Welcome to the 5G age
Mobile technology is powering the global economy

$12 Trillion in goods and services by 2035
Meeting the soaring demand for data

Mobilizing 5G NR enhanced mobile broadband for smartphones in 2019

Growth in mobile data traffic (2014-2020)

Source: Nokia Bell Labs Consulting Report, 2019
World’s first announced 5G data connection on a 5G modem chipset for mobile devices

Qualcomm Snapdragon® is a product of Qualcomm Technologies, Inc.
Making 5G NR a commercial reality
Preparing for 2019 deployments

5G NR Standards
Interoperability testing and trials

LTE foundational technologies

5G NR Standards-compliant products
Leading the way on 3GPP-compliant trials 5G NR

In collaboration starting 2nd half of 2017 with...

Interoperability testing and trials at sub-6 GHz and mmWave
Complexity of mobile RF systems is accelerating

5G impacts RF Front End design

- Many more spectrum bands/types
- Advanced wireless technologies
- More diverse deployment scenarios
- A much wider variation of use cases

Number of RF bands and band combinations
By technology generation

<table>
<thead>
<tr>
<th>Generation</th>
<th>Early 4G</th>
<th>4G today</th>
<th>4G carrier aggregation combinations</th>
<th>Early 5G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of RF bands and combinations</td>
<td>16</td>
<td>49</td>
<td>&gt;1,000</td>
<td>&gt;10,000</td>
</tr>
</tbody>
</table>

Source: Qualcomm Technologies, Inc. internal analysis
5G NR in a smartphone?

Challenge accepted
LTE advancements are essential to 5G

Foundational technologies enable expansion of mobile ecosystem
Epic speed for connected apps, cloud access to files

Faster connections in congested areas*

Make the most of unlimited data

Gigabit LTE

Double the antennas for a strong signal

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*Based on the use of 6x6 MIMO, 256-QAM and LTE-U/LAA technology, which increase network capacity in dense areas.
Gigabit LTE
Global phenomenon

40
Operators

1.2B
Connections served

24
Countries planned or trialed
Gigabit LTE. Only on Android.

Great apps are even better with Gigabit LTE

- Google Drive
- Google Photos
- YouTube
- Google Play Music
Mobile technology is transforming industries

4G, 5G and connectivity convergence

- Automotive
- Mobile PC
- IoT
- Networking
Future of automotive

Intelligently connected
Increasingly electric
Efficiently shared
Increasingly autonomous
Connecting vehicles to everything with Cellular V2X

- Vehicle-to-infrastructure
- Vehicle-to-network
- Vehicle-to-vehicle
- Vehicle-to-pedestrian
Meet the Always Connected* PC

Windows 10

QUALCOMM®

Beyond all-day battery life
Virtually always on, always connected*
Sleek, innovative designs
The Windows 10 you know

*Requires Network Connection
Qualcomm Technologies is at the heart of the IoT ecosystem

>1.5 Billion

IoT devices shipped using Qualcomm Technologies' chips

*Qualcomm Technologies, Inc. data, as of May 23, 2017; includes products from Qualcomm Technologies, Inc. and Qualcomm Technologies International, Ltd.*
Over 20 mobile operators committed to deploy Cat-M1 and/or Cat-NB1 networks.

Expanding the mobile ecosystem with LTE IoT

- **Cat-M1 (eMTC)**
  - Higher throughput, mobility, VoLTE

- **Cat-NB1 (NB-IoT)**
  - Lower cost, larger coverage, 2G migration

Transforming connectivity in the home
Advancing the mesh Wi-Fi revolution

Bringing mesh networks to broadband carriers

- Facilitating first step to a wireless broadband reality
- Creating a carrier-grade mesh platform
Leading the world to 5G