

## 2000

### **Development of a PAM for multi-channel radio communication**

#### **~ Packaging ~**

Multi-channel PAM (Power Amplifier Module) progressed around 2000 to carry out the internet connection of mobile phones and the exchange of more radio signals. LTCC (Low Temperature Co-Fired Ceramic) substrate was used for multilayer circuit boards for PAM. On the inner layer of the LTCC board, ingenious efforts were made to stabilize radio signals, such as coupling capacitors, impedance matching wirings, and baluns.

The figure is a part of a thesis by Murata Manufacturing which got the excellent paper award at STS (SEMI Technology Session) of SEMICON Show in 2001 which was sponsored by SEMI.

Similar structures were also released from other PAM manufacturers such as Hitachi. LTCC, particularly the one with Cu or Ag wiring, is now an indispensable technology for small radio equipment because of its good design capability of L and C, high Q design, adoption of high dielectric constant insulator, and baluns and band pass filters. The size has been more miniaturized and the capability to handle more channels has been enhanced.

