I'm on the train

Are mobile phones on trains dangerous or not?

COMMUTER trains are often stuffy and crowded, and they frequently fail to run on time. As if that were not bad enough, Tsuyoshi Hondou, a physicist at Tokohu University in Japan, published a paper in 2003 that gave commuters yet another reason to feel uncomfortable. Dr Hondou examined mobile-phone usage in enclosed spaces such as railway carriages, buses and lifts, all of which are, in essence, metal boxes. His model predicted that a large number of passengers crowded together, all blathering, sending text messages, or browsing the web on their phones, could produce levels of electromagnetic radiation that exceed international safety standards. That is because the radio waves produced by each phone are reflected off the metal walls of the carriage, bus or lift. Enough radiation escapes to allow the phone to communicate with the network, but the rest bathes the inside of the carriage with bouncing microwaves.

This sounds worrying. But maybe it isn’t after all. In a paper published recently in Applied Physics Letters, Jaime Ferrer and Lucas Fernández-Seva from the University of Oviedo in Spain—along with colleagues from the Polytechnic University of Madrid and Telefónica Móviles, a Spanish mobile operator—dispute Dr Hondou’s findings. They conclude that the level of radiation is safe after all.

The key addition to the new research is the effect of the passengers themselves. While each phone produces radiation, the number and the effect that leaving out the other passengers would have on the radiation level. As a result, say the authors of the new paper, he significantly overestimated the level of electromagnetic radiation.

When one is sitting on a train, Dr Ferrer and his colleagues found, the most important source of radiation are one’s own phone, and those of one’s immediate neighbours. The radiation from these sources far exceeds that from other phones or from waves bouncing around the carriage. And all these sources together produce a level of radiation within the bounds defined by the ICNIRP, the international body that regulates such matters.

People concerned about the effects of mobile-phone radiation are unlikely to take much comfort from Dr Ferrer’s results. They worry that even small amounts of microwave radiation—within the ICNIRP’s limits—may have adverse health effects. The evidence so far is ambiguous, inconsistent and sparse. Indeed, Dr Ferrer says he was surprised at how little research has been done in this area.

Yet both Dr Hondou’s results and Dr Ferrer’s are based on mathematical models, not physical measurements. Their models make assumptions about the physical properties of train carriages and their passengers, and both assume that the radiation is uniformly distributed rather than clumped into “hot spots”. But if the debate about the safety of mobile phones is to be resolved, there must be less reliance on models and anecdotes, and more emphasis on hard experimental data.