December 4, 2018

Rome, Italy

Qualcomm

Innovation Culture

Enrico Salvatori
SVP and President
Qualcomm EMEA

Qualcomm

#1

Fabless semiconductor company

#1

In 3G/4G LTE modem

30+

Years of driving the evolution of wireless

804M

MSM™ chipsets shipped FY ‘17

Sources: Qualcomm Incorporated data, as of Q4 FY17; IHS, May ’18; Strategy Analytics, Mar. ’18. MSM is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.

Leading mobile innovation for over 30 years

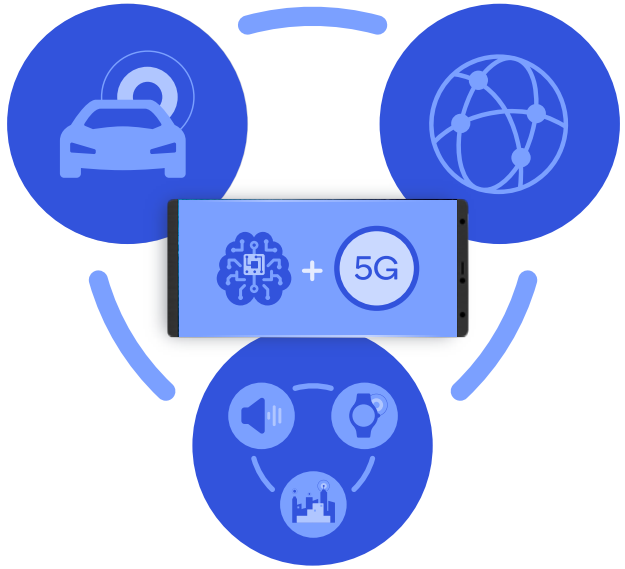
Digitized mobile communications

Analog to digital

Redefined computing

