

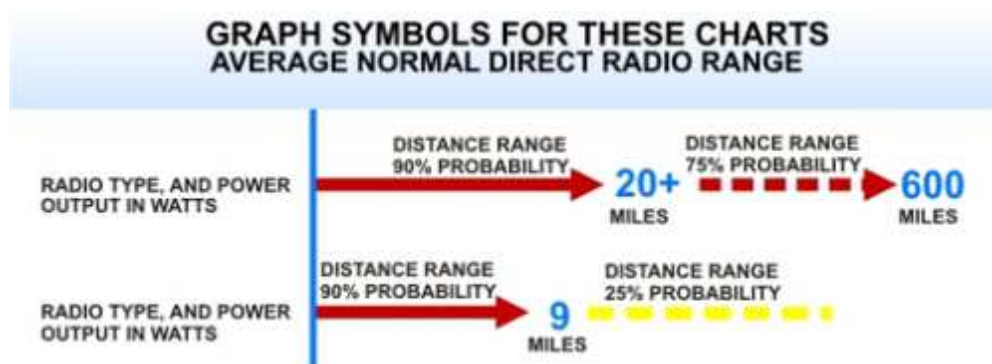
RadioMaster Reports

Survivalist Communications for the SHTF Prepper

Survivalist Radio Communications: Ham vs CB vs FRS vs GMRS vs MURS

Posted on [2013 July 7](#) | [10 Comments](#)

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Survivalist Radio Communications: Ham vs CB vs FRS vs GMRS vs MURS

“What type of radio should I get for SHTF with the most communication range?” “How far will that radio go?”

We see these questions being asked a lot on various forums, especially outdoors, sports, prepper, or survivalist sites. It often leads to complex answers and heated discourse because so many factors influence the distance of radio communications...



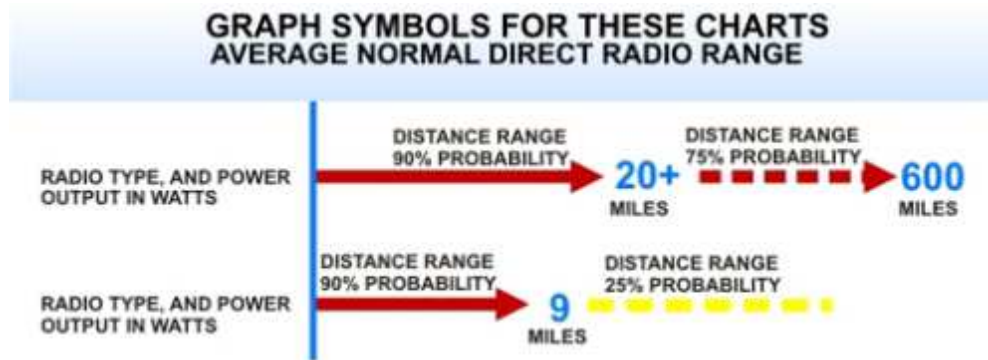
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The following charts show how many miles you can usually communicate over normal terrain in suburban or rural areas with different types of radios, power levels, antennas, and station configurations.

