



Y-Patch Antenna

A two-port y-patch antenna is modeled in FEKO to determine isolation between ports and radiation patterns of the antenna

Communications technology is constantly aiming to achieve higher signal-to-noise ratios (SNRs) and especially for portable devices a compact design is required. MIMO systems are one way to improve SNR but may require two or more antennas in a single device. In [1] a two-port y-patch is used to achieve dual antenna diversity in a single compact unit. Here a y-patch antenna is modeled in FEKO to determine the isolation between the two ports and radiation patterns of the antenna.

Figure 1 shows the FEKO model of the antenna which consists of a single y-shaped patch with two feed probes. The geometry is symmetric about the y-axis and the probes are attached at equal lengths along the patch. Capacitive loading is used to reduce the inductive impedance of the probes and the structure is mounted on a finite ground plate.

Figure 1: FEKO model of y-patch antenna

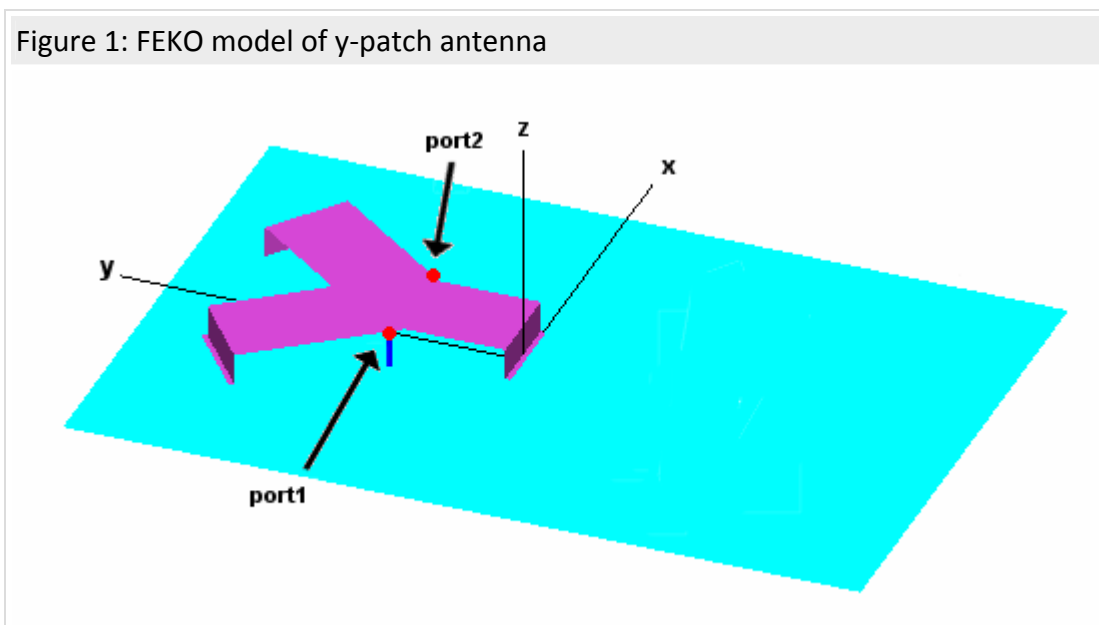
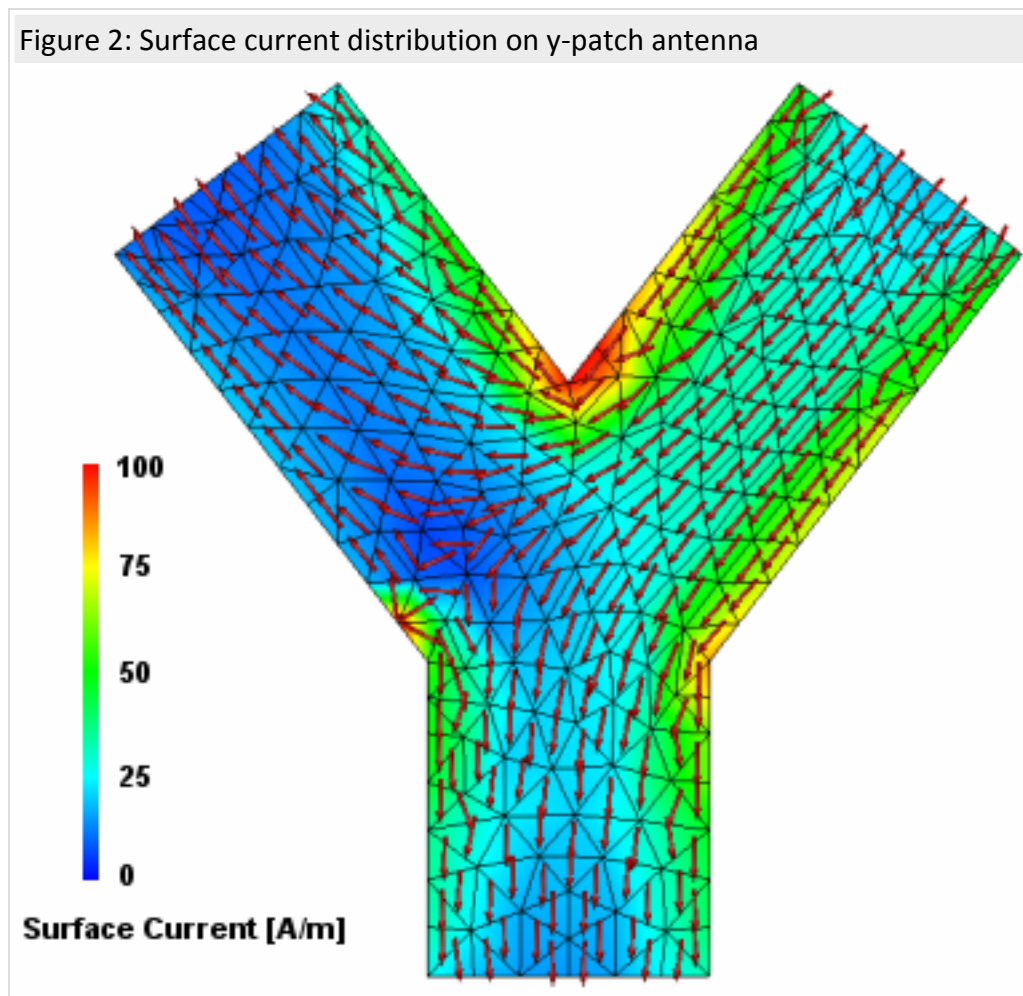
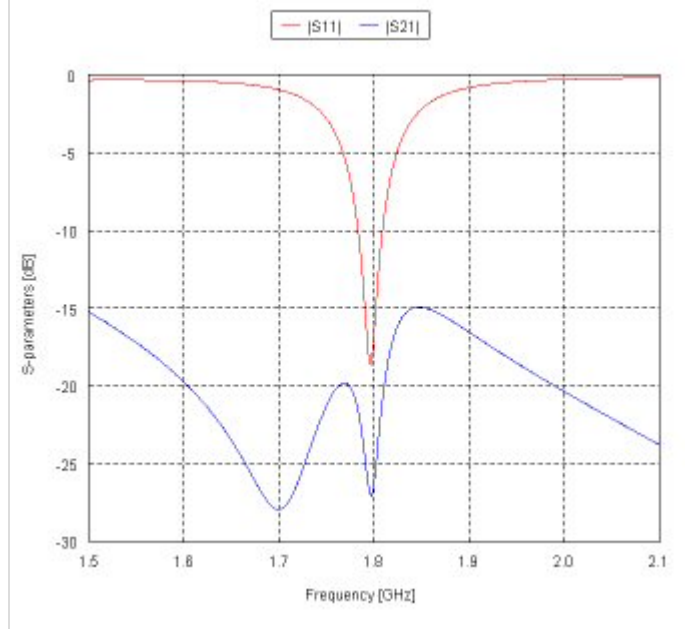


