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Title: Reconfigurable beam reflectarray antenna for frequencies in terahertz and millimeter-wave range applies bias voltage to conductive components phase-shifter cells to vary dielectric constant liquid crystal layers phase-shifter cells

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Abstract: NOVELTY - The antenna has a flat array (1) phase-shifter cells (3b) illuminated by a feeder to produce electronically reconfigurable collimated or shaped beam. The phase-shifter cells are formed by multiple stacked layers conductive components (4c-4f) on a dielectric substrate (17), alternated with layers liquid crystal (5c,5d) and a conductive plane (9). Bias voltages are applied to conductive components, such that dielectric constant liquid crystal is varied, phase shift in reflected field in each phase shifter cell is produced, and electronic beam scanning or reconfiguration is performed.

USE - Reconfigurable beam reflectarray antenna for frequencies in the terahertz and millimeter-wave range. Can be used in the fields telecommunications, radar, space technology and security, such that the antenna can be used for observation satellites, communications and security systems.

ADVANTAGE - Provides a reconfigurable beam reflectarray antenna that includes multiple layers conductive components and liquid crystal for improved bandwidth and performance the beam scanning or reconfiguration. Ensures that the antenna has reduced weight, volume and cost, by eliminating all the parts that require mechanical movement and replacing them with electronic control. Uses low-cost liquid crystal technology to further reduce cost the antenna which is essentially suitable for VHF applications. Ensures better electronic control on the antenna to ensure improved mechanical scanning with improved scanning speed. Ensures that the antenna performs electronic scanning beam, allows the beam to conform, and allows to reshape the beam in real time, which can be very useful in reconstruction images, communication antenna outposts, and antennas used in observation satellites or communications.

DESCRIPTION DRAWING(S) - The drawing shows the front view the phase-shifter cell the multi-layer reflectarray comprising two layers liquid crystal and two conductive patches, each being provided with independent voltage control.

Flat array phase-shifter cells (1)

Phase-shifter cells (3b)

Layers conductive components (4c-4f)

Layers liquid crystal (5c,5d)

Conductive plane (9)

Dielectric substrate (17)

Drawing:

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