

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Fixed and Broadcast Communications (5)

Author: Mr. Xin Xu  
China Academy of Space Technology (Xi'an), China, jerry\_1019@163.com

NOVEL DESIGN FOR MICROSTRIP TO STRIPLINE TRANSITIONS FOR MILLIMETER-WAVE  
APPLICATION IN LTCC

**Abstract**

This paper presents two transitions between microstrip and stripline in Low Temperature Co-fired Ceramic technology, including a vertical transition and a coplanar transition for millimeter-wave application. These interconnects are simulated and optimized by three-dimensional electromagnetic field simulator. Simulation results show that the return loss of microstrip to stripline vertical transition is less than -22dB, and insertion losses is better than 0.5dB up to 35GHz, and better than 1dB up to 40GHz. Similarly, the return loss of the coplanar transition is less than -32dB and insertion loss is better than 0.5dB. LTCC test structures were fabricated and the performance of all transitions successfully validated by scattering parameter measurements up to 40GHz. These two transitions have been used in a high integrated LTCC downconverter in satellite, which used fourteen microstrip to stripline coplanar transitions in the RF chain, the measured results of the LTCC downconverter shows the insertion loss of the transitions is less than 3 dB, and the gain flatness of the downconverter is about 1.5dBp-p at the 300MHz work frequency bandwidth. The transition can satisfy the requirement of this product well.