

Co-operation profile details from Enterprise Europe Scotland

12 CH 84FB 3PEY - Thin planar radar absorbers with very broad operation bandwidth (14 – 26 GHz) requiring simple fabrication process Technology collaboration OFFER

Abstract

A Swiss university offers new radar absorbers based on Frequency Selective Surfaces (FSS) that are thin, very broad wideband (14 – 26 GHz), have a simple fabrication process and reduced weight. The technology can be used for reducing radar cross sections of aircrafts or ships, but also for electromagnetic shielding of electronics or protecting humans from electromagnetic radiation. Type of collaboration sought: license agreement, joint further development and/or testing of new applications.

Description

Background radar absorbers

Radar absorbers are structures which cover a device and minimize the reflection of incident electromagnetic waves. Two parameters are usually important in the design of an absorber, the absorption bandwidth and the total thickness of the design. The ideal situation for a design is to achieve the largest bandwidth with the minimum possible thickness.

Fig. 1. The perforated FSS absorber consists of printed patches on the substrate (left) directly attached to the perforated substrate (right).

Thin, very broad wideband, simple fabrication and lighter

The presented invention provides an alternative absorber with improved absorptive properties. "Perforated FSS absorbers" were introduced, comprising a periodically perforated lossy substrate fully grounded on one side and covered by a FSS pattern on the other side (Fig 1). This design has the advantage that the holes in the substrate affect the resonance properties of the structured metallic layer and the spectral absorption of the whole device. This subsequently allows broadening the spectral response of the absorber. Interestingly, the investigations proved that a simple structure for the holes, i.e. a single cylindrical hole, suffices to achieve considerable enhancement. The optimization results show that absorption properties of the perforated FSS absorber can be enhanced more than 100% by drilling one hole per unit cell in the substrate (Fig. 2C).

Fig 2. The perforated Frequency Selective Surfaces (FSS) absorber leads to a very broad absorber range (C) compared to a homogenous absorber (A) and a FSS absorber (B).

Note: Some websites do not show the second figure. Please make an Expression of Interest and request for the picture.

Field of Application:

- Defense industry: tracking applications to reduce the radar cross section (RCS) of aircrafts or ships
- Electronic packaging and building industry: shielding electronic circuits, equipments and living environments from electromagnetic interference
- Building industry: absorption of the incident radiation to buildings located around airports
- Mobile and telecommunication industry: protecting humans from electromagnetic radiation

Innovative Aspects:

- Very broad operation bandwidth (14 -26 GHz)
- Stable angular behaviour compared to homogeneous absorbers
- More degrees of freedom for designing thin absorbers
- Simple fabrication process, only one hole per unit cell is required
- Thin absorbers with reduced weight

Target partner expertise sought:

- Type of partner sought: Companies, Industry
- Specific area of activity of the partner: Partner is active in one of the following fields of application:
 - Defense industry: tracking applications to reduce the radar cross section (RCS) of aircrafts or ships
 - Electronic packaging and building industry: shielding electronic circuits, equipments and living environments from electromagnetic interference
 - Building industry: absorption of the incident radiation to buildings located around airports
 - Mobile and telecommunication industry: protecting humans from electromagnetic radiation
- Task to be performed by the partner sought: Feasibility: First step is to analyze together the possibilities and opportunities of the offered technology for the application of the partner.

Prototyping and testing: Second step would be testing of the technology in prototypes - or functional models - of the application of the partner.

Other steps to be defined.

Key information:

Country of origin: SWITZERLAND

Listed under: Communications & Networking \ Building and Construction \ Materials \ Transport & Logistics \ Aeronautics and Space

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To find out more, contact Enterprise Europe Scotland on 0141 228 2797 or email us at info@enterprise-europe-scotland.com quoting ref 12 CH 84FB 3PEY