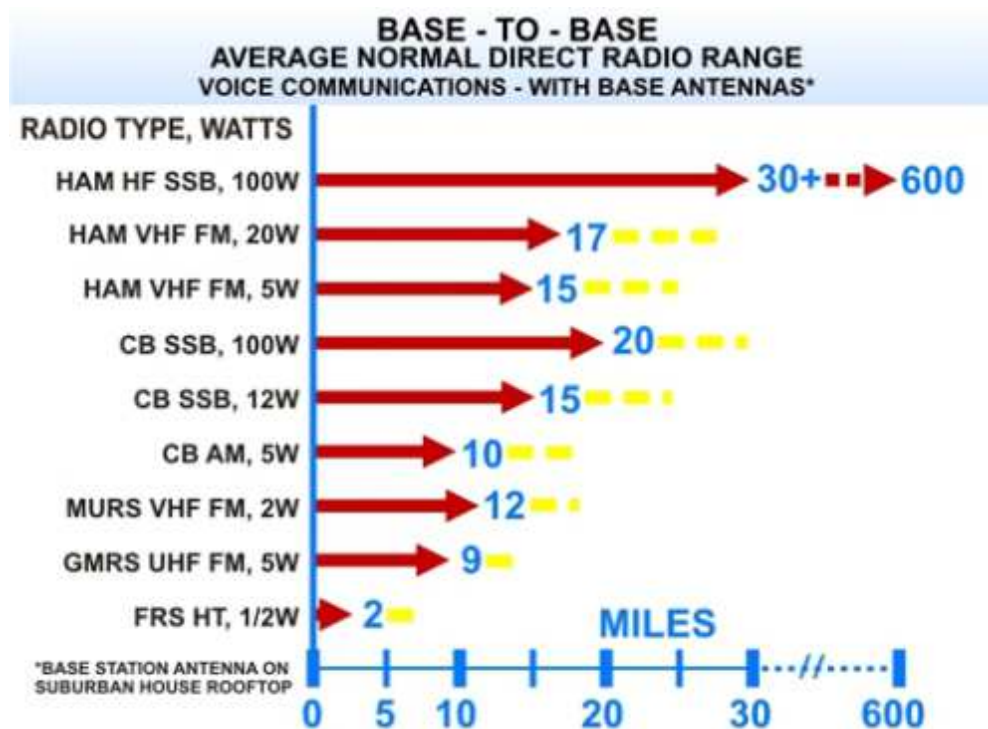
The graphs compare the most commonly available 2-way radios such as ham, CB, FRS, MURS, and GMRS. Some radio gear advertisements tout the maximum possible distance in perfect conditions, an often misleading specification that only technicians can achieve if they are both on mountain peaks or going through repeaters.

In the real world, people want to know the normal *dependable* average range of a radio. Here it

is:



Symbols show average probability of communication. Red solid arrows with blue mileage indicates a 90% high probability of communicating at this distance. Dashed line with a red arrow shows 75% probability of dependable communication. A yellow dashed line shows 25% or less probability of communicating for this distance.

