

# Bending Assessment of Dual-band Split Ring-shaped and Bar Slotted All-Textile Antenna for Off-body WBAN/WLAN and 5G Applications

## Abstract

This paper presents a dual-band split ring-shaped and bar slotted textile antenna for potential WBAN/WLAN and 5G applications. The antenna is made using textiles and features a full ground plane to possibly alleviate coupling to the human body. The overall size of the antenna is  $70 \times 70 \text{ mm}^2$ , with a patch sized at  $47.2 \times 31 \text{ mm}^2$   $0.472 \lambda \times 0.031 \lambda$ . The antenna is made using ShieldIt Super as its conductive textile and felt as its substrate. To enable its dual-band resonance at 2.45 and 3.5 GHz a split ring-shaped and bar slots are integrated onto the patch. The proposed antenna is evaluated when bent under different radii and at different axes to estimate its performance in terms of reflection coefficient, bandwidth, efficiency and gain. A 10-dB impedance bandwidth of 57 % or 135 MHz (from 2.39 to 2.52 GHz) and 70 % or 240 MHz (from 3.45 to 3.56 GHz) are obtained when evaluated in the planar /bent configuration. The maximum realized gain is 6 dBi for at 3.5 GHz. These performances indicate that the antenna proposed in this work can be potentially improved for applications in WBAN/WLAN and 5G bands.

## Keywords

5G; All-Textile antenna; Microstrip antenna; Off-body; Wearable textile antenna