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# A Multi-band Monopole Antenna for the 5G Wireless Communication Systems Operating at Sub-6G Frequency Band

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### Abstract



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This paper presents a compact multi-band printed monopole antenna for the 5G wireless communication operating at the Sub-6G frequency band. The proposed antenna consists ... [View more](#)

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#### Abstract:

This paper presents a compact multi-band printed monopole antenna for the 5G wireless communication operating at the Sub-6G frequency band. The proposed antenna consists of three resonators that operate at 1.9, 3.5, and the range of 4.6 to 7GHz for possible GSM1900, LTE, LTE-Advanced, and 5G applications. The antenna is built on RT/Duroid 5880 high-frequency laminate with a finite ground plane on the other side of the substrate. Simulation results show that the antenna has good performance in all frequency bands of operation, where a matching level is below -10 dB at the aforementioned bands.

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**I. Introduction**

A highly-efficient spectrum utilization system operating at different bands is needed to meet the demands of future communication systems [1]. Developing an antenna system that can support multiple wireless standards and have a high-data rate and efficient spectrum usage is challenging. Multi-band antennas are considered a good solution for supporting different applications. This is under the condition that the designed antenna should maintain good performance at all frequency bands such as a reasonable gain and suitable omnidirectional radiation patterns. However, the design of a multi-band antenna for multiple application systems is a challenging task. Recently, many different designs for attaining multi-band antennas operating at sub-6 GHz have been developed [2]-[7]. The integration of lumped elements such as PIN Diodes with the antenna is another approach to achieve a dual-band antenna. However, this approach deteriorates the antenna efficiency due to the additional losses caused by the lumped elements [8]. In this paper, we introduce a multi-band printed monopole antenna for GSM1900 (1.85-1.95 GHz) and LTE (3.4-3.6 GHz). Furthermore, the proposed antenna supports the suggested 5G application covering the band from 4.7-7 GHz.

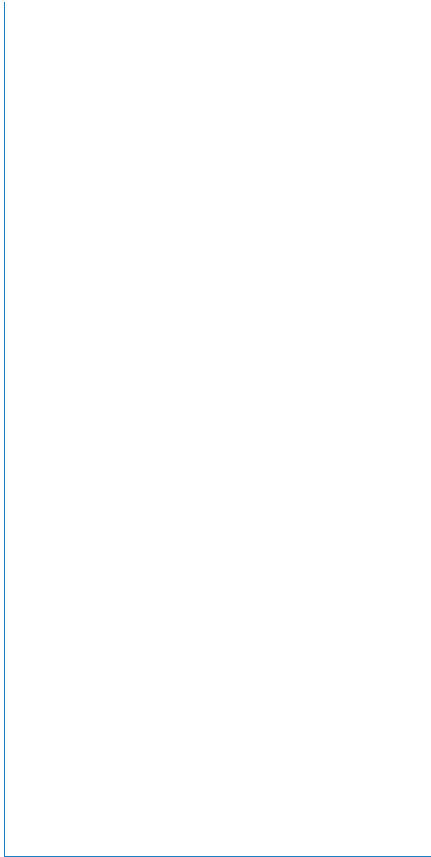
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