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March 5, 2007

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To: VSRT Group
From: Alan E.E. Rogers
Subject: Demonstration of the sense of circular polarization

A simple experiment to demonstrate that the Direct TV feeds are sensitive to circular polarization can be setup using a 27 W fluorescent lamp (FLE27QBX/2/SW) as a signal source to generate fringes between 2 feeds spaced right next to each other. If the lamp is temporarily covered with an aluminum juice can, whose top has been cut away with scissors, the fringes will completely disappear. Weak fringes can be made to remain when the lamp is covered if a helix antenna of the correct hand sense is placed through a small hole in the base of the can as illustrated in the photos of Figure 1. With the voltage to the power injector at 13v I found that only the left handed helix would produce fringes. This means that the Direct TV dish would be sensitive to right hand polarization (RCP) since the reflection on the dish reverses the sense of polarization.

Another way the experiment can be conducted is to cover the lamp with a can and an exposed helix and then change the voltage from 13v to 18v and note that fringes on the LCP helix will appear below 15v and disappear above 15v. Change to the RCP helix and the opposite should be observed

A) 18v AC/DC power adapter is available from mini-box.com at \$12)

Notes:

- 1] I placed the lamp about 8" above the feeds.
- 2] CAUTION – don't leave the lamp covered with the can for an extended period as it will overheat. Some more work is needed to make this a robust and safe experiment.
- 3] The optimum circumference for a helix is about 1 wavelength or one inch for our 12 GHz frequency.
- 4] The portion of the wire inside the can couples some of the 10,000 K noise inside the can to the helix. Details of this need to be refined.

