PRESS RELEASE

Fraunhofer IIS successfully tests terrestrial IoT technology mioty® via GEO satellite

Erlangen, Germany: mioty® communication technology enables the simultaneous transmission of data packets from a large number of sensor nodes over long distances and is particularly energy efficient. Previously, providing the Internet of Things (IoT) in a terrestrial network was limited to a range of up to 15 kilometers. Now, transmission tests by the Fraunhofer Institute for Integrated Circuits IIS in Erlangen, Germany, have shown that mioty® can be used via geostationary (GEO) satellites – without having to adapt the wireless protocol. Deploying the IoT via satellite allows the range of a network to be extended at will, up to and including around the globe.

Fraunhofer IIS recently tested the use of mioty® for massive IoT applications via a GEO satellite. In the test setup, the transmitters with integrated mioty® sensor nodes sent data packets directly to the satellite. Transmission in the S band at about 2 GHz was realized via the EchoStar XXI communications satellite. The transmitters used mioty®'s Telegram Splitting Ultra Narrow Band (TS-UNB) wireless protocol without any special adaptations for satellite communication.

The tests were carried out as part of the European Space Agency's ARTES Future Preparation program.

Demonstrated support of massive IoT applications

With the mioty® transmission method of Telegram Splitting, data packets – i.e. "telegrams" – are split into smaller sub-packets and transmitted over different frequencies and time. The method is particularly robust against interference and allows an enormous number of sensor nodes to be served.

To fully test the total capacity of the transmission system, Fraunhofer IIS used a signal generator to virtually increase the volume of data packets sent to a huge number. The tests showed that in a defined coverage area and at a system bandwidth of only 200 kHz, up to 3.5 million telegrams per day can be successfully transmitted via satellite with mioty®.

"Through the tests, we were able to demonstrate that massive networking of IoT transmitters via satellite isn't just possible, it's straightforward. This paves the way for

Head of Corporate Communications
Thoralf Dietz | Phone +49 9131 776-1630 | thoralf.dietz@iis.fraunhofer.de | Fraunhofer Institute for Integrated Circuits IIS | Am Wolfsmantel 33 | 91058 Erlangen, Germany | www.iis.fraunhofer.de

Editorial notes
Claudia Wutz | Phone +49 9131 776-4071 | claudia.wutz@iis.fraunhofer.de | Fraunhofer Institute for Integrated Circuits IIS | www.iis.fraunhofer.de

an entirely new class of applications in which sensors can transmit data from the ground directly to a satellite, independent of terrestrial infrastructure. Some sectors in particular – logistics, transportation, mobility, shipping and agriculture – will benefit greatly from direct IoT solutions via satellite, which can provide connectivity even in the most remote corners of the world," explains Florian Leschka, Group Manager System Design at Fraunhofer IIS.

Energy-efficient terminals in use

During the tests, the researchers employed the same transmission protocol that conventional mioty® systems on the ground are based on. Moreover, despite the enormous distance to the satellite of about 38,000 kilometers, the user terminals could be operated at transmit power similar to that of terrestrial networks. This allows individual satellite IoT transmitters to be enormously energy efficient in practice, and they can transmit data on their own for years. In addition, the system design of the terminals is based on the use of low-cost, non-proprietary components, such as the conventional rod antenna used to transmit the data during the tests.

The terminals used in the tests have integrated mioty® sensor nodes, and are based on a preliminary development from an ESA-funded project: Energy Efficient User Terminals for Massive Uncoordinated Access via Satellite (E2UT). Within the E2UT project, lab simulations have already demonstrated that massive data transmission with mioty® also works via satellites in low earth orbit (LEO).