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(57) Abstract :
Milli-meter waves (mm Wave) represent a pivotal breakthrough in wireless communication technology, particularly in the context of 5G frequency bands. The operation at higher frequencies facilitates unparalleled data transmission speeds, reaching several gigabits per second. This article introduces a meticulously crafted Multiple Input Multiple Output (MIMO) antenna, specifically designed for optimal performance at 29 GHz and 39 GHz. The MIMO antenna comprises two elements with overall dimensions of 15x10x0.9mm3. It consists of two patches, a ground made of copper, and a substrate composed of Rogers RT5880 material with a dielectric constant of 2.2. The two copper patches measure 7x7mm, ground with three concentric circles of radii 6.2mm,3.4mm and 2.8mm respectively and substrate have dimensions of 15x10 mm. Noteworthy features of the antenna include a staircase-enriched rectangular micro-strip patch, contributing to the achievement of a dual-band operation at frequencies of 29 GHz and 39 GHz. The antenna achieves an impressive overall efficiency ranging between 77%-78%. Furthermore, the isolation between the two patches is remarkably low, measuring less than -15 db. This antenna attains a bandwidth of 1.8GHz (29GHz) and 2.6GHz (39GHz), accompanied by a gain of 6.48 dBi and 6.17 dBi, respectively at two bands. The Voltage Standing Wave Ratio (VSWR) is consistently below 2. This antenna effectively cover n260 band contributing to its versatility and applicability in various 5G scenarios.

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