Terahertz graphene receiver for wireless communications

Fact Sheet

Project Information

TERACOMM
Grant agreement ID: 101113529

DOI
10.3030/101113529

Funded under
European Research Council (ERC)

Total cost
€ 0,00

EU contribution
€ 150 000,00

Coordinated by
FUNDACIO INSTITUT DE CIENCIES FOTONIQUES
Spain

Start date
1 October 2023

End date
31 March 2025

Objective

6th generation (6G) mobile broadband communications will transform the communications industry, leading to high speed networks capable of linking integrated communication, sensing, and computing capabilities to fuse the physical, biological, and cyber worlds. However, 6G infrastructure will require a significant increase in data transfer rate (>10 times larger than current standards), ultra-low power consumption (<1pj/bit), and high reliability. 5G technology, originally designed for data rates up to 20 Gbps, cannot fulfill these requirements. The sub-THz spectrum (~100GHz-300GHz) could provide the required capacity for 6G short-range wireless links. On the other hand, Multiple-Input-Multiple-Output (MIMO) systems, consisting of multiple transmitting/receiving antennas, are a key element of 5G tech, dramatically increasing the spectral efficiency of the wireless link, multiplying the data...
transfer rate of the single TX/RX antenna system by the number of implemented channels. Developing a technology that can combine the advantages of the sub-THz spectrum and MIMO systems could yield short-range 6G wireless connectivity, significantly enhancing data rates, power consumption, and reliability. ICFO’s patented Antenna-integrated-Graphene-THz-Detector (AGTD) technology, providing ultrabroadband frequency operation, high speed (potentially >100GHz), high sensitivity, small footprint and low power consumption, represents an ideal solution able to meet all the requirements for the realization of a MIMO system operating at unprecedented frequencies. TERACOMM envisions the realization and the demonstration of the receiver module of a graphene-based wireless MIMO system able to reach data rates >100Gbps for short range applications. Industrial links, protection of intellectual property, and commercial exploitation will lie at the heart of the project from the outset, in order to maximize the potential for this technology to realize a significant social and economic impact.

**Fields of science**

- engineering and technology
- nanotechnology
- nano-materials
- two-dimensional nanostructures
- graphene

**Keywords**

- TERACOMM

**Programme(s)**

- HORIZON.1.1 - European Research Council (ERC)

**Topic(s)**

- ERC-2022-POC2 - ERC PROOF OF CONCEPT GRANTS

**Call for proposal**

- ERC-2022-POC2
Funding Scheme

HORIZON-ERC-POC - HORIZON ERC Proof of Concept Grants

Coordinator

FUNDACIO INSTITUT DE CIENCIES FOTONIQUES

Net EU contribution

€ 150 000,00

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Region

Este > Cataluña > Barcelona

Links

Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Other funding

€ 0,00

EC signature date 29 March 2023
Last update: 26 July 2023

Permalink: https://cordis.europa.eu/project/id/101113529

European Union, 2023