

# A Dual-Band High Gain Antenna For GPS Application

Shuguang Chen

The dual-band high gain antenna may be used for the commercial (L1 Band) and military (L2 Band) Global Positioning System (GPS) applications. This paper describes a high gain microstrip stacked patch antenna that can be used as a single high gain antenna or as a single element for the adaptive anti-jamming antenna array. The innovative design of the presented antenna uses one simple probe parasitic feed that makes the dual frequency bands wider to compensate the detuning due to the mutual coupling.

Figure 1 (Left) shows the fabricated prototype photo of the designed antenna. There are two stacked Printed Circuit Boards (PCB) on top of the ground, working as the radiation elements. The top PCB is optimized at the L1 frequency band and the bottom PCB is designed to work at the L2 frequency band. Both of the two PCBs are designed for the Right Hand Circular Polarization (RHCP) for GPS applications. On the other sides of both PCBs, there are copper pads for parasitic feeding for the wider working frequency band purpose. The PCBs are 0.032" thick Rogers 4003C material with the square sizes of 3.4" x 3.4" and 4.4" x 4.4", individually. The height of L1 PCB above L2 PCB is the same as the height of L2 PCB above the ground, which is 0.250". The ground plane is made of another PCB that has 50-ohm microstrip line on the other side. This microstrip line can be easily connected to the end-launch SMA connector. The RF interface can be any other types based on the applications, as long as there is a well matched mode and impedance transitions to the coax-probe feed.

Figure 1 (Right) shows the measured Voltage Standing Wave Ratio (VSWR) of the prototype antenna for the covered L1 and L2 frequency bands. The measured results exceeded two to three-time wider frequency bandwidth with the spec of VSWR less than 2.0:1. The measured VSWR result expressed that more than 90% of the RF energy is accepted by the antenna. The measured radiation performance in term of antenna gain patterns along with detailed antenna design parameters will be presented in the conference.

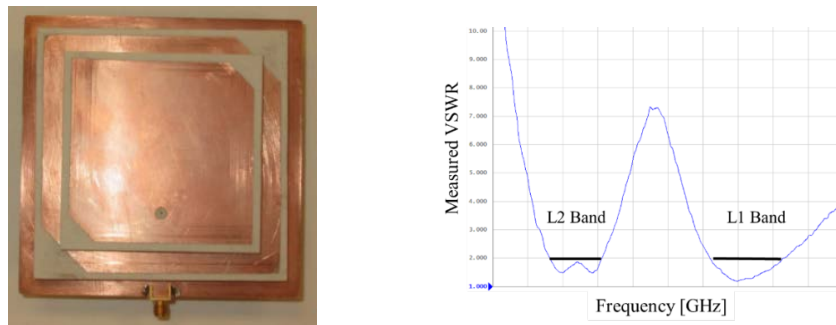


Figure 1. Antenna Prototype Photo (Left) and Measured Antenna VSWR (Right)