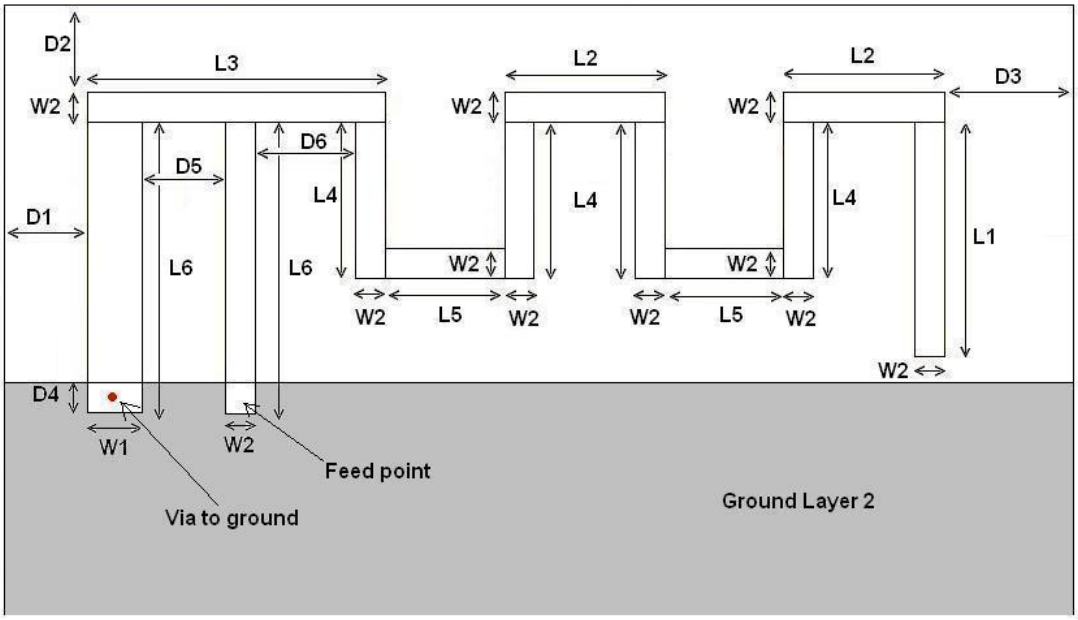
ANTENNA DESIGN

The PCB antenna on the CCBR75AR01 CB Radio reference design is a meandered Inverted F Antenna (IFA). The IFA was designed to match an impedance of 50 ohm at 2.45 GHz. Thus no additional matching components are necessary.