Figure 2 shows the surface current distribution at 1800MHz with port 1 active and port 2 terminated in a 50Ω load.



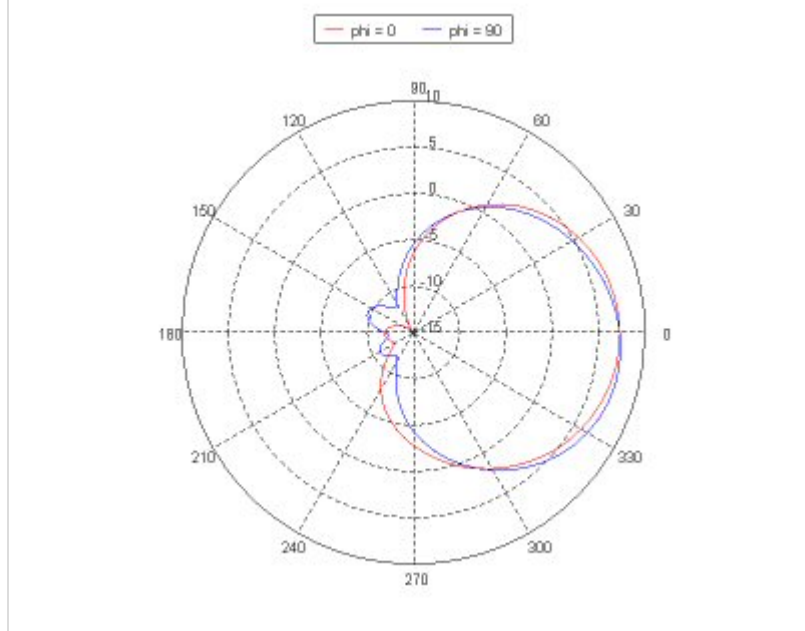
An S-parameter simulation is used to calculate the input reflection and isolation between the two ports. The results are shown in Figure 3. A -10dB bandwidth of about 6% is obtained and isolation between the two ports is more than 20dB within the operating band.

Figure 3: S-parameters for two-port y-patch antenna



Finally the radiation pattern is calculated with port 1 active and port 2 terminated in a 50Ω load. Figure 4 shows the gain patterns at 1800MHz. The angle phi is measured in the xy-plane from the x-axis.

Figure 4: Radiation patterns for y-patch antenna at 1800MHz



References

- [1] S.C.K. Ko, R.D. Murch, "Compact Integrated Diversity Antenna for Wireless Communications", IEEE Transactions on Antennas and Propagation, Vol. 49, No. 6, pp. 954-960, June 2001.



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