

Why does my mobile signal drop when I'm on a train?


Long journeys can feel even longer when your Spotify or Netflix stream comes to a juddering stop. Our expert Iñaki Val reveals how poor mobile connectivity on rail infrastructure threatens more than just your entertainment.



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Calls placed from a moving train often open with a hedged warning that the conversation might drop unexpectedly, an event often preceded by the words ‘I’m going into a tunnel’.

So why is it so hard to get a good connection while riding the rails?

“The simple answer is a lack of a good receiving signal,” says Val, industrial wireless principal research scientist at [IKERLAN](#) , a

leading knowledge transfer research institute.

Your mobile phone stays connected so long its internal antenna can pick up a signal coming from an external source, such as a base station antenna on top of a building or tower. “We call this line of sight, which really means that the signal source can see your phone without any obstacles, and in relatively close range,” Val explains.

This is all well and good when driving down an open highway or talking to mum and dad from home. But it becomes a bit more challenging whenever something passes between your phone and the signal’s source – and trains just so happen to be rife with such somethings.

“While tunnels are probably the most obvious obstacle to achieving line of sight, mobile signals are also blocked by mountains, trees, buildings, etc.,” says Val.

Even the train itself can block mobile signals, because they are essentially big metal

tubes traveling at incredibly high speeds. Mobile signals aren't very good at penetrating metal, and while traveling by train, you constantly move in and out of the range of different base station antennas.

“Just as quickly as your phone is in line of sight with a signal its already travelled beyond the tower's range and needs to reconnect,” remarks Val. “The faster the train goes, the faster the signal strength changes, increasing the likelihood of a lost connection.”

More than just an inconvenience

While there's no arguing that a dropped connection is a pain, mobile connectivity in trains is more than just an issue of passenger convenience – it also has important safety implications.

“Trains must be in constant communication with central control,” says Val. “The problem is that trains face the same connection challenges as mobile users do, but with critical consequences if the communication fails.”

To illustrate, Val points to the situation where a train must stop due to a mechanical issue. “This information needs to be quickly relayed to all the trains behind them so they can begin braking and reducing their speed,” he explains.

With the support of the EU-funded [Safe4RAIL-2 project](#), Val is working to establish better connectivity, for both trains and train passengers, thus ensuring a safer, more comfortable experience for everyone.

So even if your train is brought to a standstill, your latest Netflix binge won't be.

Find out more about Iñaki Val's research: [All aboard a better-connected train](#).

Keywords

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