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Press

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New Siemens technology to enhance mobile signal reception in the Rhein-Ruhr Express

- **Special coating on windowpanes significantly improves reception**
- **Rhein-Ruhr Express first train worldwide with the new technology**
- **Maintenance-free, cost-effective solution**

The Rhein-Ruhr Express (RRX), a train for Germany's Rhine-Ruhr metropolitan region, will be the world's first train in series production to feature a new radio-frequency windowpane solution from Siemens that massively improves mobile phone reception in trains. The new windows on the RRX will allow radio waves to pass through up to 500 times more easily than is the case with conventional thermal insulation glazing. As a result, passengers will be able, for the first time, to surf the Internet and make telephone calls freely without the need for special cellular-signal amplifiers (in-train repeaters). Train operators will also profit from the new technology: in new vehicles, the windowpane solution is significantly more cost-effective than installing in-train repeaters.

Without repeater modules in the cars, it has been very difficult to achieve good cellular reception in many trains. These reception issues are caused by the vehicles' windowpanes, whose metallic coating provides protection against heat and solar radiation. Unfortunately, heat and solar rays are not the only things that the windowpanes reflect. Other electro-magnetic waves are also blocked. As a result, the cars act like Faraday cages. In high-speed trains, blockage is 99.9 effective.

Siemens researchers in Vienna have now developed a special windowpane coating that allows radio signals to pass through unhindered. This is made possible by a fine pattern that the scientists apply with the help of lasers to the panes' electrically

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conductive, transparent layer. “This approach massively improves signal-reception levels for mobile terminal devices in trains,” says Lukas W. Mayer, project head at Siemens Corporate Technology. “In high-speed trains, our solution enables us to increase signal strength in cellular frequency bands by at least 50 times. The panes also allow all frequencies useful for mobile communication to pass through. What’s more, future mobile standards like 5G will be immediately available without additional investment.”

The new technology will also pay off for train operators. The windowpanes can be used for decades without maintenance. They are easy to install and – unlike in-train repeaters – require no electric current. In new vehicles, they are also more cost-effective. Existing cars can be retrofitted at any time. The panes can be installed in all rail vehicles with thermal protective glazing: the fine pattern in the coating is almost invisible.

The first prototype of an electric multiple unit equipped with the new windowpane technology for the RRX was unveiled today at Siemens’ test and validation center (PCW) in Wegberg-Wildenrath, Germany. In the months to come, a total of seven pre-series units will be put into operation at the PCW, where they will complete a comprehensive test program before making their first trial runs on the public rail network. The RRX is scheduled to begin passenger service in the Greater Rhine-Ruhr Region at the end of 2018.

Additional material is available at: www.siemens.com/press/RRX

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