Desktop to smartphones

Transforming industries



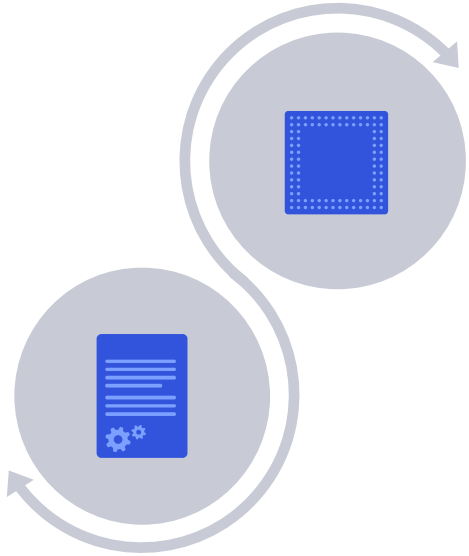
Connecting virtually everything

Redefining how the world connects, computes and communicates

A proven approach for growth and innovation

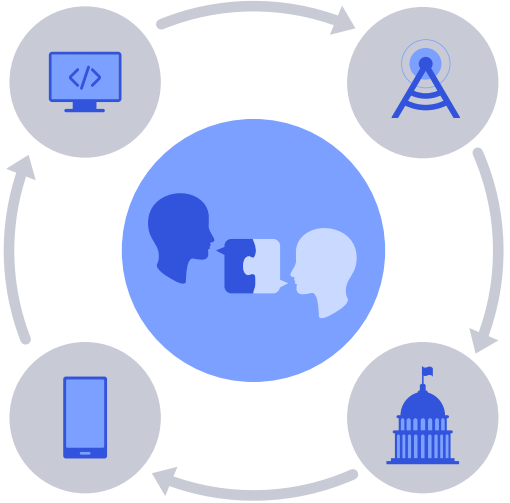
Invent

Continuously engineer
foundational technologies



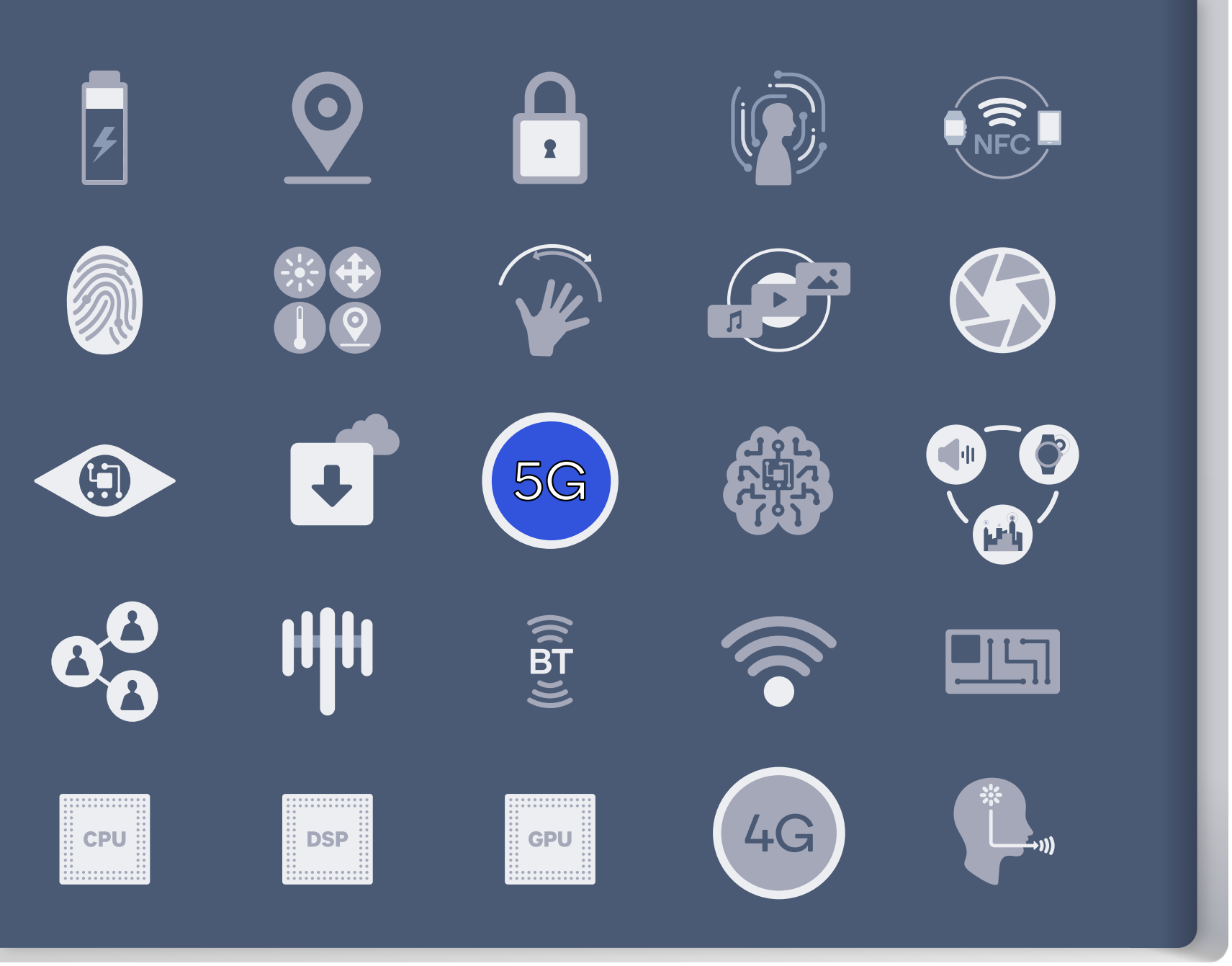
Share

Proliferate via technology transfer
Accelerate with chipsets, platforms



Collaborate

Support implementation
across the ecosystem

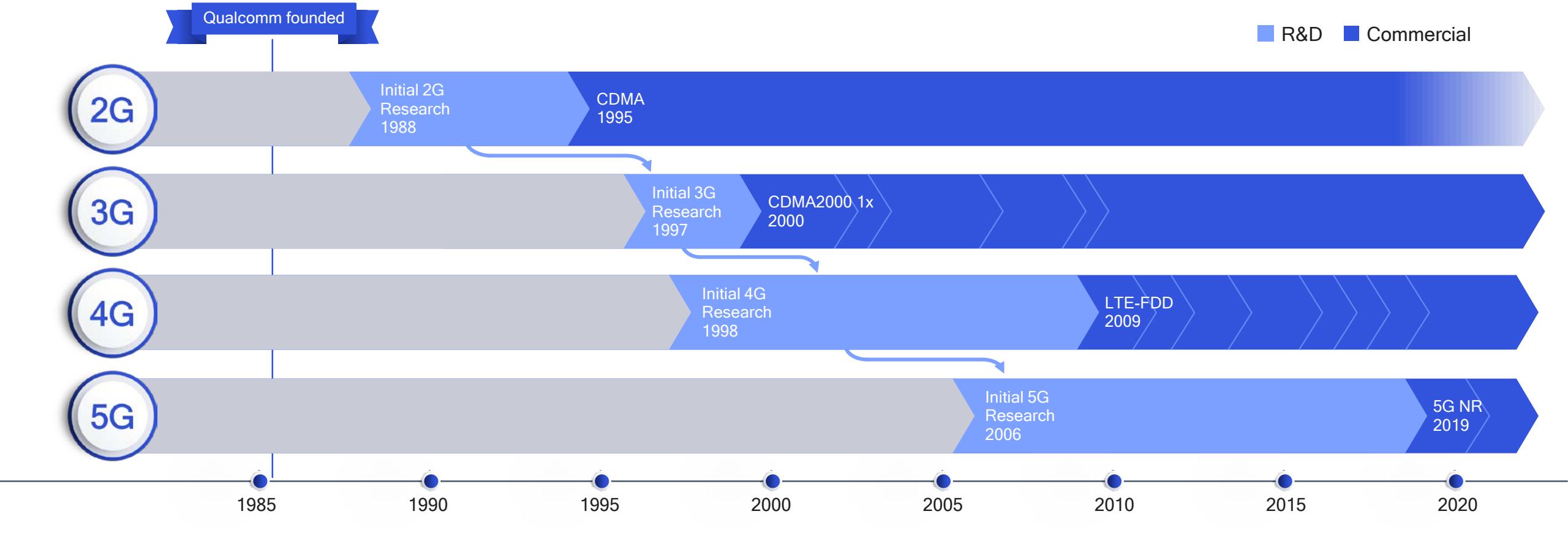


5G leadership comes from R&D

