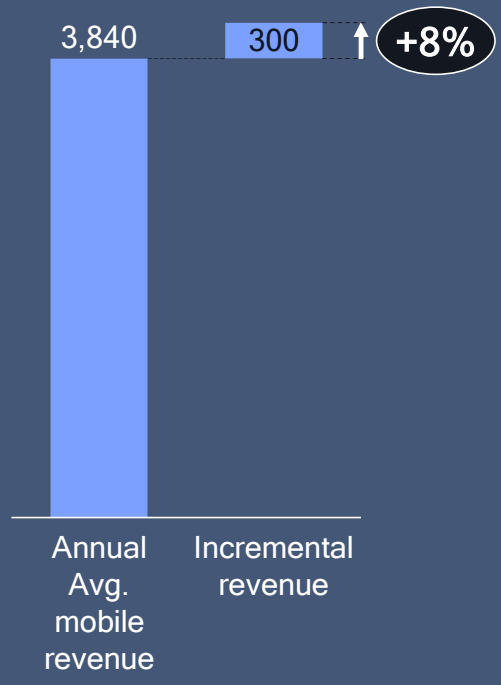
300

M Euros*

Incremental Revenue potential

(UK, Annual Avg. M Euros over 2021-26)

UK Operator Annual Mobile Revenue (M Euros/Year)



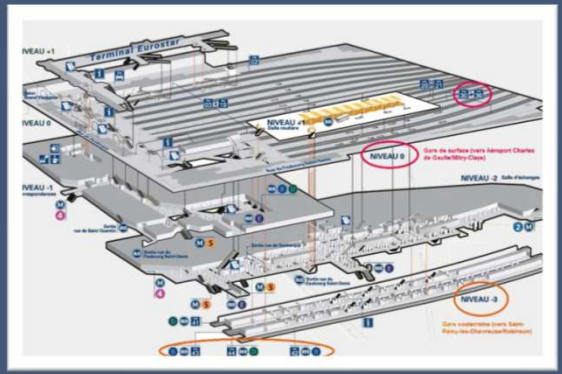
GLA - Gross Leasing Area

* Estimated for one operator with 30% market share

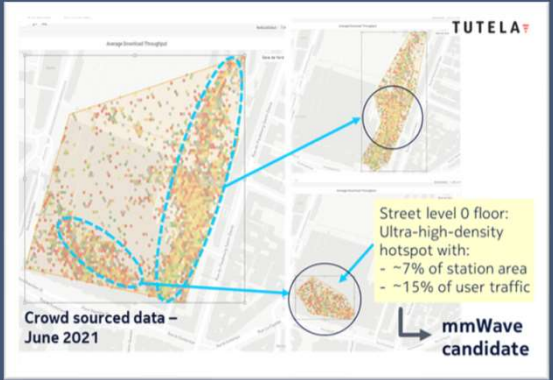
Source: Bell Labs Consulting, Sep. '21.

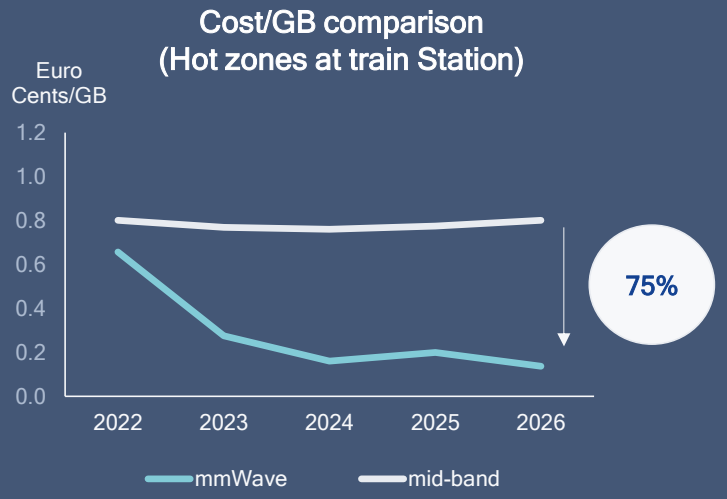
mmWave captures traffic cost-effectively vs. sub-6 at hot zones

