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Dual Band LoRa/GPS Dipole Antenna with Harmonic Suppression Capability

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Abstract : This paper discusses the design, simulation results, and testing of a compact dual-band printed dipole antenna operating at frequencies of 916 MHz and 1.57 GHz for LoRa and GPS applications, respectively. The basic design of this antenna uses a linear dipole that operates at 916 MHz and 2.7 GHz. A small triangular-shaped linear balun has been developed as the matching network. Parasitic elements are employed to tune the second frequency to 1.57 GHz through a parametric study. Meanwhile, a stub is used to suppress the undesired 2.6 GHz frequency. This antenna is capable of operating on dual-frequency bands simultaneously with high efficiency in suppressing the unwanted frequency. The antenna exhibits the following parameters: return loss of -18.5 dB at 916 MHz and -14 dB at 1.57 GHz, VSWR of 1.25 at 868 MHz and 1.5 at 1.57 GHz, and gain of 2 dBi at 916 MHz and 2.75 dBi at 1.57 GHz. The radiation pattern of the antenna shows a directional E-plane and an omnidirectional H-plane at both frequencies. With its compact size and dual-band capability, this antenna demonstrates great potential for use in IoT applications that require both LoRa and GPS communication, particularly in applications where a small yet efficient form factor is essential.

Keywords : dual band, dipole antenna, parasitic elements, harmonic suppression, LoRa and Gps
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