$53+ billion cumulative investment in R&D

Source: Qualcomm data, as of Q3 FY18

Continuously fueling mobile innovation



New technology generations can take a decade of R&D, collaboration, and ecosystem development before returns are possible

A unifying connectivity fabric for society

5G NR pioneering advanced 5G NR technologies

To meet an extreme variation of 5G NR requirements

Mission-critical services

Cellular Vehicle-to-Everything (C-V2X)

Drone communications | Private Networks

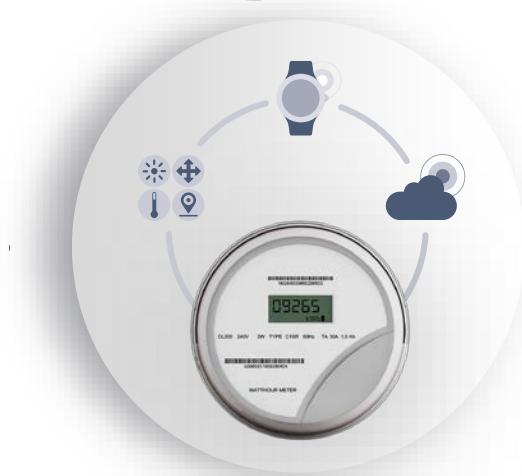
Ultra Reliable Low Latency Comms (URLLC)

