

# Size matters: the rise of thin electronics

The development of ever more compact technology has driven wireless connectivity to a point where it can be carried in our pockets, handbags or otherwise concealed about our person. All this since Nokia introduced their first truly commercial - yet, from our viewpoint in 2009, very large - mobile phone in November 1992.



But what is the appeal of all this wireless connectivity? Originally of course, the main purpose was to enable us to make calls from our cars and eventually to replace our landlines. Now though, we demand a great deal more from our wireless devices. It's not overstating the case to suggest that wireless connectivity acts these days as a form of social glue, linking us with friends, family and services - from health to entertainment. And it just keeps on expanding, with new services and fads coming along to meet demands that we have yet to make. People just expect now to be able to connect - or be connected - wirelessly, wherever they are.

Of course all this functionality comes at a price in terms of the number of devices that the average person ends up carrying. Pockets or handbags end up bulging with mobile phone, NFC payment cards, wireless/GPS-enabled camera, electronic car keys, etc. The inconvenience of this in turn drives the technology to be smaller which, in many cases, means thinner.

So, can the technology deliver on such thin devices?

Well, single chip GSM components are already less than 1mm thick and require a minimal number of external components. Modern PCB manufacturing techniques allow us to make the circuit boards themselves very thin, flexible and strong. Further, the increasing demand for smart cards has driven display and battery technology to the point where these too are now suitable for use in thin devices. This type of enabling technology underpins the

development of simple to use, convenience-connectivity. A phone not in your pocket, but in your wallet. A browser not on your smart phone, but on a loyalty card. A GPS not in your satnav, but on a fold-up map.

Of course, we mustn't forget the user in all this. Many applications will still need an easy user interface, and this requires a certain amount of space on which to mount keyboards, screens, and buttons. Look at some modern phones and it is immediately apparent that the keyboard is very difficult to use unless you have extremely slender fingers. So we need to preserve the surface area of such devices but not necessarily the depth or height of the device.

These developments are not without risk either. As always, technology can be used either for or against society. There are moral and personal safety issues around the idea of personal tracking and location systems, for example. Nevertheless, with appropriate regulation, the positives will outweigh the negatives and the technology will generally be a force for good.

Very soon we will see wireless connectivity shrink to a point where it is entirely unobtrusive and can be carried, for example, in your wallet or built into your clothing. At that point, you'll not need to know that you are connected. The ubiquitous wireless society will simply be part of your environment, whether it's for everyday voice or data transfer, or a matter of life and death.

**Fraser.Edwards@CambridgeConsultants.com**