

Analysis of the G3LTF Dual Band Feed for 23cm and 13cm

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G3LTF described has described **(1)** a dual band feed for the 23 cm and 13 cm bands. The feed is a combination of two proven designs: an EIA dual-dipole feed for 23 cm, with a cylindrical waveguide horn, or “coffee-can,” feed for 13 cm. The dipoles are backed with a 1λ diameter GP (ground plane); the cylinder fits in a hole in the centre of the GP, so that the GP acts as a flange at the aperture of the cylinder. Each dipole is fed with a stripline balun arrangement from a remote power divider, and the cylindrical waveguide is excited by a probe.

Taken separately, each feed is known to work well; radiation patterns and calculated dish efficiency may be found in the W1GHZ Microwave Antenna Book — Online **(2)**. What remains to be seen is how well the combination works. Is the dual band feed as good as the individual feeds, or are there unexpected interactions that

spoil the performance?

The radiation patterns were calculated using Ansoft **HFSS** software **(3)** and plotted in 3D in Figure 1. Performance as a dish feed was estimated using my **PHASEPAT** software **(2)**. The calculated dish efficiency at 2304 MHz is very good, as shown in Figure 2. Best **f/D is around 0.5, just** right for the two-meter diameter dish at G3LTF. The phase centre is 0.07λ beyond the aperture of the cylindrical horn, or about 9 mm above the GP. Since the phase centre is most critical at the higher frequency, the 1296 MHz dish efficiency in Figure 3 is calculated at the same phase centre (best phase centre at 1296 MHz would be 0.14λ above the GP). Efficiency is also very good, with only a tiny phase error due to the phase centre compromise. Best f/D is again around 0.5, so this is a good feed on both bands for the G3LTF dish.

Figure 1