Enhanced mobile broadband

Spectrum sharing | Flexible slot-based framework

Scalable OFDM | Massive MIMO | Mobile mmWave

Dual Connectivity | Advanced channel coding | VR/XR



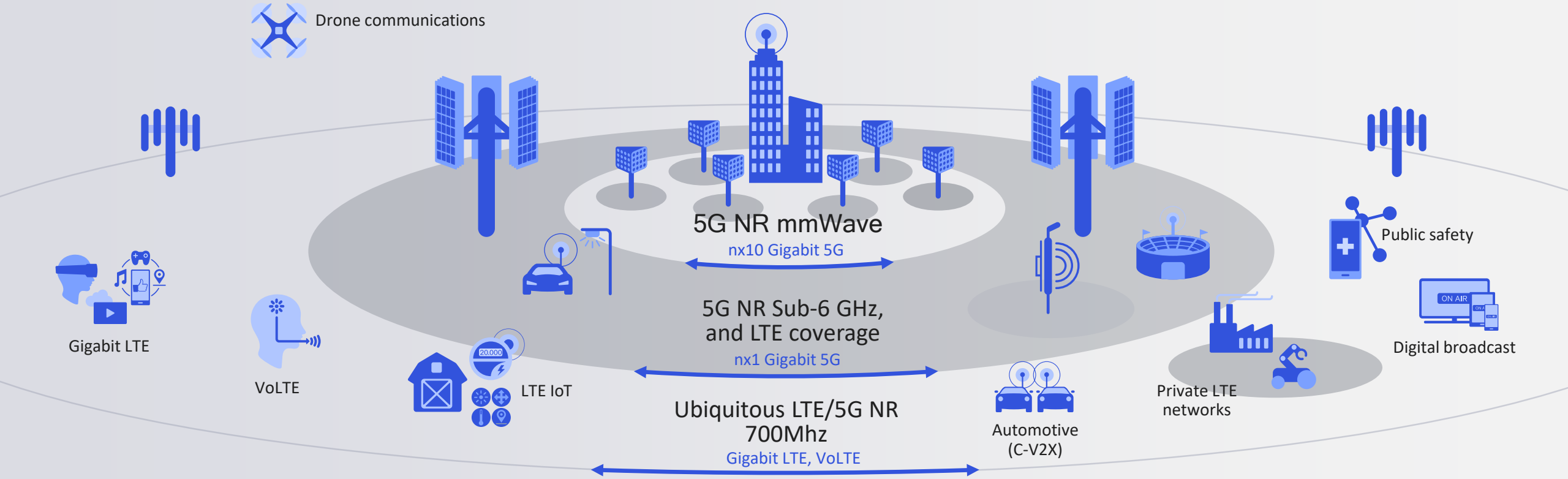
Massive Internet of Things

Enhanced power save modes

Deeper coverage | Grant-free UL

Narrow bandwidth | Efficient signaling

5G NR Overlay with LTE Advanced



World’s first 5G NR milestones led by Qualcomm Technologies

ZTE中兴

World’s first interoperable 5G NR sub-6 GHz data connection

November 2017

ERICSSON

World’s first interoperable 5G NR mmWave data connection

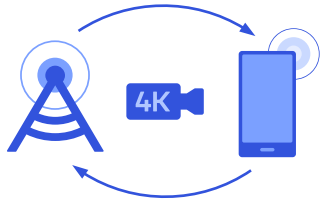
December 2017

NOKIA

Successful multi-band 5G NR interoperability testing

February 2018

SAMSUNG HUAWEI



GSMA MOBILE WORLD CONGRESS

Interoperable 5G NR sub-6 GHz & mmWave connections with 5 vendors

MWC 2018

大唐移动 DTmobile

5G NR interoperability testing preparing for the Chinese mass market

June 2018

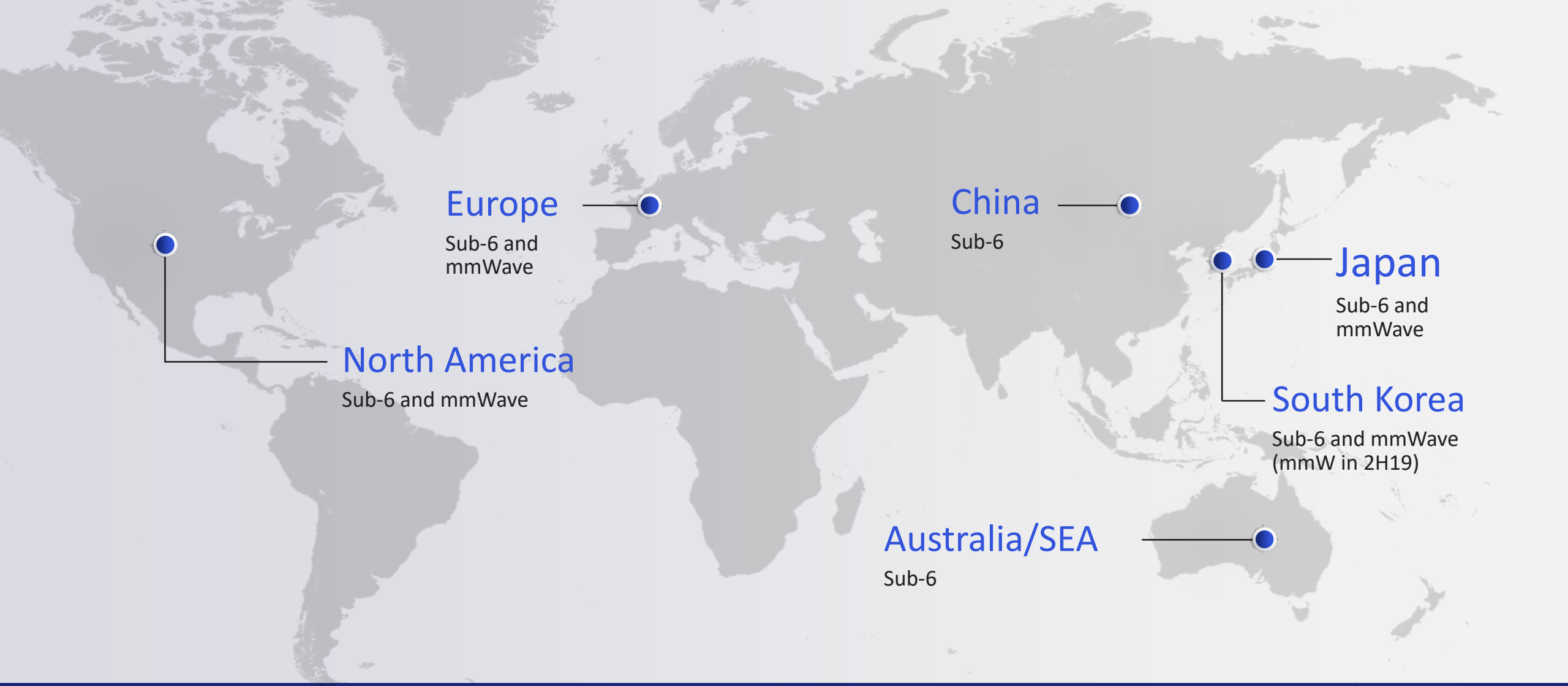
Qualcomm snapdragon X50 5G modem

Rel-15 5G NR trials based on Snapdragon X50 modem chipset

2H-2018

Driving the 5G ecosystem towards 2019 launches in collaboration with 20+ global mobile network operators and 18+ device manufacturers

Global mobile operators select Qualcomm® Snapdragon™ X50 5G modem for mobile 5G NR trials



5G will be a commercial reality in 2019

5G Spectrum in Europe

Focus on mid-band (3.4–3.8 GHz) and 26 GHz (24.25-27.5 GHz) for 2018+

Band	Auction
