

The State of 5G



If you happen to notice the top left-hand corner of your mobile device, a subtle string of ever-present figures and symbols lurks, likely reading “4G LTE.” This has remained the same series since roughly 2009, begging the question, what’s next?

Each advancement of the modern wireless network has brought distinct change: The first presented in the late 1980s, allowed for analog cellular; 2G delivered voice transmission on an international stage – a global system of mobile communications (GSM). Fast-forward and 3G made the app revolution possible, followed by our present network, 4G, which brought a radical increase in speed.

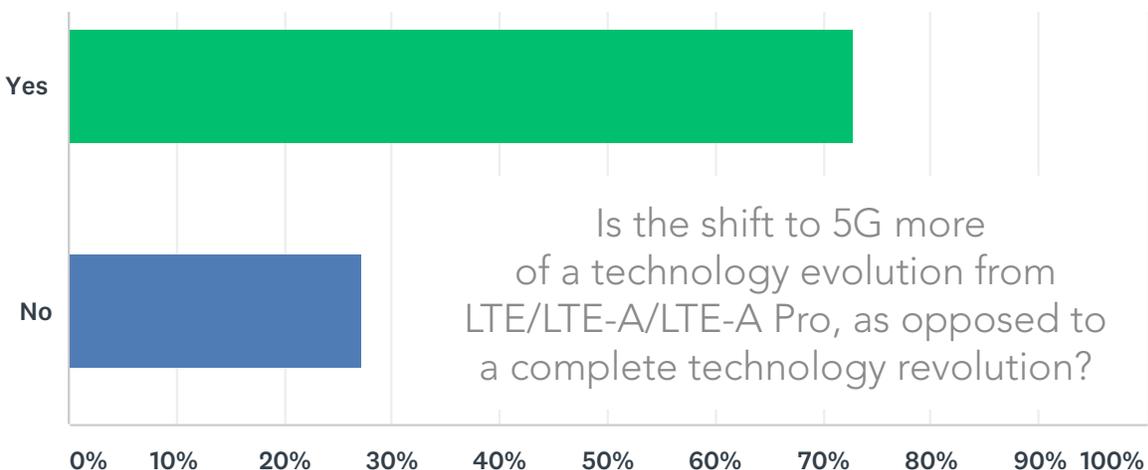
Compared to 4G, the fifth-generation mobile network is expected to produce three primary use cases, with the capacity to move more data, be more responsive, and connect millions of devices at once. More specifically, this includes enhanced mobile broadband (eMBB), ultra-reliable, low latency communications (URLLC) – minimal buffer times – and increased connectivity, allowing billions of devices and applications to come online seamlessly and communicate simultaneously thanks to Massive Machine Type Communications (MMTC).

“Transformative.” “Revolutionary.” “Instantaneous.” These are just a few bold adjectives associated with this hypothetical technology. The ambition associated with 5G cannot be denied or understated. An article in AdWeek this June went so far as to say: “This Shift from 4G to 5G Will Change Just About Everything.”

Fulfillment of these lofty goals is contingent on a wide variety of factors and stakeholders. Some experts say this process will take years – others are more bullish, expecting a near-immediate roll-out of 5G infrastructure, technology, and functionality.

It is with such incongruent industry feedback – the high hopes and the skepticism – that we set out to survey the wireless ecosystem from manufacturers, operators, test houses, and labs, service and repair specialists, network maintenance and installation professionals, and more to get a thorough status report on 5G.

