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| (51) International classification             | :H04W0016140000,<br>H03H0007010000,<br>H01Q0001520000,<br>H01Q0021280000,<br>H04B0001120000 | (71)Name of Applicant :<br><b>1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) DHANBAD</b><br>Address of Applicant :INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) Dhanbad, Jharkhand 826004, India Jharkhand India |
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(57) Abstract :

The present invention discloses a substrate integrated waveguide (SIW) filter based multiple-input-multiple-output (MIMO) antenna system for interweave and underlay cognitive radio operation. The pre-defined frequency band is 2.3-4.2 GHz, which is in mid-band 5G network implementation. For sensing the 2.3-4.2 GHz band, a dedicated wideband antenna is used separately. The SIW filter is operated in two phases. In one phase, SIW filter acts like a tunable bandpass filter through which spectrum interweave cognitive radio functionality is achieved. In another phase, SIW filter works like a tunable bandstop filter from which spectrum underlay cognitive radio functionality is obtained. A plurality of RF PIN diodes (D1, D2, D3, D4, D5) used to achieve the frequency tunability. The SIW filter is integrated to the four-port wideband MIMO antenna which gives good isolation between the ports, envelope correlation coefficient, and antenna performance.

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