1. Layout and Implementation

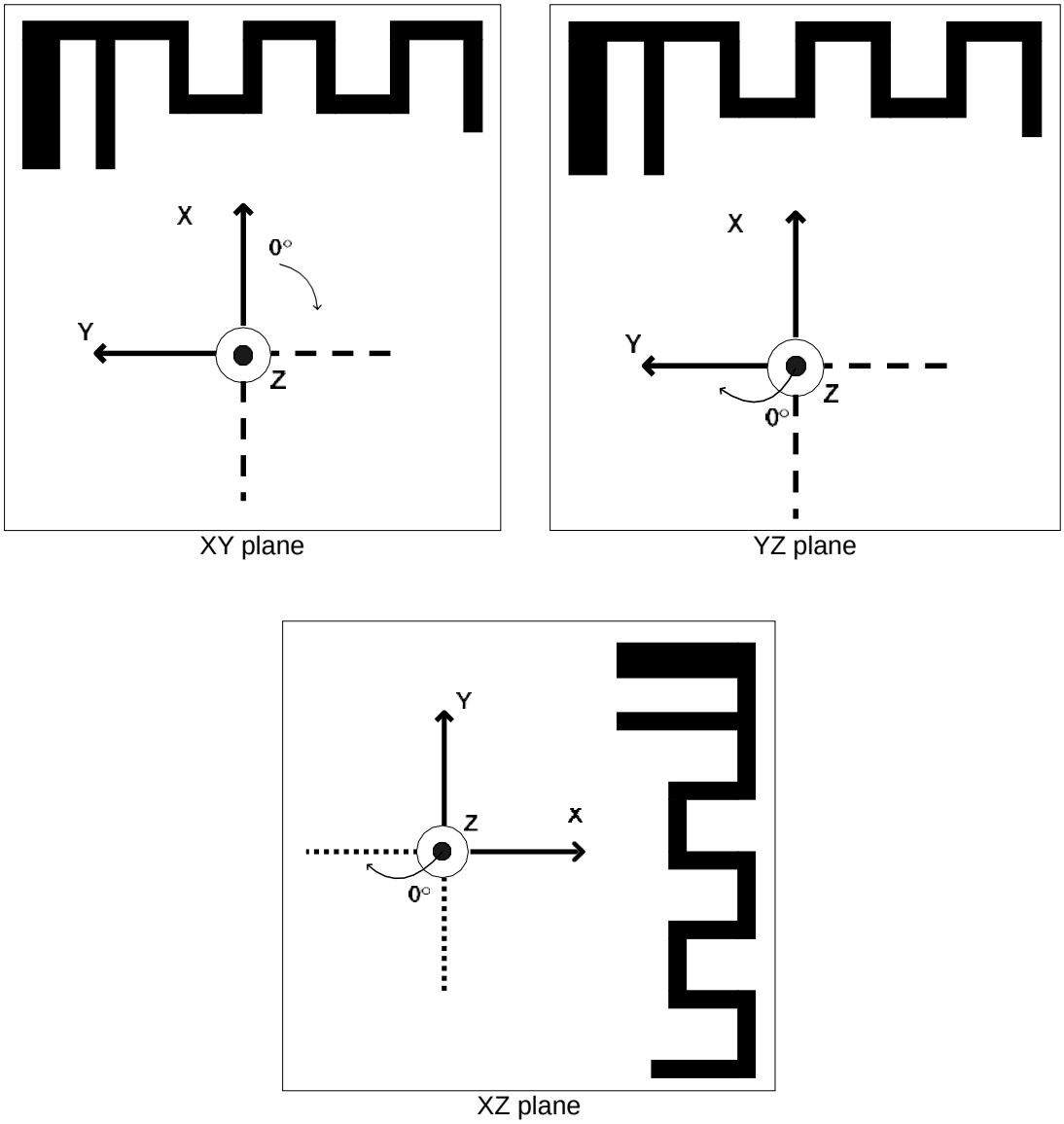


L1	3.94 mm
L2	2.70 mm
L3	5.00 mm
L4	2.64 mm
L5	2.00 mm
L6	4.90 mm
W1	0.90 mm
W2	0.50 mm
D1	0.50 mm
D2	0.30 mm
D3	0.30 mm
D4	0.50 mm
D5	1.40mm
D6	1.70 mm

Table 1: Antenna Dimensions

2. Radiation Pattern

The radiation pattern for the antenna implemented on the CCBR75AR01 CB Radio reference design has been measured in an anechoic chamber. Figure 1 through Figure 6 shows radiation patterns for three planes, XY, XZ and YZ, measured with vertical and horizontal polarization. All these measurement were performed without connecting the dongle to a computer. Figure 7 and Figure 8 shows the radiation pattern when the dongle is connected to a laptop. All measurements were performed with 0 dBm output power. Figure 0 shows how the different radiation patters are related to the positioning of the antenna.



