

## What Your Smartphone Would Be Without Patents



Written by: [Roger Martin](#)

Senior Vice-President, Chief IP Strategist

[Qualcomm, Inc.](#)

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Each morning as I wake up, I roll

over and reach for my smartphone. I don't have to reach far because I charge it overnight on my bedside table. As I pick it up and scroll through the emails and news that came in overnight, look at my calendar for the day and check the weather, I yawn and stretch and finally put my feet on the floor. Walking out of the bedroom and toward the [kitchen](#) to get my coffee,

I'll keep reading and browsing through items that interest me, and deleting the messages that don't. After letting the dogs out, I'll sit down at the table with my mug of hot coffee and my smartphone and continue getting informed and organized until the mug is empty. I might check Facebook, Twitter, watch a YouTube video or two, and check the traffic along my route to work. Maybe I'll even text my workout [partner](#) and let them know I'm running a little late this morning. Because I'm a creature of habit, I'll repeat this routine day after day without thinking much about it. It probably sounds familiar to you.

But the other morning, I did stop to think about it. I asked myself how this device called the "smartphone" – which didn't even exist as a product category five years ago – could have become such an integral part of my morning routine. Why do I always keep it charging on my bedside table at night instead of the other room?

The short answer is patents. But here's the long answer to tell you what I mean.

I keep my smartphone close at night for the same reason I keep it close all day: It is my connection to everything in the world that is beyond my immediate reach. That feeling of connection is so strong, and fulfills such a core human need that it persists even when I am asleep!

If you doubt me, try this experiment: Try charging your smartphone overnight in the other room. I bet it won't feel right, that just the thought makes you a little uneasy, and that you'll toss and turn thinking about why you're doing this dumb experiment anyway. It will be out of sight and maybe out of hearing, but not out of

mind. It will remind you how it feels when your smartphone runs out of battery and your day isn't yet over. Or worse, it will remind you of the time you "lost" your smartphone for a few hours and frantically kept calling it, hoping you'd hear its faint ring loud enough to zero in on where it was hiding.

But for those of you who understand the human need for connection that's fulfilled by a smartphone, you won't have to try the experiment. You already know what I'm talking about.

OK, before you start comparing me to the main character in the Spike Jonze [movie](#) "Her," let me be clear that I'm not talking about a connection *with* my smartphone, but rather how it connects me to everything I care about. And the reason it can do that in the first place is intellectual property protection.

That connection to my world was enabled through a variety of technologies that are fundamental to how the smartphone operates and that cooperate in an integrated system to get information and present it to me on demand according to my own needs and schedule. And as cool as all the different applications of a smartphone are, none of them work without the coolest feature of all: connectivity.

Let's use my morning routine as an example. Checking email from bed sounds simple. But how did that email get onto my bedside table? And as I walked to the kitchen, or let the dogs out, or wandered aimlessly down the hall still half asleep, or eventually got in my car to drive to work, how did my smartphone continue to

receive and send email or calendar or Facebook messages no matter where I was? Wireless data connections are so ubiquitous now we taken them for granted, but can you imagine how different our mornings would be if I were trying to carry around a laptop computer connected by an Ethernet cable?

Ask yourself for a moment, how does a smartphone fitting in the palm of my hand simultaneously download my emails while I watch high-definition YouTube videos of Felix Baumgartner jumping out of a hot air balloon, even as the smartphone figures where I am, where my work is, calculates the traffic delay and lets me know all this and stock quotes too while I keep watching the videos? I didn't even mention the incoming text from my workout partner with an embedded picture of the beach where he is and I am not, captioned "WHERE R U?" And how can my smartphone do all that at the same time all my neighbors' smartphones are using the same finite amount of radio frequency spectrum to accomplish the same tasks while they watch dog-shaming videos? The answer, however mundane it sounds, is as powerful as magic and just as invisible: high-data-rate wireless connections.

The wireless-technology pioneers who invented the technologies that enable these connections were bold enough to do costly research and development in extremely risky and unproven areas, at a time when cell phones were the size of brief cases and only carried by doctors and heads of state. They were able to take those risks and do that R&D because there was a chance, albeit a small one, that they might solve problems previously considered unsolvable and then sell products or license that technology to others for a fee. Some of those successful inventors then took

some of that money and reinvested it in even more R&D that produced even more advanced, licensable technologies and generated even faster connections.

None of them would have been able to take those risks or spend the money to experiment without the guarantee that their invention breakthrough would be theirs to own and license. In short, they relied on protection of their inventions by the U.S. patent system. Patents like [5,056,109](#); [5,101,501](#); [5,103,459](#); [6,574,211](#); [7,120,134](#); [5,930,230](#); [6,961,388](#); [6,473,418](#); and [7,623,442](#), covering such esoteric sounding technologies as CDMA signal generation; soft handover; uplink power control; EVDO/HSDPA channel quality feedback; HSUPA uplink power control; multi-channel CDMA transmission; MIMO coding techniques; OFDM resource allocation and hopping; and LTE uplink SC-FDMA signal generation. These are some of the key technologies underlying what everyone now calls 2G, 3G and 4G, or LTE.

As if that weren't enough, the same patent system encourages other inventors to use these basic human connectivity technologies to give us richer, more satisfying content and interactions over those ultra-fast wireless connections.

For example, the video streaming that makes the Felix Baumgartner video look as if we were really there in space with him as he jumped (U.S. Patent [6,724,944](#)), or the algorithms that combine GPS, cell site signals, WiFi and other information that let you to find yourself on a map ([5,874,914](#)). Not to mention the ability to download these and other applications on demand from an app store just when you need them ([6,941,133](#)).

So tomorrow morning, when you wake up and reach for your smartphone, think about what the smartphone would look like without the technologies encouraged and enabled by patents. I think it might look a little like this: two tin cans connected by string.

### **About the Author**

[Roger Martin](#) is Senior Vice-President and Chief IP Strategist at Qualcomm.