

## **The Myth of Cellular Tower Health Hazards**

**By Elliott Drucker**

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An acquaintance recently asked me to weigh in on a wireless coverage issue. Apparently, a major wireless network operator had approached his church about placing a cell site on church property. The deal seemed to be good, including physical upgrades such as hiding the antennas in the church steeple and a monthly lease payment. Yet many in the congregation expressed concern about the risk of exposure to harmful levels of RF radiation. They questioned whether it would be safe to worship in the church sanctuary while antennas, literally right over their heads, pumped out hundreds of watts of radio power.

Of course, I told my friend that they had nothing to worry about from the proposed cell site installation, at least in terms of health risks from RF exposure. This is a familiar battle that the wireless industry has fought for years. We know that the signal levels from even a very close cell site are well below the levels considered unhealthy. In fact, federal law now prohibits municipalities from rejecting zoning for a cell phone tower solely on the grounds that it may pose health risks. It is apparent that these concerns are not fully abated, because despite my advice, the church passed on the offer from the wireless carrier.

I was reminded of this problem the other day by an article in *The New York Times*, which reported on a controversy over placement of a hilltop cell tower in wealthy Mendham Township, N.J. According to the article, the main objections to the tower are nominally aesthetic, but it is clear that those living nearby also are worried about health issues.

Such controversies are not likely to go away any time soon. As more people choose to rely on cell phones for their primary phone service, coverage in residential areas is becoming a key competitive issue. That means more towers located near homes, schools and churches, and more parents worrying about how exposure to resulting RF radiation might be damaging their children.

But in fighting to keep cell towers away, residents quickly learn that they cannot win by raising such health concerns, so they are left to argue that a tower would destroy the character of a residential neighborhood. I, therefore, suspect that if we could somehow put the myth of health risks to rest, the industry might see some reduction in resistance to new site deployments.

One way to do that might be to put some hard numbers behind our general assertions that cellular towers pose no risk. As a worst-case scenario in terms of exposure to RF radiation, consider a cell tower located only 30 meters (about 100 feet) away, and transmitting a total of 500W effective radiated power (ERP). Of course, if you are only 30 meters from the transmitting antennas, you also are likely well below their horizontal beam centers even if severe downtilt is used. But for the sake of our worst-case analysis, let's assume that the full 500W is aimed right at you. In that case, the RF power

density where you are standing would be 4.4 microwatts per square centimeter. For comparison, the FCC's mandated power density limits for continuous uncontrolled RF exposure by the general public are 600 and 1,000 microwatts per square centimeter for 900 and 1900 MHz signals, respectively. Even in our highly unlikely worst-case scenario, RF exposure levels would be well under 1 percent of the maximum deemed safe by the FCC.

Of course, analysis based upon government regulations won't satisfy everyone, so here's another way to look at it. VHF TV broadcasts often transmit at power levels exceeding one megawatt ERP from antenna towers well within 1 kilometer of residential areas. At a distance of 1 kilometer, a 1-megawatt ERP transmission would result in a power density of just under 8 microwatts per square centimeter, still nearly twice our worst case value from a nearby cell tower. Yet nobody seems worried about health risks from VHF TV broadcasts.

If these objective numbers still are not convincing, consider this factor. Handheld cell phones, because of intimate proximity to the user's head, provide RF exposure levels to their users that are orders of magnitude higher than transmissions from cell towers. If one accepts that there is at least some question about health risks from handset use, then it follows that this risk is reduced by lowering the handset's transmit power.

But handset transmit power is governed primarily by RF path loss between the handset and the serving base station; the lower the path loss, the lower the handset transmit power. Thus, by having a serving cell tower close by, a cell phone user actually may reduce any risks associated with RF exposure. How's that for irony?

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