XY plane

YZ plane

XZ plane

Figure 0: How to Relate the Antenna to the Radiation Patterns

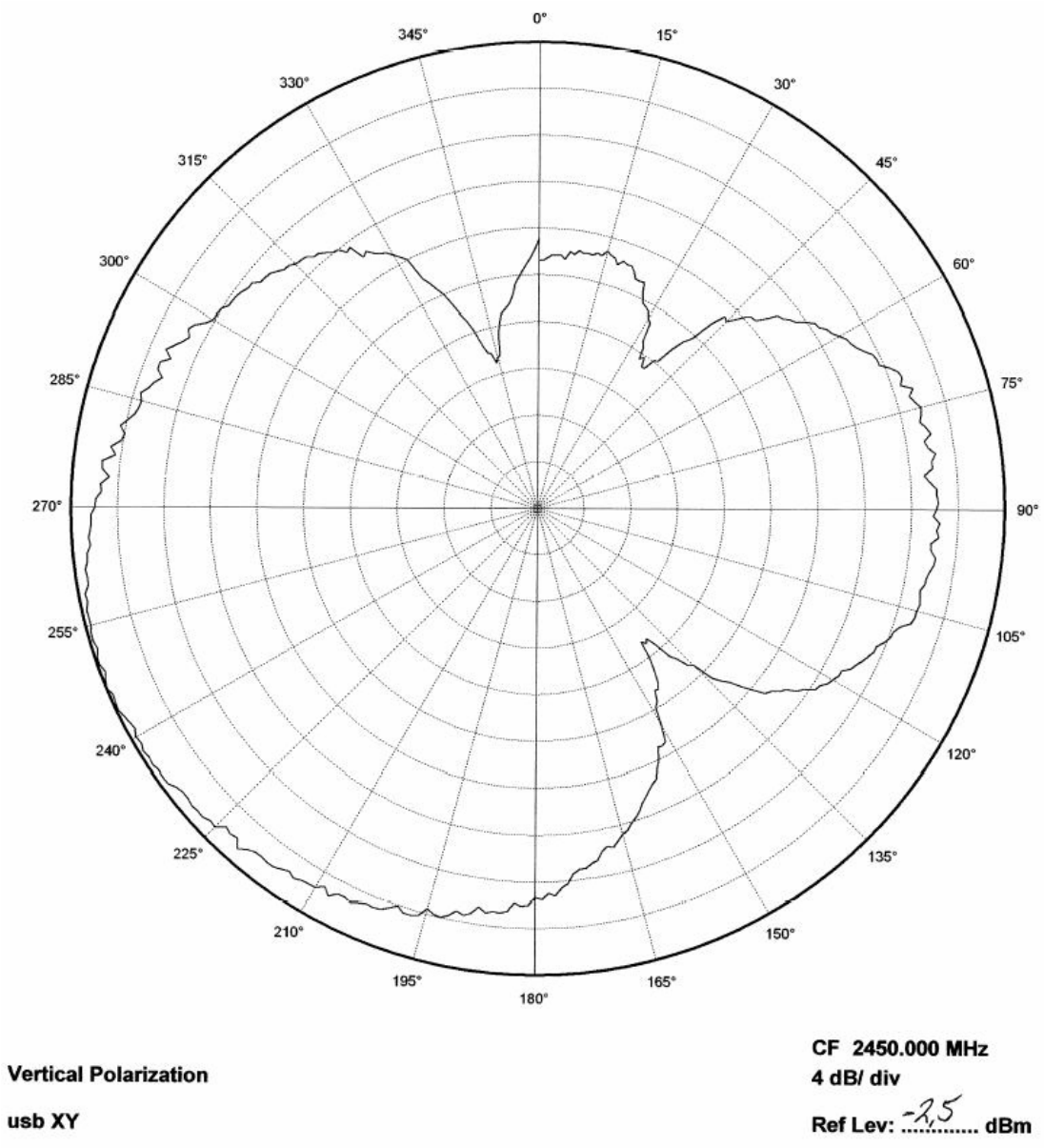


Figure 1: XY Plane

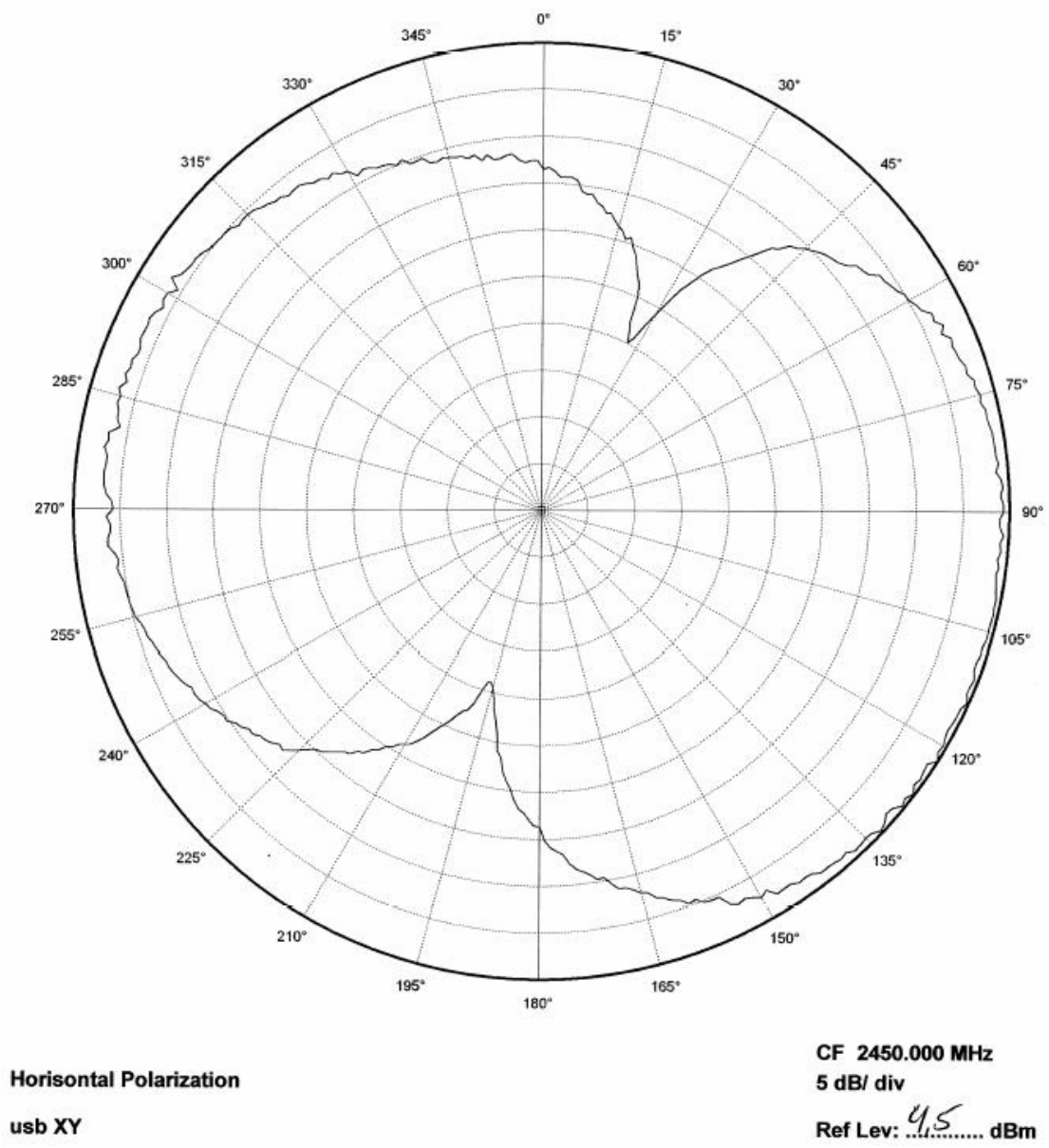


