Circuit keeps wandering children and pets nearby

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The receiver circuit in Figure 1 sounds an audio alarm when the transmitter (Figure 2) moves beyond a designated perimeter. The transmitter, a voltage-controlled oscillator, operates at approximately 915 MHz in the unlicensed ISM (industrial/scientific/medical) band. It has a tuning voltage of $1.5V = 3\times R_2/(R_1+R_2)$, which lets you easily adjust the frequency by varying the values of resistors $R_1$ and $R_2$.

The receiver comprises low-noise amplifier IC$_1$, power detector IC$_2$, comparator IC$_3$, and a buzzer. When the transmitter is within range—for example, when a child or a pet is carrying it—the receiver detects the RF signal and provides a voltage greater than 400 mV at the inverting terminal of the comparator. Resistors $R_9$ and $R_{10}$ preset the reference voltage at the comparator’s noninverting terminal. The reference voltage is $3\times R_{10}/(R_9+R_{10})$, and the comparator’s output remains low.
When the transmitter moves outside the predetermined boundary, the detected RF produces less than 400 mV at the comparator. The comparator then generates an output of approximately 3V, which turns on the buzzer and sounds an alert that the transmitter has moved beyond the restricted perimeter.

To increase the detection range, you can place additional low-noise amplifiers or VGAs (variable-gain amplifiers) in front of the power detector. You can also increase or decrease the desired perimeter by adjusting $R_{10}$ to change the comparator’s reference voltage.

Figure 2 The transmitter comprises a voltage-controlled oscillator, which $R_1$ and $R_2$ tune to approximately 915 MHz.