

CIRCULAR ANTENNA ARRAY FOR VEHICULAR DIRECTION FINDING



The invention is a circular antenna designed for localization of vehicles without the use of GPS

INVENTION

The circular antenna array comprises of multiple radiating elements arranged across a disk and fabricated to form a microstrip antenna. Each of the individual antenna elements can be either individually powered or simultaneously operated to generate highly direction antenna radiation patterns. Based on the phase of the input signal to the individual array element, the radiation beam can be directionally rotated to scan the complete plane, resulting in an electronically scanned antenna.

MARKET SIZE AND GROWTH

The introduction of autonomous vehicles has led to an increase in the research on antennas and the communication front ends. The automotive antenna market is expected to grow at a CAGR of 8% by 2021 with North America being the hub of research and development.

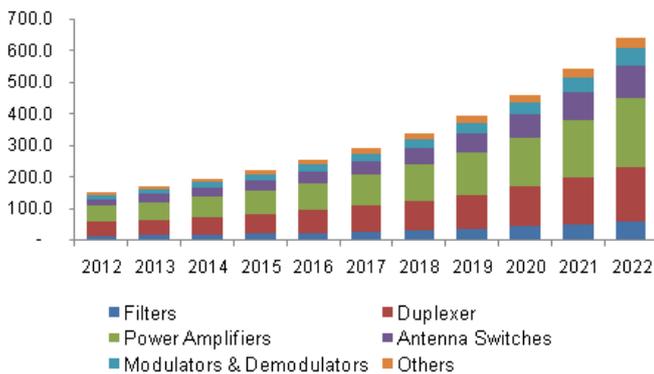


Fig. 1 Revenue Generated by Communication System Manufacturers in India – 2012-2022

Among the communications systems being manufactured in India, antenna switches and duplexers make a major portion of the products. Considering the booming industry of automated/self driving cars, the automotive antenna industry is expected to increase in value.

APPLICATIONS

The circular antenna array finds its application in the automotive localization systems. This includes systems that can provide the accurate location of a vehicle to the user using a mobile application without the usage of satellite positioning systems. In addition, the beam scanning ability of this invention can be used for some driving control for autonomous vehicles. Considering the compact design of the antenna, it can be easily fabricated within the roof of the vehicle making a seamless integration without affecting the aesthetics of the car.

ADVANTAGES

The invention has the following competitive advantages:

- The antenna array can be fed either coaxially or through a microstrip feed. This flexible nature of powering the antenna made the installation and retro-fitting the device easy for the users.
- The antenna has been fabricated on easily available FR-4 substrate, making the overall profile of the antenna compact and resilient to back-reflections.
- The ability of the antenna to be used wither in switched and scanning mode makes the sinle antenna feasible for multiple functions when installed on a car; car localization or collision avoidance/object detection.

PROJECT STATUS

The antenna array has been simulated for different operating modes and 2 different configurations have been fabricated with the test results closely matching the simulation results.

LOOKING FOR A DEVELOPMENT PARTNER

Although a lab prototype has been successfully tested, this invention requires integration on a car to monitor the affect (if any) of the car body on the operation parameters of the antenna.

PATENT PROTECTION

A U.S. patent issued: US13/771048.

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