8 Design Examples

The following section shows a series of design examples. Each of these has been tuned for a particular design, so a cut-and-paste approach will not necessarily ensure optimum performance. However, these designs are a good starting point for further optimization, and they indicate the approximate size of the particular antenna.

8.1 F-antennas

The following figure shows an F-antenna. Measurements are in millimetres.

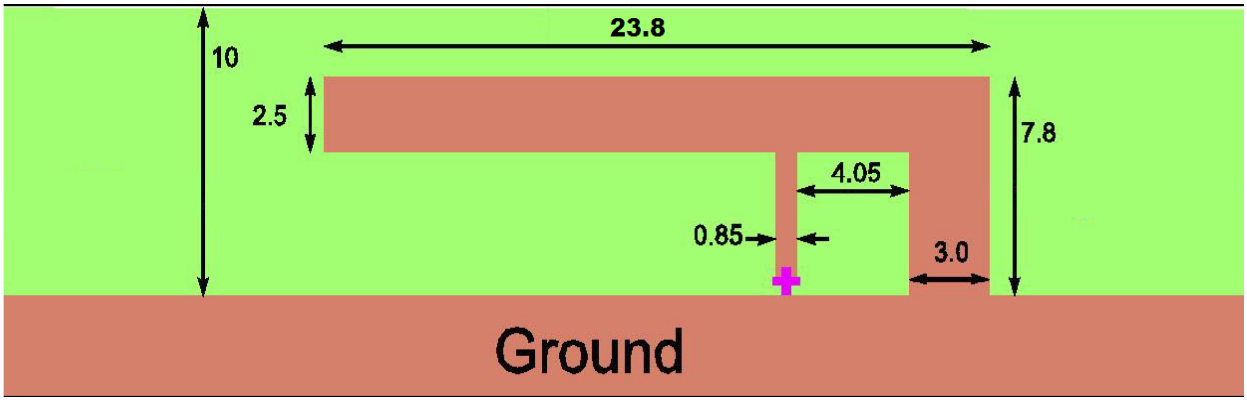

Figure 11. F Antenna

Figure 12 shows the EVK horizontal PCB radiation pattern. Red represents vertical polarization and blue represents horizontal polarization both measured in dBi.

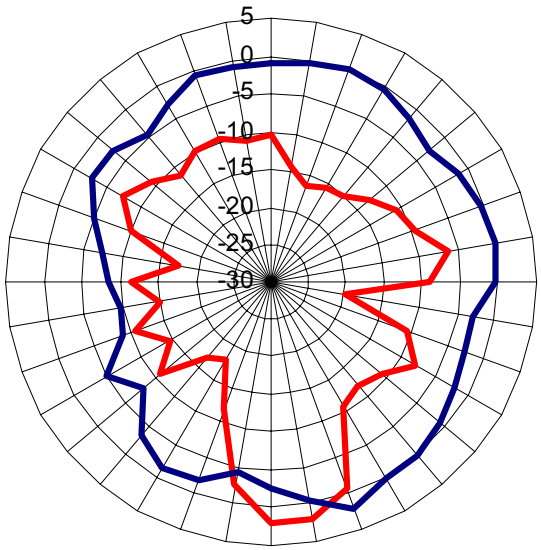

Figure 12. F-Antenna Radiation Pattern (For Antenna as Shown in Figure 11)

Figure 13 shows a typical plot of the return loss and bandwidth obtainable with an F-antenna. A slight ripple is caused by the ground plane size.

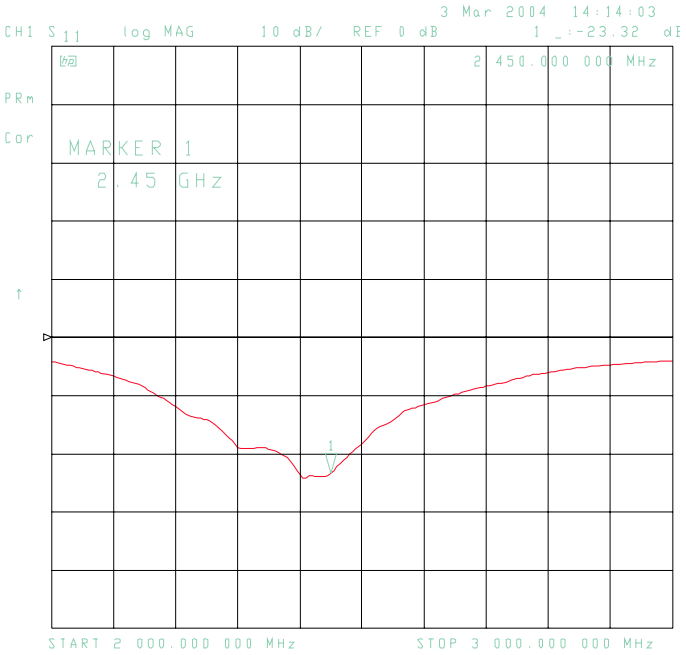

Figure 13. F Antenna Return Loss and Bandwidth

~~8.2 Chip Antennas~~

~~Numerous chip antenna designs exist and Freescale strongly recommends carefully following the antenna manufacturers guidance regarding ground, keep-out areas, etc.~~

~~With no tuning, chip antennas often have a resonant frequency above 2.5 GHz and the return loss at 2.45 GHz is very poor. The antenna must be tuned either by inserting a chip coil in series with the feed point, or adding a PCB track to the opposite end to lower the resonant frequency to 2.45 GHz. The antenna needs to be tuned for the PCB and enclosure that the end product will have.~~

~~8.3 Dipole Antennas~~

~~The following two full-size designs have been tested:~~

1. ~~A printed balun and 50 ohm connector for use with the RF Daughter Card (13192RFC-A00).~~
2. ~~A printed balun on the MC13192-SARD which is included in the Developer's Starter Kit (13192DSK-A00).~~

~~The shape assures reasonable omnidirectional coverage while feeding and matching is accomplished by the hairpin design. In one particular design, separate TX and RX antennas were placed on top of each other one on each side of the PCB. Performance in this design has been adequate, but not optimum. This approach trades off performance for reduced PCB area. This dipole has also been bent to improve the omnidirectional characteristics and reduce board width. Impedance matching is improved by using a~~