E-band Low-Profile, Wideband 45o Linearly-Polarized Slot loaded Patch and Its Array for Millimeter-wave Communications

ABSTRACT

A series of E-band low-profile wideband antenna arrays with 45o and ±45o dual linear polarizations are presented for high-speed millimeter-wave communication applications. The array element consists of a corner-fed patch with a tilted slot cut at its edge, which suppresses unwanted modes in order to generate the desired 45o linear-polarization. Comparing to a traditional 45o tilted patch, the proposed element gets rid of the bending feedline and realizes a higher isolation level between adjacent patches in the side-by-side arrangement. For proof-of-concept demonstration, a 2×8 array with 45o linear polarization was fabricated and measured, exhibiting a good agreement between simulated and measured results. The proposed array prototype possesses a -10dB impedance bandwidth of 10.6% (74.3~82.5 GHz). Moreover, a dual 1×8 array with ±45o dual-polarization is also presented, showing a bandwidth of 9.7% (74.4~81.9GHz) and a high isolation level of greater than 25dB. The proposed E-band planar arrays own the advantages of low-profile, i.e. ~0.067λ0, single-layer, low fabrication cost, simple structure, wide operational bandwidth, i.e. ~10%, and polarization flexibility. They represent promising candidates for high-speed E-band communications.

EXISTING SYSTEM

- A single-layered low-profile microstrip comb-line arrays were also proposed.
- However, they are only suitable for narrow band application such as automotive radars, due to their travelling wave structures which result in beam squinting.
- In general, it is highly desirable and challenging to design a single-layered array antenna with a low profile, simple structures, low fabrication cost, and 45o polarization in a wide bandwith for mmW communications.

PROPOSED SYSTEM

- A low-profile E-band slot-loaded patch is proposed for wideband mmW wireless communications.
- In order to generate 45o linear polarization, the current path of the undesirable mode is suppressed by a loaded slot cut on the edge of the patch.
- This radiator has superior performance than a traditional 45o tilted patch in that it possesses a higher isolation level between adjacent elements and eliminates the bending microstrip feedline.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

- Processor - intel core i3
- RAM - 2GB
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS:

- Ansoft HFSS(High Frequency Structure Stimulator)

REFERENCE

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