



Wireless Industry Primer

A Guide to Wireless for non-Techies Living and Working in a Techie World

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Preface

It's inescapable. Headlines and press releases blare a myriad of technical terms describing some astounding new advance in the wireless world. CDMA this and 802.11b that – just what does all this mean? For many people that have worked a significant time in the wireless or telecom industry, the discussion of wireless technologies may be no big deal. For many others though, it's an intimidating area to say the least.

Breakthroughs in the technical and business side of wireless are happening every day. What most people want (and need) from these events is how it impacts the wireless end user and the businesses working to meet the needs of an unwired world. But making the leap from a technical discussion of the physics of wireless or the industry to the relevant, useful information can be extremely difficult. Being short of a background in wireless and a solid grasp of the big picture can lead to many misconceptions in this area. For those of us that are new to the industry there are few places to turn to get up to speed quickly on the wireless world. Welcome to the first Wireless Industry Primer.

This report is designed especially for someone who has little or no knowledge of the wireless industry or technology – but wants to learn in a fun and easy way. But even those with some experience in the area can benefit from the comprehensive view provided here. Wireless Industry Primer will give a broad perspective of the industry and how all the pieces fit together. It will also explain various technologies in a way simple enough for anyone to understand in order to gain better insight into the vast possibilities of the global wireless market.

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Introduction

So you have a problem. You're new to wireless but need to get up to speed quickly. Maybe you've moved over to a new job in the industry or you're just a student looking for a good background before you dig deeper. So where do you start? Let's see, the wireless sector is fragmented and morphed with about a dozen different technical industries, ranging from semiconductors to software services. Within each of those there's a few more sub-categories with a myriad of companies, some incumbent operators and some new entrants. Company A has SuperCool technology, but company B will be rolling out 3D-SuperCoolx2 technology soon.

Is the CDMA technology used by company A significantly better than the GSM technology used by company B? Will the network structure set up by Company X support the high bandwidth services they plan to roll out this year? Will Company ABC have much success in selling their new wireless software platform?

Attempting to answer these types of questions right out of the starting gate is kind of like running into the middle of a forest; you suddenly stop and realize you've lost all sense of direction and now wish you had left that popcorn trail. Or at least had enough sense to bring your trusty Boy Scout compass. Let's try to explain a better approach with the following analogy.

Flying by Instruments

Plenty of pilots successfully navigate extremely complex aircraft to airport destinations everyday without a whiff of understanding of what's going on behind the instrument panel. They only need to know how to effectively interpret the information they are presented with on the gauges in order to understand if they are on their expected course and making good time. Similarly, the ability to "read the instruments" of various companies and events in the wireless industry will help guide you to where you need to be. You also should be able to survey the landscape, that is, take in the big picture. This is a crucial early step that many people overlook. The big picture gives you a constant source of reference just in case your instruments are a little off. While many pilots are qualified to fly by instruments only, I don't know of many whom would ignore a clear view out the front window if they had it.

Of course, good pilots are also able to sort out significant information from the redundant stuff. Altitude is important. Direction is important. That blinking red emergency light is important. What the cabin crew is serving for lunch, however, has no real bearing.

Knowing what to pay attention to and what to ignore in the study of wireless is important for many reasons. The most important is your sanity – because there is no way you're going to absorb the overwhelming amount of information about the industry and associated technology (and you don't need to either). Hopefully, this report will help you make the job simpler – not more complicated.

Putting the Cart before the Horse

Until you know the basics of an industry and the technologies that support it, the details and technical jargon have little significance. The basics give the context necessary to evaluate daily events and compare advances in technology. Unfortunately, many of us are introduced to the wireless world by simply being inundated with a lot of detailed information. After a while, some of it begins to stick, but the process can be very long and frustrating.

A better approach is to first take a look at the big picture: basically what wireless means and how it's done. This is done on two main levels – one technical and the other business. To understand how wireless communications are physically achieved is one thing but to understand how various companies work together to make it all possible is another. This report will help guide you through the technical minefield of wireless and give you a solid background on the industry supporting wireless services today.