Up to 75% less cost/GB vs. sub-6 GHz at hot zones in a busy train station



Hot-zones at the train station



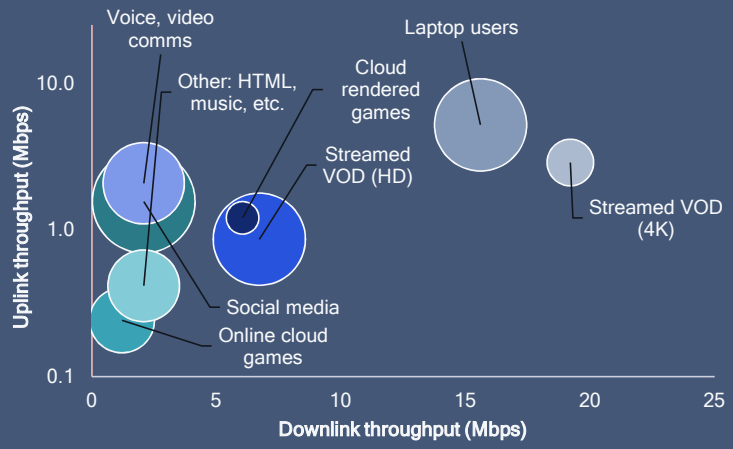


Source: Bell Labs Consulting, Sep. '21., www.gare-du-nord.paris, crowdsourced performance data provided by Tutela (tutela.com) from 1-30 June 2021

mmWave business case is highly attractive

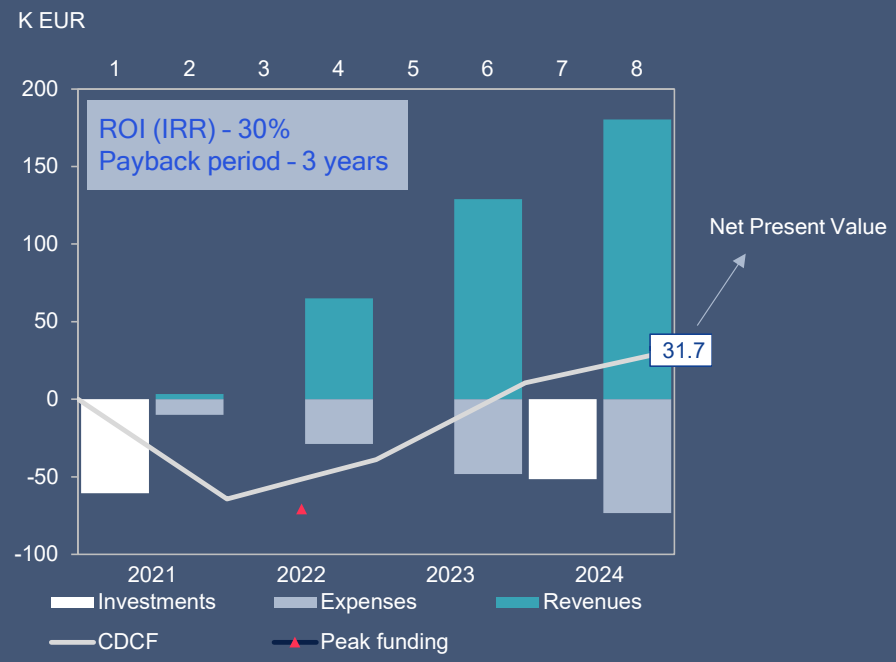
With payback period less than 4 years and ROI of 20-30% across high-density locations

End-user applications in a train station hot zone



Everyday applications with moderate technical requirements but simultaneous usage warrants mmWave capacity

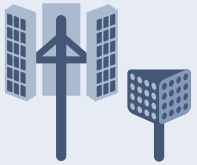
Business Case for hot zones at Train Station (Gare du Nord, Paris)



* ROI - Internal Rate of Return (IRR) over 4 years

Source: Bell Labs Consulting, Sep. '21.

mmWave +
Sub-6 GHz
=
Extreme capacity, multi-Gigabit 5G where it matters



mmWave +
Fixed Wireless Access
=
Fiber through the air for 5G-connected homes and more

5G mmwave

DEPLOYING MMWAVE TO

Complete the 5G puzzle

mmWave +
Open RAN
=
Easily scalable, flexible, high-performance 5G

mmWave + Sub-6 GHz +
Standalone
=
Critical infrastructure for industry 4.0 and more

Qualcomm

Thank you

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