



No. 11 Mobile Antennas for 10 Meters



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I was asked to do a column on mobiles. While I claim no serious expertise on mobile antennas, there are some ideas worth considering, some information worth getting, and some safety thoughts worth taking very seriously.

Mobile in motion

Inherently, a mobile-in-motion antenna system, consisting typically of a shortened, loaded vertical antenna, is a very lossy system. Most of your power goes nowhere. However, do not let that discourage you, since some truly amazing hamming has been done mobile. Let the problem be your challenge. How can you minimize the losses?

The first step is to ensure that a mobile rig in your car will not do bad things to your car's computer and equally bad things to your car's warranty. ARRL has published some contacts with automakers and distributors where you can get some (but probably not all) of the answers.

The second step is to prepare your car for a mobile antenna system. This involves close attention to power cabling, ground cabling, and decoupling RF from the battery and other auto electrical components. Use coax that can handle the automobile's hot and cold and greasy and dirty environment. Avoid foam insulated coax cables, as well as those like RG-8 and RG-58 with older types of jackets. RG-213 generally meets the needs of the mobile environment. The very best book I know of on the subject of mobiling is Don Johnson's (W6AAQ) *40+5 Years of HF Mobiling*, which is from World Radio. Please do not just slap a rig in the car, mount an antenna on the roof, trunk lip, or plastic bumper, and try operating. Read Don's advise and carefully prepare your vehicle for a mobile set-up.

The third step is choosing an antenna. According to various sources, the bugcatchers (either Texas or California style) and the DKs (antennas that follow Don Johnson's design) appear to do the most consistent job across the ham bands. However, for 10, you can consider the Hamstick types or even an old fashioned quarter-wave whip with no loading.

Mounting brackets come in every conceivable size and shape. Brackets used by truckers for CB antennas will attach the antenna almost anywhere on the vehicle. The big question is this: where?

Since the vehicle serves as a ground plane for most mobile antennas, the best place is in the middle of the roof, which is often a bad place physically. The antenna hits every overpass (until it breaks, of course), and you have to put a hole in your new \$15,000 to \$30,000 car, an act to which warranty servers may not take kindly, especially if you lease your car.

Since trunks are making a comeback after a decade of hatchbacks, the trunk lip is a possibility. However, do not rely on the set screws of the trunk lip mount for a ground to vehicle metal. Add a short, wide strap from the ground of the base to a good bolt in the car metal.

Increasingly, you can find a metal bumper only on trucks and vans. However secure, the antenna base, where the highest current resides and creates the most intense part of the radiation field, is very close to ground without much of a ground plane below it.

Trucks and vans are becoming more popular as wheels for mobiles, and folks seem less fearful about making holes in them. Side-mounting mobile antennas well up the van wall or cab side is considered an acceptable alternative to roof mounting, and it lowers the tip of the antenna by a foot or so. Bumpers are strong on many of these vehicles: consider a sturdy extension to the antenna base to raise the entire assembly.

Once everything is in place, including the rig, do not just hit the road chatting away. If you have not watched a weaving car with a cellular phone in the driver's hands, you have not been paying attention. While some ham-drivers can learn to drive and talk and twiddle knobs all at once, many others are high-speed unguided missiles. Unless you are certain that you are safe, let your passenger do the operating. I learned that the semi-hard way--from a close call rather than from an accident. It was inches from being the other way around.

Mobile not in motion

The safest way for the driver to operate mobile is to stop the vehicle and operate a while. Here, the driver can select a potentially good site to maximize radiation in useful directions, as well as operate safely. Parking lots, open fields, and hilltops are all likely operating points.

Once you stop your car, you should instantly realize that your antenna options increase dramatically. You can take a modified mag mount CB antenna, resonated for 10, and slap it on top of the vehicle so you can monitor the band while you assemble and raise some kind of antenna less dependent on the car for its ground plane.

With careful planning, you can create a dipole or a 2-element beam that breaks down into sections that store within the trunk or a similar storage space. A little tool kit with pliers, screwdrivers, and nut drivers can have a permanent place in the trunk. Here are a few tips for such antennas:

- 1. Avoid sheet metal screws as element length connectors. Their holes will wear out just when the band opens to Asia. Use hose clamps with a nut driver (usually faster and more sure-footed than a screwdriver).
- 2. Protect the elements and the center connectors when not in use. A cheap golf-club bag (are there any such things any more?) or something similar is a good protective carrier.
- 3. Store any loose hardware in a bag with a seal inside a plastic box with a clasp. Finding all but one absolutely necessary screw is Murphy's favorite joke on you. Better yet, have no loose hardware--keep it attached to one or the other of the pieces separated for storage. Then, keep a few EXTRA pieces in that bag in a box.
- 4. Keep the antenna sturdy enough to store well, but as light as possible for easy assembly and raising. Remember, the antenna does not have to withstand gale-force winds in this application. Smaller diameter, thinner wall tubing will do a good job and prevent back pain.

The mast can be as simple as 4 5' sections of TV mast. There are also a number of extendable aluminum poles, most never intended as masts, that will support a light antenna in very small breezes. The search for the perfect stationary-mobile mast is endless.

Guying the mast, even for a brief stop is a good safety measure. One workable system requires a little 3/16 or 1/4 inch rope and a single concrete block. The mast slips into one of the block's holes, which generally is enough to prevent the end from skidding. A side bracket attached both to the door frame (of a car and perhaps the side rail of a pickup) holds the mast a few feet up. The guy ropes go from near the top of the mast to the other side of the car and are tied to the fore and aft bumper frames with a slight tension that holds the mast in place, but still lets you turn it.

You can also make up a tubular bracket a few feet long and attach it firmly to a pickup's rear bumper. The mast slides into it and is self-supporting.

Most studies show that over flat land, low horizontal antennas do best at a 5/8 wavelength height, which is just about 20' on 10 meters. Although the take-off angle is high (above 20 degrees ordinarily), short skip operation is quite good, and dx is often only about 2 S-units down from elevations above 1 wavelength (35'). Even though the take-off angle decreases with each increment in antenna height, try to avoid heights between 3/4 and 7/8 wavelength, since ground reflections tend to cancel some of the radiation in the lowest lobe,

which is the most useful lobe for skip. If the land is not flat, diffraction effects can wash out some of these phenomena.

However, a 20' mast is the most many hams can handle mechanically in the field. Those who can get above 30' up need to ensure both personal safety and the safety of passengers. Not to mention saving that big wheeled investment from damage by a \$10 homebrew antenna.

Of course, nothing says you cannot use a well-installed regular mobile antenna. When the band is open, antenna efficiency only makes a difference in pileups (station pileups, not vehicle pileups).

This style of mobile operation is more leisurely than mobile on the fly. It is also safer for everyone.

Drive safely. The life you save may be mine.

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