

BASICS - Tuning the antenna.

About tuning antennas.

All antennas should be tuned for the frequencies they are to be used on. This includes antennas used for receivers.

The main reasons for tuning the antenna are:

1. Performance. The antenna will only perform at its best if it is correctly tuned.
2. With transmitters such as CBs, incorrect tuning can cause damage to the transmitter output.
3. Transmitting on a poorly tuned antenna may also cause interference to TV, radio, etc.

Antennas for receivers usually come pre-tuned but this is not the case with CB antennas.

Tuning a CB antenna is usually just a matter of adjusting the length for the lowest SWR reading.

The SWR meter.

First of all, you will need to know how about the SWR meter.

The basic features of any SWR meter are:

- * Meter - to see the reading.
- * FWD/SWR (or SWR/REF) switch - to switch mode.
- * Calibrate control - to adjust the meter for the amount of power used.

The meter on the right also has extra features:

- * FS function - To measure the strength of the signal from your antenna.
- * Antenna - for taking field strength readings.
- * Power meter function - To measure radio output.

These are not necessary for SWR measurement or tuning the antenna, but may be handy functions for the more advanced CBer.

Connecting the SWR meter.

On the back of the SWR meter, there will be two antenna type sockets (known as SO239 connectors). One of these should be connected to the CB radio, and the other to the antenna. The sockets should be marked up to show which one goes where.

Connecting these the wrong way will not damage any of the equipment, but the FWD and REF switch functions will be swapped (FWD will read as REF and vice-versa).

The best position to place the meter is close to the antenna, with a short lead from the meter to the antenna. However, this may be inconvenient, so the alternative is a short lead from the radio, with the main coax running from the meter to the antenna.

As the meter uses the power coming from the CB to take the measurements, an additional power supply is not usually needed. Some meters also measure FM modulation and these would need a power supply when taking those readings (but not for antenna tuning).

Tuning the antenna.

STEP ONE - measure on lowest channel.

1. Set the CB to the lowest channel. For a single band radio, this is simply channel 1. For a dual band CB, also select the EU (CEPT) band.
2. Set the FWD/REF switch to FWD.
3. Set the CB to transmit.
4. Adjust the CAL knob so that the meter reads at the end of the scale, where you may see the word SET or CAL.
5. Switch the SWR meter to REF or SWR (whichever name it uses).

6. While transmitting, take the SWR reading and make a note of it.

STEP TWO - measure on highest channel.

1. Set the CB to the highest channel. For a single band radio, this is simply channel 40. For a dual band CB, also select the UK band.
2. Follow steps 2 to 6 above.

STEP THREE - work out whether to lengthen or shorten the antenna.

If the SWR reading was lower on the lowest frequency, shorten the antenna.

If the SWR reading was lower on the highest frequency, lengthen the antenna.

Steps One to Three should be repeated until the SWR readings are about the same on the highest and lowest channels. The SWR will usually be lowest on the middle channel... For a single band CB this will be CH20, but for a dual band it will be either CH1 UK or CH40 CEPT.

How low should the SWR be?

Although lower is better, most antennas will not tune down to 1:1.

You should be able to get the SWR down to 1.5:1 or better on your middle channel, although less than 2:1 should be OK. The SWR at the top and bottom channels will depend upon whether you use one band or both and how well the antenna will cover the bands used.

The SWR should not go far above 2:1 on any channel, or there is either a problem or (if using both bands) you need a wider bandwidth antenna.

What if the SWR is still high?

As well as the antenna length, there are several other possible causes of a high SWR:

- * Coax connections - Check the coax connections. It is easy for a strand of two of the braid wire to be touching the centre wire, causing a short circuit on the output.
- * Mobile mounting position - On a car, low mountings such as a bumper mount can cause the car body to reflect signal, giving a high SWR.
- * Nearby objects - Objects such as walls, trees, poles, etc can affect the SWR. Where possible, the antenna should be fitted well clear of such obstructions.
- * Poor or damaged coax. Do not skimp on the coax. If you are limited by cost, buy a cheaper radio and get good coax. Second-hand coax may look like a bargain, but water could have got in or the coax could be damaged in some other way.
- * Faulty antenna - As with the coax, try to buy your antenna new. If limited by money, buy a cheaper radio and spend more on the antenna. Second-hand antennas may look OK, but could have water or corrosion inside. Some antennas have been known to show a good SWR, yet perform poorly because of corrosion caused by water getting inside.