

PRESS RELEASE

PRESS RELEASENovember, 2015 || Page 1 | 3

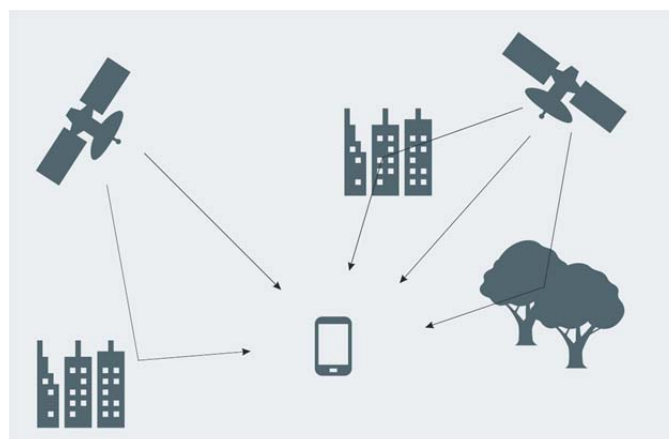
Fraunhofer Gesellschaft Demonstrated Over-the-Air (OTA) Communication Test System Based on IZT Solutions

New approach to test GNSS receiver robustness and performance with realistic emulation of real world scenarios

Ilmenau/Erlangen – November, 2015 – The Fraunhofer Gesellschaft, Europe's largest organization for application-oriented research, presented an Over-The-Air (OTA) wave field synthesis system for test of GNSS (Global Navigation Satellite System) receivers at its Fraunhofer IIS Facility for Over the Air Research and Testing (FORTE) in Ilmenau. The innovative OTA test system is mainly based on hardware solutions from IZT GmbH. The demonstrated setup to test GNSS receivers represents a new approach that in contrast to conventionally conducted and open-field tests, realistically emulates real world scenarios under controllable and repeatable conditions. This enables the realistic comparison of receivers and algorithms especially for multi/beamforming antenna receivers. The OTA test system is cost-effective, flexible and scalable. In this way arbitrary sizes of test objects can be tested due to the freely scalable number of channel emulator outputs.

The newest generations of mobile communication systems employ multiple antennas for transmission and reception, like LTE, LTE-A, WIMAX, and Wireless LAN.

Multiple Input Multiple Output (MIMO) OTA test systems are typically deployed for certification, performance testing and product evaluation of broadband wireless devices. The related devices have to be tested in their related environments. In contrast to mobile phones, GNSS receivers are extremely susceptible to all types of interferences. Hence the goal was to develop a new testing method for interference robustness of GNSS receivers.



Real World GNSS Scenario for Emulation. © Fraunhofer IIS www.iis.fraunhofer.de/en/pr

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

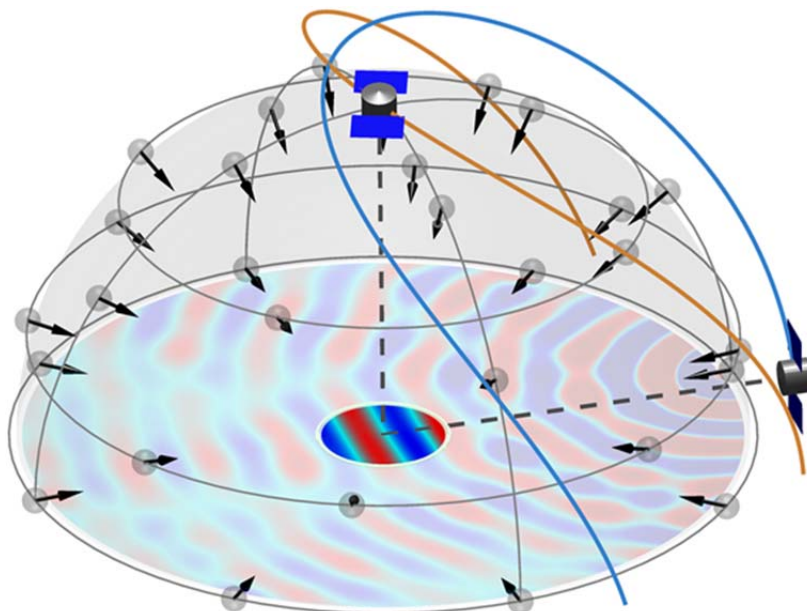
Editorial notes

Markus Landmann | Phone +49 3677 69-4297 | markus.landmann@is.fraunhofer.de | Fraunhofer Institute for Integrated Circuits IIS | www.iis.fraunhofer.de

The OTA test approach

The OTA test laboratory comprises a satellite signal emulator (Spirent) used as signal source, a OTA channel emulator used for wave-field synthesis which is able to emulate any electromagnetic environment in an anechoic chamber, and several OTA illumination antennas. The OTA channel emulator from IZT GmbH supports up to 12 inputs and arbitrary number of phase coherent outputs in the frequency range of 1 to 6 GHz, and provides the output signals to the OTA illumination antennas. Note that the final version of the system based on the IZT components at Fraunhofer IIS will have 12 x 32 channels.

The wave field at the GNSS receiver is generated as a coherent superposition of pre-defined, discrete plane wave components with specific directions, amplitudes and phases that are radiated by the OTA illumination antennas. In this way, arbitrary complex multi-path propagation channels and interference environments can be emulated. Consequently, the interaction between the device antennas and the radio environment is taken into account, which is not the case with conventional (conducted) tests.



Example for the emulation of 2 GNSS satellites at FORTE © Fraunhofer IIS www.iis.fraunhofer.de/en/pr

FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

The unique test environment developed at FORTE together with IZT GmbH excels in its great flexibility regarding possible applications in communications technology. The new OTA emulation approach enables realistic radio channel emulation taking into consideration multipath propagation, multi-frequency, and multi-user scenarios. The OTA system supports emulation of complex channel impulse responses of nearly unlimited complexity. Besides GNSS equipment the test system can be applied for LTE and Cognitive Radio (CR), sensor networks (including energy networks and smart metering) or Car-to-X (i.e. car-to-car and car-to-infrastructure) communications.

The outlined Testsystem at FORTE is especially of interest for customers in the mobile communications, vehicular and military sector as it reduces development costs as well as the possibility to test again jamming and spoofing of security relevant devices/infrastructure.

PRESS RELEASENovember, 2015 || Page 3 | 3

The **Fraunhofer-Gesellschaft** is the leading organization for applied research in Europe. Its research activities are conducted by 66 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of nearly 24,000, who work with an annual research budget totaling more than 2 billion euros.

The **Fraunhofer Institute for Integrated Circuits IIS** is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. It ranks first among all Fraunhofer Institutes. With the creation of mp3 and the co-development of AAC, Fraunhofer IIS has reached worldwide recognition. In close cooperation with partners and clients the Institute provides research and development services in the following areas: Audio & Multimedia, Imaging Systems, Energy Management, IC Design and Design Automation, Communication Systems, Positioning, Medical Technology, Sensor Systems, Safety and Security Technology, Supply Chain Management and Non-destructive Testing. About 880 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985 in Erlangen, Fraunhofer IIS has now 13 locations in 10 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Bamberg, Waischenfeld, Coburg, Würzburg, Ilmenau and Deggendorf. The budget of 120 million euros is mainly financed by projects. 23 percent of the budget is subsidized by federal and state funds.

Detailed information on: www.iis.fraunhofer.de/en