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**Flexible milimeter-wave microstrip patch antenna array for wearable RF energy harvesting applications**
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**Abstract**
In this paper, a series-fed milimeter-wave microstrip patch antenna array operating at 28 GHz is presented for wearable radio-frequency (RF) energy harvesting applications. The antenna array is made of 4×4 rectangular microstrip elements on a polyethylene terephthalate (PET) substrate to provide conformability when directly attached on human body parts. A 4-way Wilkinson power divider is connected to the array for RF power combining. The overall size of the antenna is 47×28×0.25 mm. The half-power beamwidth (HPBW) of the antenna array can be increased up to 151.9° via structural deformation making it suitable for energy harvesting applications. The performance of the antenna array is investigated in terms of impedance matching, gain and radiation pattern. The average simulated specific absorption rate (SAR) of the antenna is 0.52 W/kg which is well below the safety limit of 1.6 W/kg averaged over 1 g of tissue for 100 mW of input power. 

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Flexible antenna Microstrip antenna RF energy harvester

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