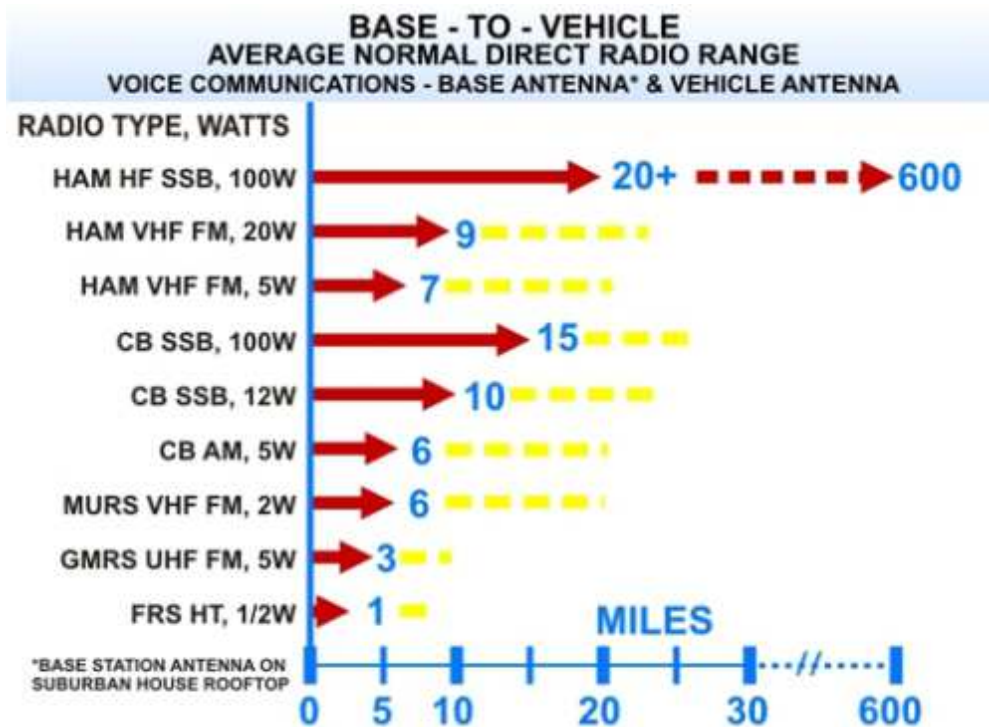


The above graph shows the distance range comparison between two base stations using a basic antenna mounted on the roof of a suburban house with a height of about 20ft above ground level.

Communication distance can be greatly improved over this by advanced gain antenna systems or a high pole or a tower. This estimate is based upon radio-to-radio direct communications *without the use of a repeater*.

The original source of this article is the [RadioMaster Reports](#) blog.

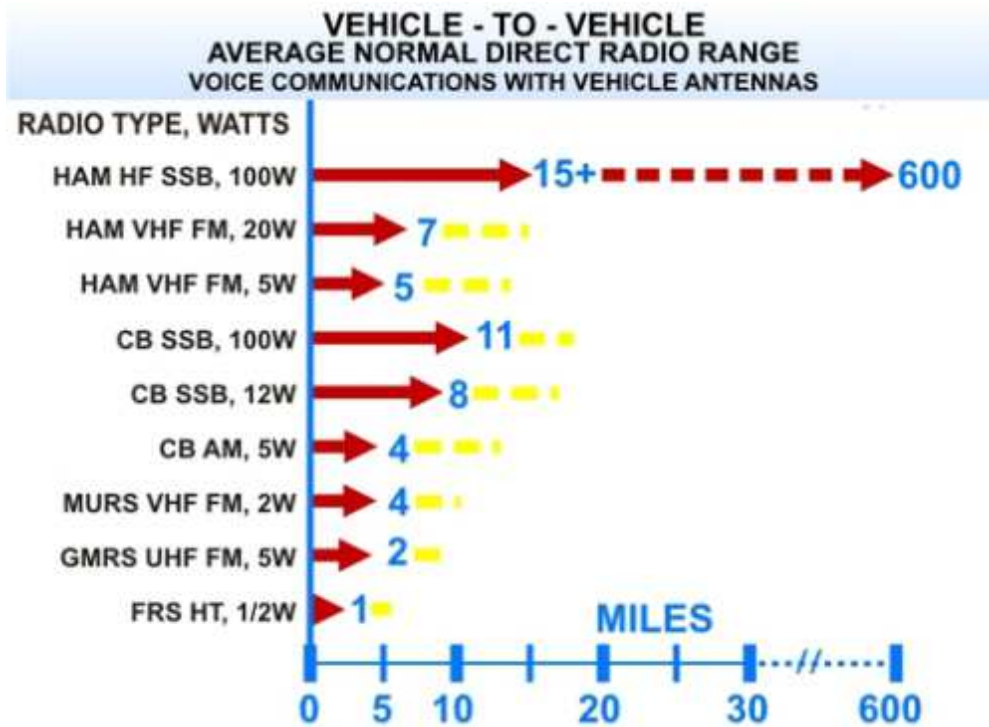
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The above graph shows the distance range between a mobile vehicle with a basic vehicle antenna, communicating with a base station using a basic antenna mounted on the roof of a suburban house.

Communication distance can be greatly improved over this by advanced gain antenna systems or a high pole or a tower at the base station.

