

SELF-PACKAGED LOW LOSS SUBSTRATE INTEGRATED AIR-FILLED WAVEGUIDE

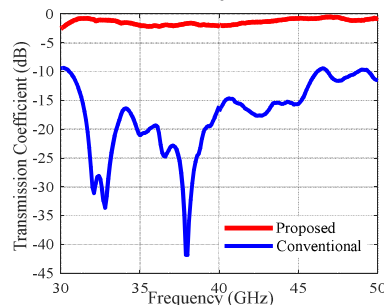
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BACKGROUND

The rapid development of millimeter-wave applications including high-speed wireless data links, short-range radars, and high-resolution imaging has increased demands for low cost and high performance integrated circuits. As the conventional circular and rectangular hollow waveguides cannot be easily integrated with the circuits, the invention of substrate integrated waveguide (SIW) technology has been a promising start to satisfy these demands. The SIW technology has received considerable attention over the last decade because of its lightweight, low cost, and compactness. However, for the applications at high frequencies, which are more desired for upcoming communication devices, the conventional SIW circuits are suffering from unexpected dielectric losses.

TECHNOLOGY

To resolve the dielectric loss problem of SIW circuits at high frequencies, a new waveguide design configuration has been developed which provides a low loss air propagation medium for the integrated circuits. This air-filled integrated guiding structure is completely isolated and self-packaged, and can be used to design low insertion loss substrate integrated circuit components at millimeter-wave and submillimeter-wave frequencies.



Comparison of measured insertion loss performance of an integrated circuit with proposed self-packaged technology (red) and with conventional technology (blue)

The components incorporating this integrated guiding structure show higher average power handling capability (APHC) compared with the components made with traditional SIW structure. Moreover, this integrated low loss waveguide does not need any expensive and strict connection of the layers, even at very high frequencies, since its innovative geometry completely isolates the guiding medium.

COMPETITIVE ADVANTAGES

- Low loss at millimeter-wave and submillimeter-wave frequencies
- Completely self-packaged integrated guiding medium with contactless waveguide layers
- Low-cost fabrication process and easy connection of the waveguide layers
- High average power handling capability

APPLICATIONS

- High data rate future communication systems
- High-frequency antenna feed networks

TECHNOLOGY DEVELOPMENTAL STAGE

- Basic circuit components based on this technology have been developed and tested
- Patent pending

BUSINESS OPPORTUNITY

-Licensing/Partnering/Co-development

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