Figure 2: XY Plane

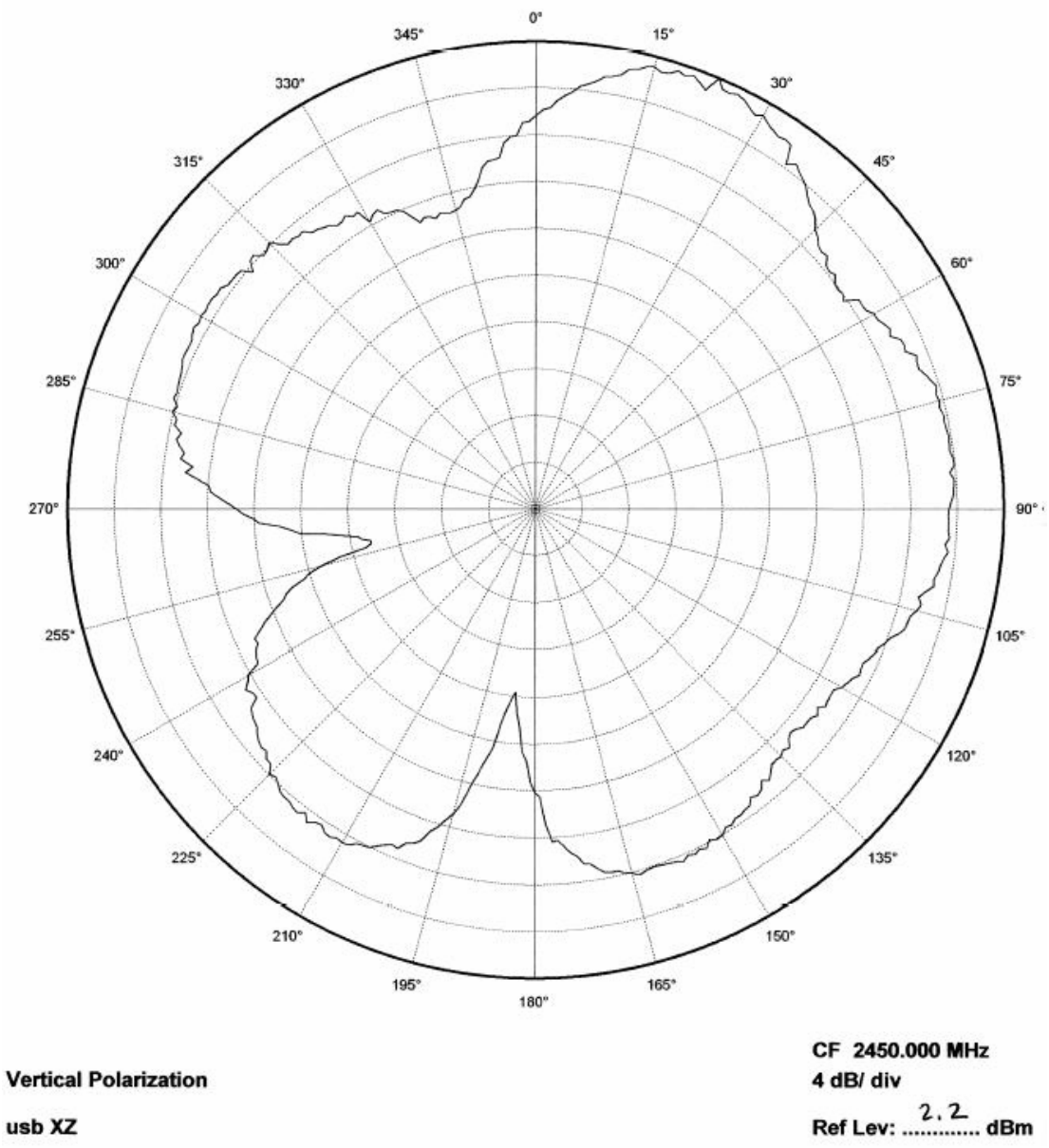


Figure 3: XZ Plane

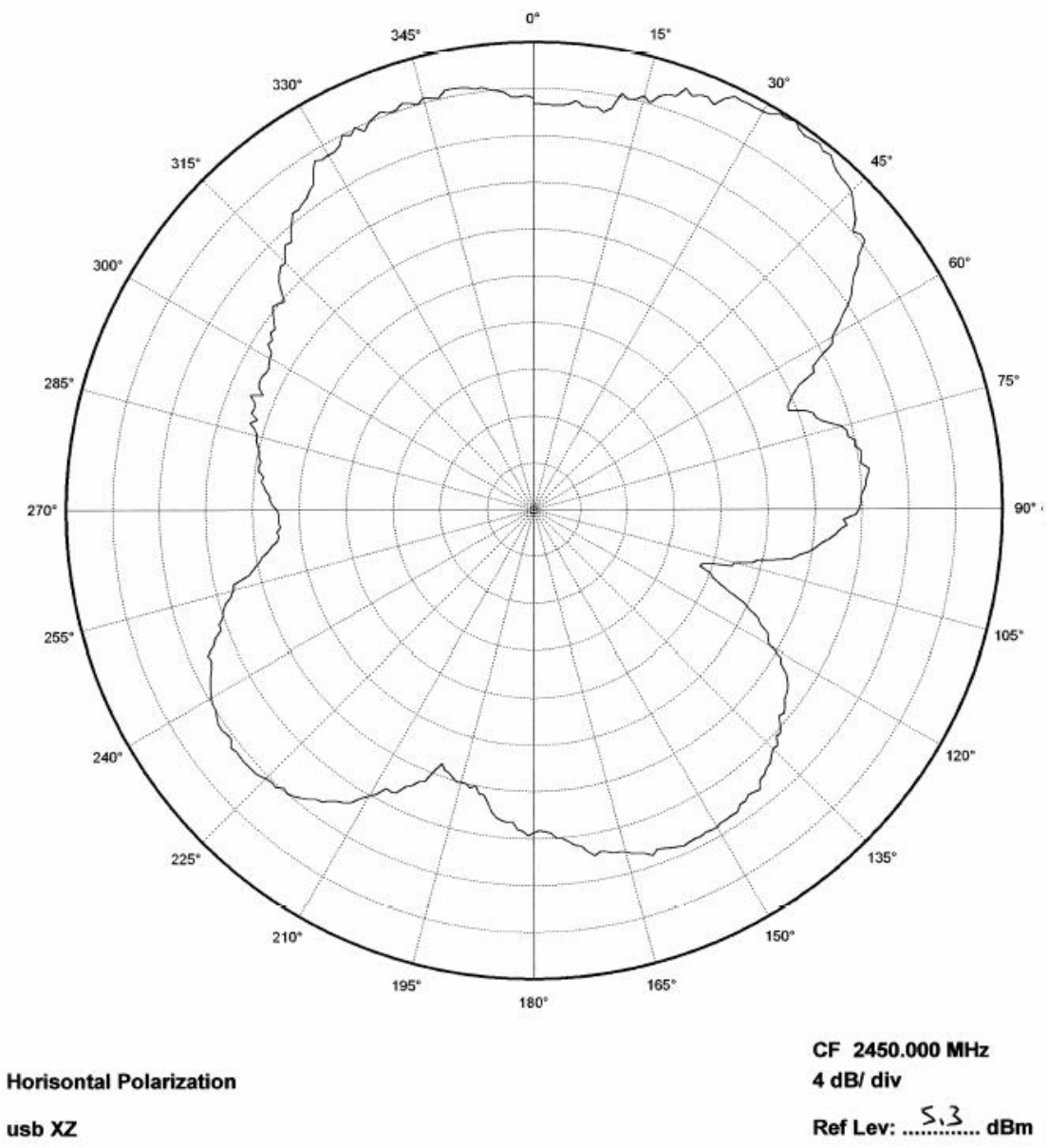


Figure 4: XZ Plane

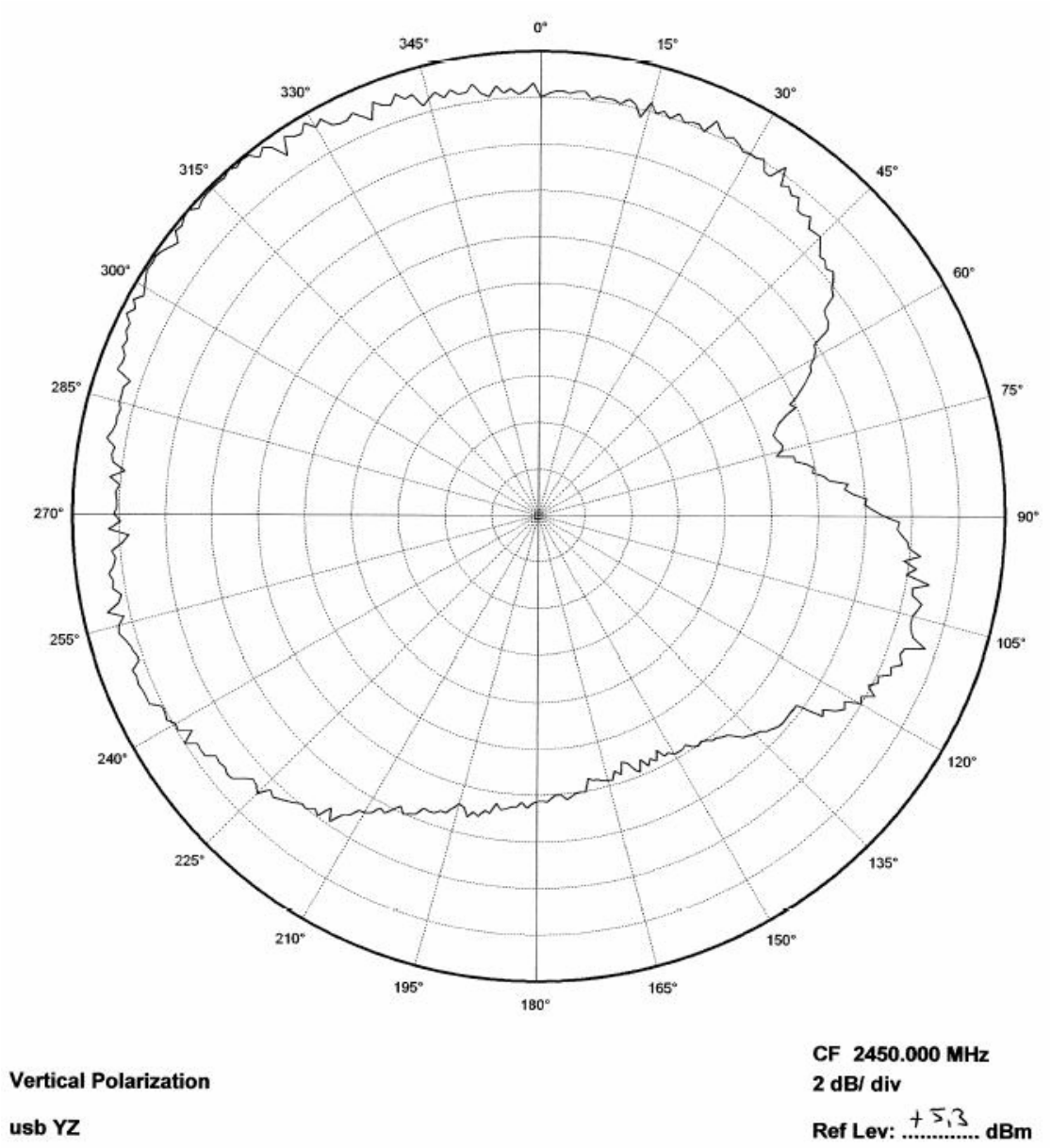