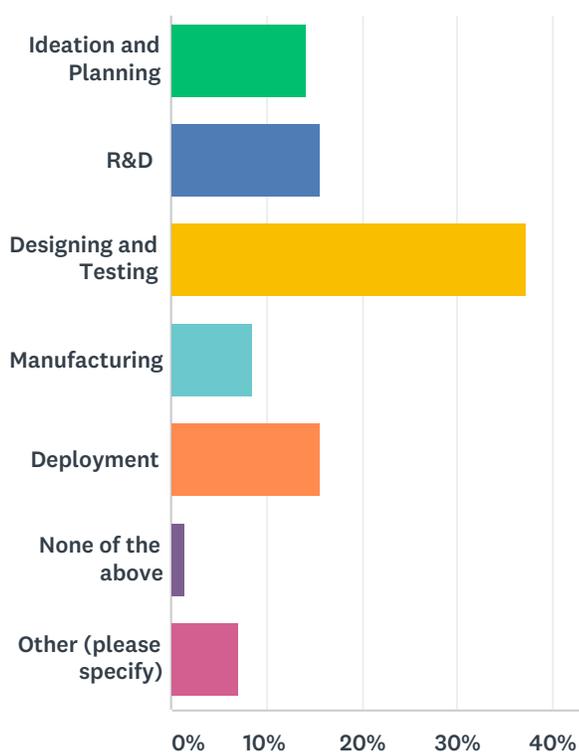
What we discovered was that after years of hype around cutting-edge network technology, gigabit speeds, and performance advancements beyond our wildest imaginations, 5G networks are, indeed, expected to launch globally by 2020, and that industry insiders are in agreement (72.86 percent) that the shift to 5G represents a steady and achievable evolution from LTE, rather than a complete technology revolution.



UNPACKING DEVELOPMENT LIFECYCLE REQUIREMENTS

This June, the 3GPP – an international group that governs cellular standards – officially signed off on the standalone 5G New Radio (NR) spec, representing a major step toward next-generation cellular networks. This event followed last December’s completed standard for the non-standalone version of 5G NR. Meanwhile, the International Telecommunication Union – an arm of the United Nations that oversees telecommunications around the world – stated that to qualify as 5G, a network must deliver a minimum peak data rate for downloads of 21GB/sec and an uplink peak data rate of 10GB/sec.

At what stage in the 5G development lifecycle are we currently in today based on your company’s current actions and perceptions?



With these guidelines and goalposts, the industry scurried along to build the necessary hardware, infrastructure, chips, modems, phones, and antennas for 4G’s successor.

As we set out to address the development lifecycle requirements for 5G to become a reality, the bulk (37.14 percent) of stakeholders agreed – based on current actions and perceptions – the industry is in the testing and design phase today. What’s important to note is that much of 5G is being built upon technology elements introduced in 4G, hence the evolutionary approach to this iterative process.

Some respondents (15.71 percent) believe we have already reached the deployment stage of the 5G lifecycle. This, perhaps, comes as a result of early trials and pre-5G technologies presented by organizations, mainly Verizon, Intel, and Qualcomm. Indeed, Korea Telecom claimed it would deploy 5G this year for the Winter Olympics. Of course, these tests remain a far cry from delivering a wireless infrastructure to the masses.

To account for the various stages of development and deployment survey respondents attributed lag time to the following: Incomplete specifications, a lack of available chipsets and components, an inability to overcome manufacturing production hiccups, a lack of consumer demand, cost, network complexity, and a lack of applications or services.

“There is a smattering of all of the above since 5G is coming out piecemeal and there is no coherent industry definition of what constitutes 5G,” one respondent shared.

Striking a balance to achieve a new, complex architecture, surely, isn’t an overnight project.

