394.Accession number:13012843

Title:Precision Alignment of Two mm-Wave Antennas Using an Improved Optical Alignment Tool

Authors:Gordon, J.A. (1); Novotny, D.R. (1)

Author affiliation:(1) Electromagn. Div., Nat. Inst. of Stand. & Technol., Boulder, CO, United States

Abstract:In this paper, we present an optical imaging tool, the Overlay Imaging Aligner (OIA), developed to aid in the mechanical alignment of antenna components in the mm-wave and low-THz frequency regimes (50-500 GHz). In these regimes, the millimeter and sub-millimeter wavelengths pose significant challenges for alignment. The OIA uses a polarization-selective, machine-vision approach to generate two simultaneous and overlaid real-time digital images along a common axis. This allows for aligning two antenna components to within fractions of a wavelength in the mm-wave and THz frequency regimes. The overall concept, optical design, function, performance characteristics, and application examples are presented. Preliminary data at specific frequencies in the WR-2.2 band are presented that compare the alignment achieved with the OIA to an electrical alignment.

Number of references:10

Inspec controlled terms:antenna accessories - computer vision - millimetre wave antennas - optical images - submillimetre wave antennas

Uncontrolled terms:precision alignment - two mm-wave antenna - optical alignment tool imrprovement - overlay imaging aligner - OIA - mechanical alignment - submillimeter wavelength - millimeter wavelength - polarization-selective approach - machine-vision approach - real-time digital image - WR-2.2 band - electrical alignment - antenna components - frequency 50 GHz to 500 GHz

Inspec classification codes:B5270B Single antennas - B5270F Antenna accessories - B6135 Optical, image and video signal processing

Numerical data indexing:frequency 5.0E+10 5.0E+11 Hz

Treatment:Practical (PRA)

Discipline:Electrical/Electronic engineering (B)

DOI:10.1109/MAP.2012.6309203

Database:Inspec

IPC Code:G06T; H01Q