Figure 5: YZ Plane

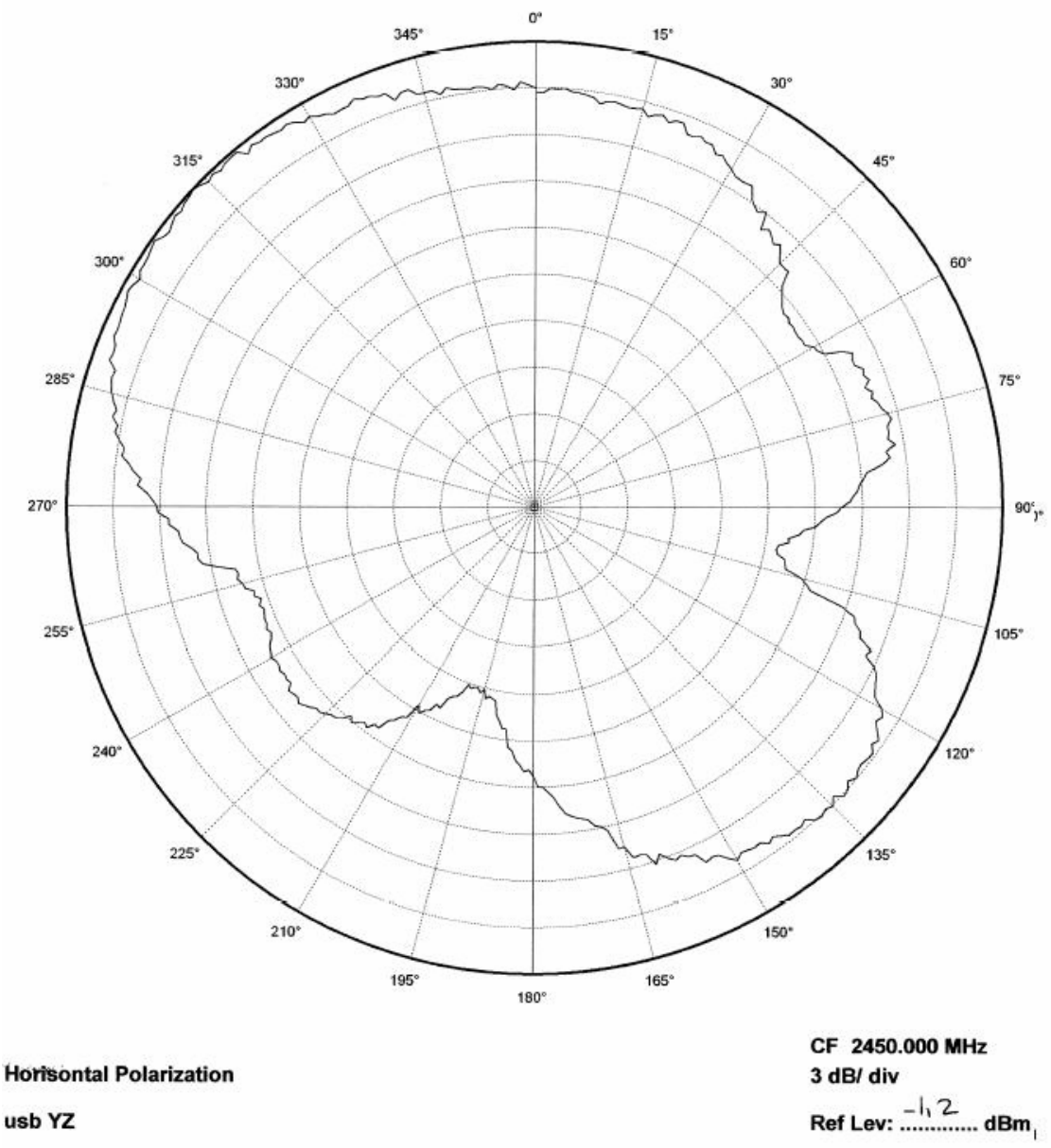


Figure 6: YZ Plane

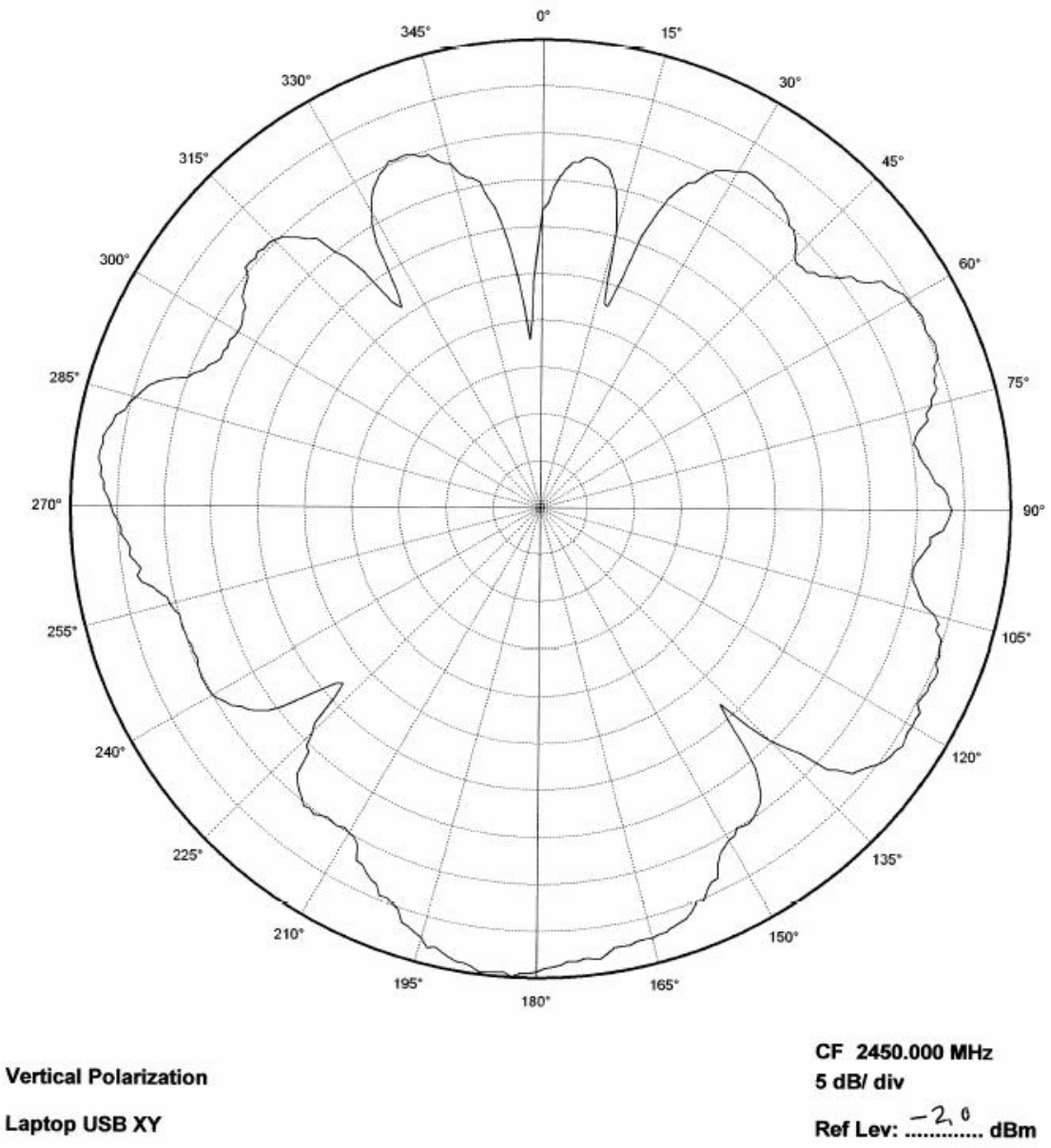


Figure 7: in Laptop XY Plane

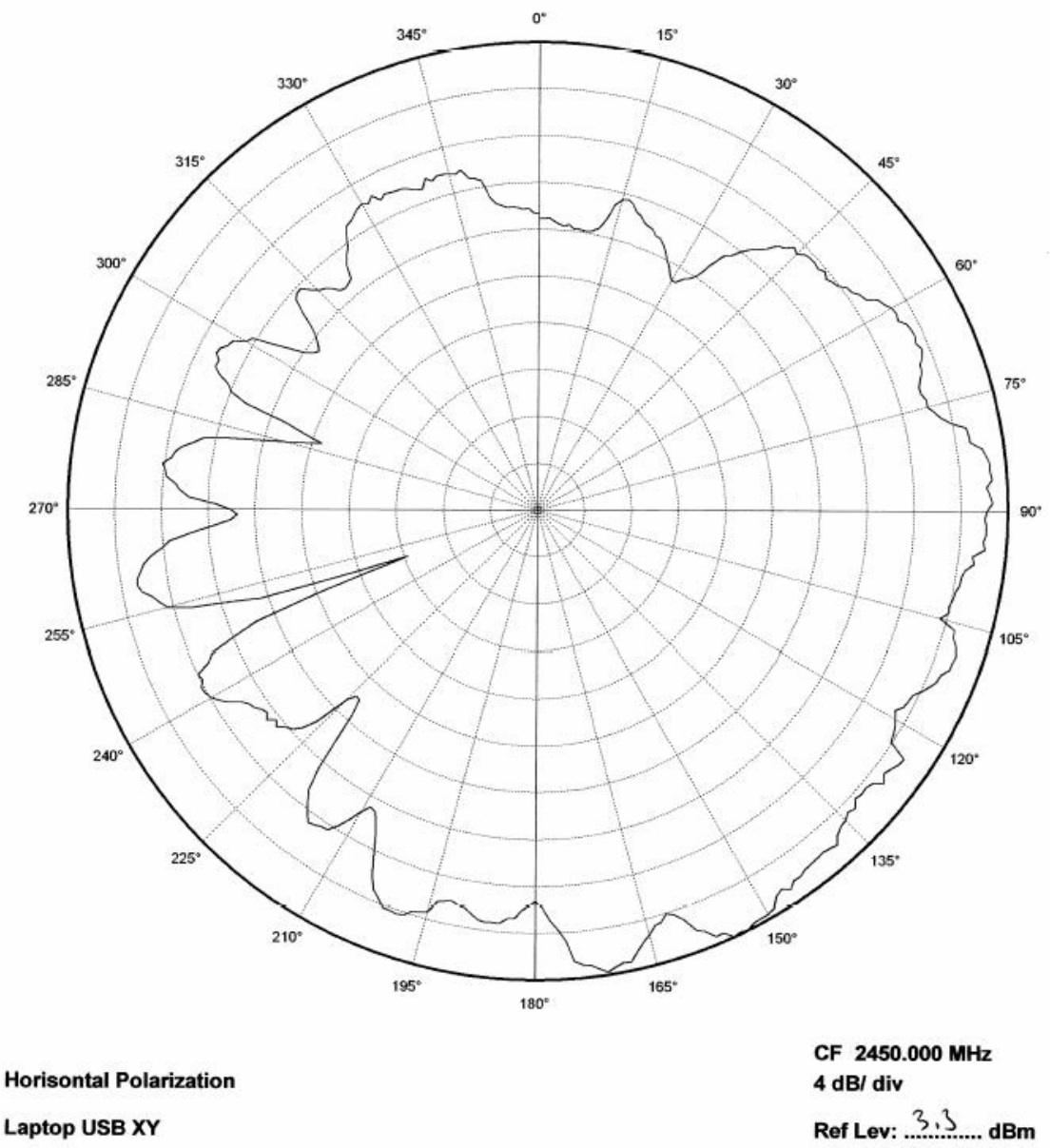


Figure 8: in Laptop XY Plane

3. CONCLUSION

This application note shows that it is possible to implement a 2.4 GHz antenna on a small area and still achieve good performance. Table 2 lists the most important properties of the Inverted F Antenna, described in this document. The free line of sight (LOS) range was measured with 250 kbps and 1 % PER.

Gain in XY plane	4.5 dB
Gain in XZ plane	5.3 dB
Gain in YZ plane	5.3 dB
Gain in XY plane, connected to laptop	3.3 dB
LOS range	240 m
Antenna size	15.2 x 5.7 mm

Table 2

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