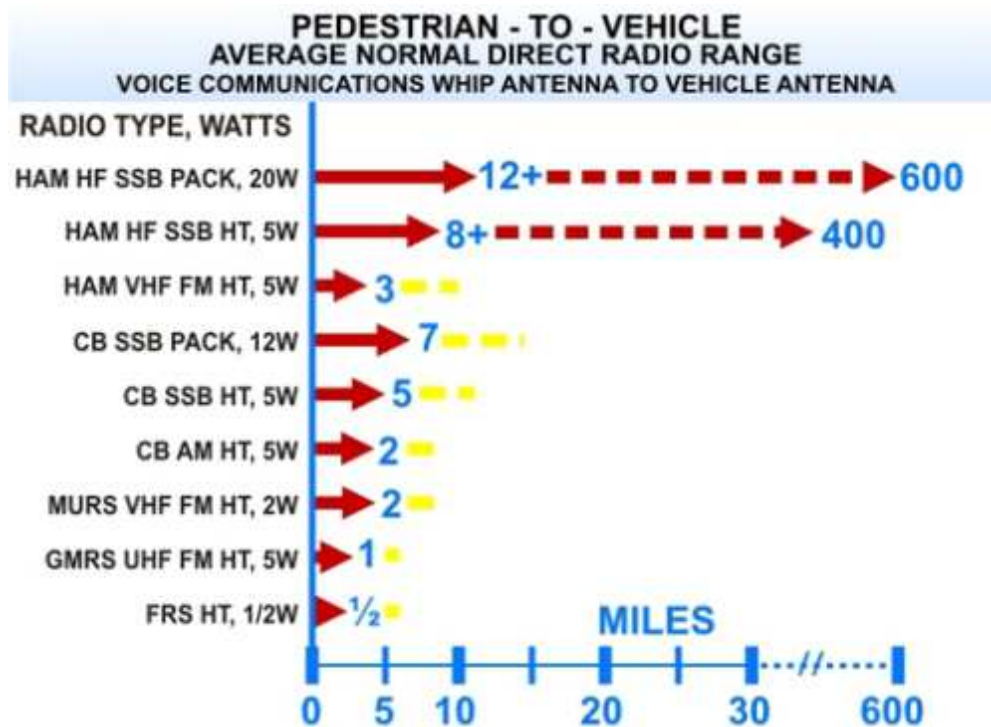
The distance can be adversely affected by interference from the vehicle engine; further distance can be achieved by parking on a hilltop or open area and shutting off the vehicle. This estimate is based upon radio-to-radio direct communications without the use of a repeater.



The above graph shows the distance range between two mobile vehicles with basic vehicle whip antennas.

Communication distance can be somewhat improved (25% to 50% further) over this on VHF and UHF by the use of a gain antenna.

The distance can be adversely affected by interference from the vehicle engine; further distance can be achieved by parking on a hilltop or open area and shutting off the vehicle. This estimate is a review based upon radio-to-radio direct communications without the use of a repeater.

