

Millimeter-wave band array antennas using transmission-loss reduced waveguide structures

Jiro Hirowawa

Tokyo Institute of Technology

This presentation discusses millimeter-wave band array antennas using transmission-loss reduced waveguides such as air-layer inserted LTCC post-wall waveguide and plate-laminated waveguide by diffusion bonding. The measured transmission loss is reduced to 17% by inserting an air region in the half along the height in a single-mode rectangular waveguide of LTCC with the dielectric constant of 6.6 in the 60GHz band. The overall estimated conductor loss is only 0.26dB by assuming the copper conductivity of 5.8×10^7 S/m in a plate-laminated waveguide corporate-feed 16x16-element slot array antenna with 33.0dBi gain in the 60GHz band. The plate-laminated waveguide slot array antennas have many functions such as high antenna efficiency of about 80%, wide 1dB-down gain bandwidth of about 10%, circular polarization, dual-polarization use and high frequency band operation up to 350GHz.



Biography - Jiro Hirokawa

Jiro Hirokawa was born in Tokyo, Japan. He received the D.E. degree from Tokyo Institute of Technology in 1994. He is currently an Associate Professor there from 1996. From 1994 to 1995, he was with the antenna group of Chalmers University of Technology, Sweden, as a Postdoctoral Fellow. His research area has been in slotted waveguide array antennas and millimeter-wave antennas. He received a Young Scientists' Prize from the Minister of Education, Cultures, Sports, Science and Technology in Japan in 2005. He is a Fellow of IEEE from 2012.