• 3.4 - 3.6 GHz (150 MHz)	Done/2018
• 3.6 - 3.8 GHz (120 MHz)	Q4 2019
• 26.5 - 27.5 GHz	2020

Band	Auction
• 3.6 - 3.8 GHz	Done/ 2018
• 26.5 - 27.5 GHz	Done/ 2018

Band	Auction
• 3.46 - 3.8 GHz	Q4 2019
• 26 GHz	2020

Band	Auction
• 3.6-3.8 GHz	Done/2018
• 26.5 - 27.5 GHz	2020

Band	Auction
• 3.4 - 3.8 GHz	Jan. 2019
• 26.5 - 27.5 GHz	2022

Band	Auction
• 3.4 - 3.8 GHz	Done/2017

Band	Auction
• 3.4 - 3.8 GHz	Feb. 2019
• 26 GHz	2020

Band	Auction
• 3.4 - 3.7 GHz	Q1 2019
• 26 GHz	2019

	Auction
• 3.4-3.8 GHz	Rostelecom
• 26 GHz	Q1 2019

Band	Auction
• 3.4 - 3.8 GHz	Done/2018
• 26 GHz	2020

Band	Auction
• 3.4 - 3.8 GHz	H1 2019
• 26 GHz	2019

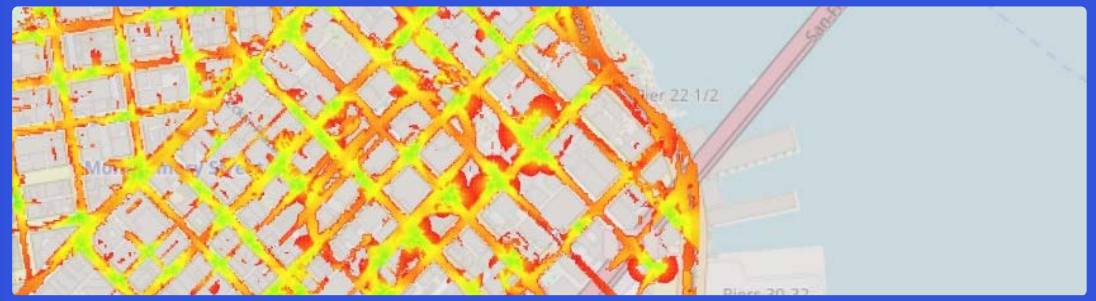
San Francisco simulation

65%
Outdoor coverage

1.4 Gbps
Median burst rate

5x
Increase in capacity

Collaborating with global operators to simulate 5G NR mmWave capacity and coverage



- Significant outdoor coverage possible utilizing actual existing LTE sites (10+ global cities)
- Will further benefit from LTE infrastructure (LAA small cells) to support Gigabit LTE launches
- Outdoor coverage only; frees up sub-6 GHz resources for out-to-indoor capacity
- Based on our extensive over-the-air testing and channel measurements

Compared to Gigabit LTE only with additional 800 MHz spectrum in 28 GHz; 2 Cell edge defined as 0.4 bps/Hz = 320 Mbps for 8x100 MHz channel bandwidth

Qualcomm

Thank you

Follow us on:

For more information, visit us at:

www.qualcomm.com & www.qualcomm.com/blog