The goal here is not to teach you the specifics of wireless. For most people, there's no real need to know just how convolutional coding is done in an 802.11g baseband link (say what?). Let's just leave that to the techies and trust that they know what they're doing. For most of us, we just want to understand the importance behind something having to do with wireless. This ability to interpret the significance of something even though we don't fully understand it is often far more beneficial than the underlying details.

OK. So we understand the focus of this paper: big picture, basic technology and industry overview. So we've had the appetizers, let's get right to the main course. We'll first look at the wireless technologies and explain the various roles that they play in this fast growing industry.

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The Technology

It is especially difficult for people wanting to learn about wireless to tackle the task of addressing technology. This is largely because the mobile world is powered by cutting-edge technology that is new and somehow intangible to our human senses. It's sometimes hard to grasp just how invisible waves travel great distances through the air to other destinations in fractions of a second.

To make matters worse, people who understand technology often assume that other people in their field maintain a similar level of knowledge about technical details. Take it from an engineer – it's very difficult for techies to remember that most other people don't "speak their language". There is often a large lapse in communication between technical members of a team and others, leading to confusion and frustration for all parties involved. The engineers can't understand why others don't see their point and others simply don't understand the engineer!

So what many people are often left with is a haphazard method of picking the brains of technical people to gather some relevant information about the significance of wireless technology. The process is often long and tedious, and usually has no particular end point where we end up knowing all we need to know.

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In the first section of this report, we'll try to ease the pain of non-technical people living in an inherently technical, wireless world. We'll look at the driving technologies in this industry – where they've been and where they're going. Remember that the goal here is not to necessarily understand how all these technologies actually work. The goal is to understand how technology enables a company to effectively provide services and compete in the market. To this end I will purposely oversimplify the discussion of various technologies. I will even go as far as to make generalizations that may gloss over some important technical details.

If after reading this section you still feel somewhat empty inside, fear not. There is an overwhelming amount of technical details available on the Internet, some of which are referenced in this report. What's here is only meant to give you a firm footing in the basics and give you a head start.

Let's begin with a very basic history and understanding of wireless technology. Remember that this is geared towards non-techie types, so it will sacrifice some details in order to keep it basic and simple.

What is Wireless?

Unfortunately, wireless is a very ambiguous term. In general, wireless technologies refer to the products and services that enable communication between two points without physical wires connecting them. Taken literally though, this definition is not consistent with most peoples' understanding of wireless. In the above broad definition, speaking across a room is wireless technology. Before we get too literal, let's not waste more time on this and go to what wireless means to most people.

There are three things that all wireless technologies address to improve; they are the speed, quantity, and distance which information can be passed between two points. As we turn the century, the most recognized advances in wireless communications are the one's that enable real time communications where none were possible before. So does that mean that technologies improving speed and quantity of information are less important? Quite the contrary! Let's look at a simple example of wireless communication.

Until recently, I could not have real-time (instantaneous) communication with my friend Bob camping in the rugged mountains. If I urgently had to talk with him, I would have to resort to smoke signals, letter by pack mule, or something else. All these methods would have significant delays involved in the communication. The amount of information and the speed at which it could be passed back and forth is limited by the technology (if you could call smoke signals a technology). But wireless technologies now enable Bob to be just about anywhere on the earth (or even on the space station), and still be accessible for a friendly conversation. It's not that Bob and I couldn't communicate ideas over long distances before, but the speed would have been severely limited, such as in the case of delivered mail. Here, the perception is that the breakthrough was in the distance now achieved in communication, but actually the speed is what has improved.

Still, what impresses the average person the most is being able to communicate in real time with anyone, anywhere. Whether you are at home, in your car on a highway, or secluded away in some remote area, you can communicate with other people through wireless technology.

But wireless is much bigger than just being able to make a phone call in the rugged mountains. There's immense potential in linking both people and intelligent machines (such as computers) in wireless networks. Outside of just being really cool, wireless technologies offer tremendous efficiency to business processes, often reducing or eliminating redundant tasks that previously required dedicated human labor.

While this report will spend quite a bit of time covering the more common mobile wireless technologies such as cel-

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