Abstract

The main objective to introduce the ABS (Acrylonitrile Butadyne Styrene) plastic substrate in place of RT-Duroid substrate for microstrip filters is to reduce the cost. The cost of plated ABS plastic substrate is substantially less (Rs. 4/- sq.inch) compared to the cost of RT-Duroid (US$ 02/- sq.inch). Two microstrip (hairpin line) band pass filters at 1537.5 MHZ and 1575.42 MHz have been developed and tested. The performance of filters have been verified over temperature range, -10 deg. C to 60 deg. C. The ABS plastic blocks have been used in place of metal blocks of brass, copper and Commercial Aluminium to fabricate three dimensional microwave cavity filters for communication systems. The specific gravity of ABS plastic is 1.03 gms/cubic cm compare to 2.7, 6.3 and 9.6 gms/cubic cm of Com. Al, Copper and Brass respectively. Hence the weight of metallized ABS cavity filters will be 1/3rd, 1/6th and 1/9th of the com. Al, copper and brass cavity filters.

References

Design and Development of Low Cost and Light Weight Microwave Filters by using Metallized ABS Plastic

- Jen-TasiKuo, Ming-Jyh Maand Ping-han Lu, Microstrip filter with Compact miniaturized hairpin line resonators” IEEE Microwave Theory and Guided Letters, Vol.10, No.3, March 2005, pp 94-95
- Hong J. S. and Lancaster M. J. Microstrip filters for RF/microwave application, A Wiely–Interscience publications Canada, 2004
- High performance plated plastics” by Jim Pychwalski and Martin Bayes, Shipley Co., Newton, MA.

- Agilent Technologies, Inc.www.agilent.com
- Sonnet Software, www.sonnetusa.com
- Ansoft-HFSS-3D for Electromagnetic modeling: www.ansoft.com

Index Terms

Computer Science

Applied Sciences
Keywords
Microstrip  substrate  hairpin line filter  dielectric constant  insertion loss  dissipation factor  quality factor  bandwidth