DEPLOYMENT

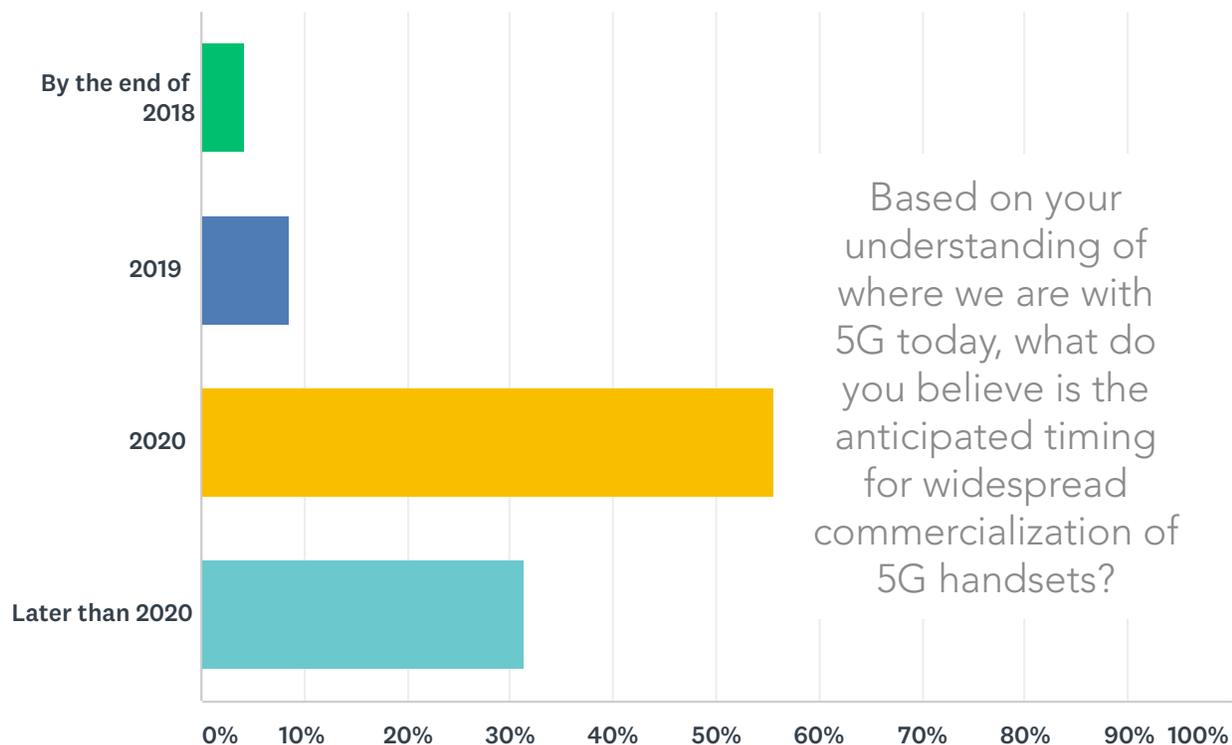
With all the scuttlebutt surrounding the launch of 5G, the race has pitted company against company, regulation against regulation, nation against nation. In a study contracted by U.S. wireless trade association, CTIA, telecom analyst Roger Entner concluded that America's 4G leadership resulted in nearly \$125 billion in the U.S. alone.

This time around, China, South Korea, the U.S., and Japan are said to be leading early rounds, with carriers in the U.S. targeting 2020 for a widespread launch. In fact, our survey indicated that 55.71 percent of industry members expect 5G's roll-out to transpire in 2020.

Across the map, wireless technology giants are coordinating with their governments to win the race to implement 5G, while carriers are striving

to bring these next-gen networks to market. Survey results illustrate that mobile telecom companies (55.71 percent) are leading the technology cycle, followed closely behind mobile network suppliers (47.14 percent) and chipset suppliers (42.86 percent). Most believe this mirrors the industry participants who led the 4G/LTE development and deployment process.

AT&T, which marketed its "5G Evolution," network in 2017 – a product which, despite its name, was not, in fact, 5G – more recently promised to roll out 3GPP-standard based 5G using "mmWave" in multiple U.S. cities. Meanwhile, Verizon is working on a broadband service for a smattering of U.S. cities before this year's end, and announced its first 5G compatible phone, the Motorola Moto Z3, expected to drop sometime next year. This is meant to replace fixed broadband, not mobile service.



On the hardware side of the business, both Intel and Qualcomm have introduced 5G modems along with other infrastructural elements to support trials rolling out this year and next.

American officials have said that winning the 5G race is critical both to the economy and national security, hence its effort to curb Chinese wireless-electronics company, Huawei, among others.

“I think the U.S. has taken the early lead in the deployment of 5G,” one survey respondent said. “But it will be interesting to see if that continues to be the case. The Chinese government has stated they want to be the world leader in 5G technology. The race is on!”

WHAT WILL IT TAKE TO MAKE 5G A SUCCESS STORY?

While many things on the road to 5G are uncertain, it is easy to envision the emergence of new and innovative use cases. When a new generation of technology makes its debut, experts often spin tall tales of overblown use cases, and 5G is no exception. The question is, what use cases will necessitate 5G?

“Everybody will drive a flying car with their VR headset,” wrote one survey respondent.

Depending on who you ask, 5G will be something to everyone: A unified interface providing gigabit speeds and sub-second latency, supporting distributed architecture and intelligent edge, using both licensed and unlicensed spectrum, and more.

Mobile broadband capacity falls near the top of the list, as 5G will offer higher data rates and capacity achieved by using more radio spectrum and higher spectral efficiency, eliminating congested networks, buffering or wait-time for loading, even in urban environments.

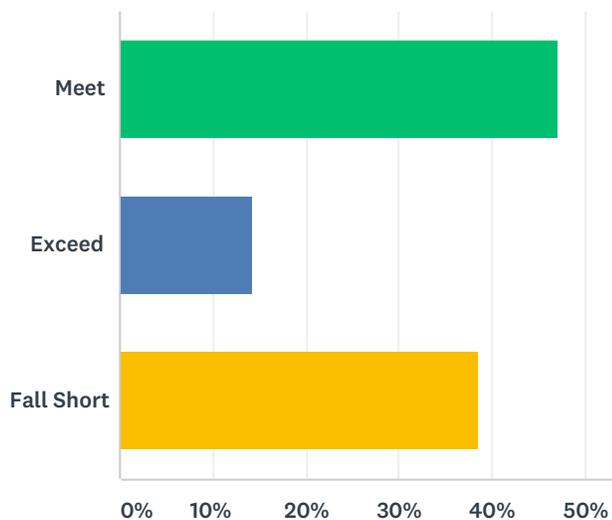
“As devices become more readily available, I think you will see 5G as an offload strategy in dense urban areas,” another survey respondent shared. “I think this type of deployment, if fairly straight-forward, and will likely be the first use case. But based on what I’ve heard and read, the use case carriers seem to be most excited about is Fixed Wireless. The deployment timeline of “mmwave” is going to be very challenging.”



Another new function anticipated with the birth of 5G is “network slicing.”

Slices are virtual networks tailored to specific applications, with multiple slices available on the same network infrastructure. 5G aims to offer new possibilities for innovations such as connected cars, improving networking between vehicles and infrastructure for automated driving functions. As an example, Nokia and BMW have shown use cases enabled by 5G network slicing. One slice is used to update HD maps by guaranteeing a defined data rate over time intervals, while a second slice exchanges time-sensitive data between cars with reliability and low transmission

Given the 5G marketing hype over the past few years, do you feel 5G will meet, exceed, or fall short of expectations?



latency, necessary for automated driving.

The real excitement over 5G comes with new uses, from the intimate to the global – involving sensors, transmitters, and cloud-based software – that aren’t possible with today’s networks.

CONCLUSION

When asked why 5G matters and who will benefit the most, our survey participants were split on their responses.

“5G can be transformative, but operators need to find a business model that works before people will reap benefits.”

Indeed, 47 percent of participants said they expect 5G to meet their expectations looking ahead.

“It only matters for density,” one said. “4G can handle much of what 5G promises for years still. 5G will matter only in increasing bandwidth and eventually, latency for the increase in network loading.”

Ultimately, 5G will significantly impact individuals, industries, and infrastructure, blurring boundaries and expanding that which is possible technologically.

“As networks grow and use cases mature, those exotic apps may become the next phase of 5G,” one respondent cautioned. “Until the devices and network rollout hit their stride in 2020, be careful not to allow marketing jargon to confuse you in your buying decisions.” ●

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