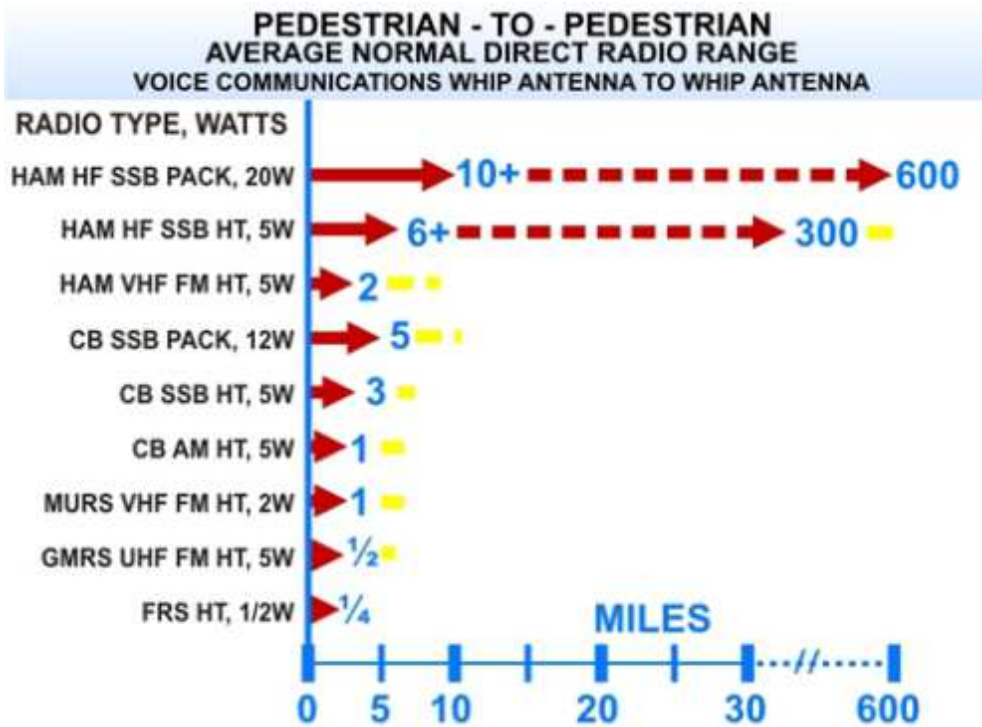


The above graph shows the distance range between a pedestrian with a whip antenna and a mobile vehicle with a basic vehicle whip antenna.

HF backpack radios , HF packs, CB backpack radios , or manpack radios are compared with Handy Talkies, Walkie Talkie, or HT radios.

Communication distance can be somewhat improved (25%to 50% further) over this on VHF and UHF by the use of a gain antenna on the vehicle.

Distance on VHF will be somewhat less if a smal rubber ducky antenna is used on the pedestrian radio instead of a full size antenna. The use of a counterpoise radial wire on the pedestrian radio improves distance. This estimate is based upon radio-to-radio direct communications without the use of a repeater.



The above graph shows the distance range between two pedestrian radios with whip antennas.

Improved distance can be achieved by standing in an open area or on a hilltop. HF backpack radios, HF packs , CB backpack radios , or manpack radios are compared with Handy Talkies, Walkie Talkie, or HT radios.

Distance on VHF will be somewhat less if a small rubber ducky antenna is used instead of a full size antenna. The use of a counterpoise radial wire on the pedestrian radio improves distance. This estimate is based upon radio-to-radio direct communications without the use of a repeater.



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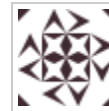
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10 RESPONSES TO “SURVIVALIST RADIO COMMUNICATIONS: HAM VS CB VS FRS VS GMRS VS MURS”

Joel "Jo-Jo" Link | [2013 December 30 at 19:23](#) | [Reply](#)



Greetings. I am currently reading your website... I love it, but I have an issue I would like to share. On the page describing “Freeband” and CB radio, you describe the difference in using USB as opposed to LSB modes. Your description is quite false. USB is no “quieter” than LSB. In fact, both are the same (SSB, for Single Sideband), just having a different “half” of the signal being filtered out. The main reason for using USB is that USB is the commonly accepted mode (not carved in stone) used by virtually ALL world HF radio services... LSB is used on frequencies below 30 Meters (10 MHz) and USB is used above... These are generally accepted practices, and you may find many exceptions to it. I bring this up, because in order for this to be truly educational information, it must be true. If you want your readers to understand things correctly, they need to be provided with accurate information. Also, what you describe as the upper and lower split channels isn't right either. Being on the actual CB channel (AM), and switching to SSB will place you on that split automatically. Just sayin...
Thanx for the cool page, though. I have many friends asking for info like this. I've been playing with the idea of doing a “survival radio” facebook page, but never have the time to figure out just how to do that.
Again, thanx, and 73!

Survival Tech EU | [2014 January 26 at 14:35](#) | [Reply](#)

Hey Joel

It might be simply a differences in semantics, although I have to agree that to people new to RF physics, could get the wrong idea, simply because of the way its explained.

I find it somewhat troubling that the distance charts dont take into consideration the environmental variables. At the same time, those same people who are new to RF Physics, will



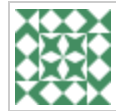
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probably not understand all the variables anyway. So the website tries to give some generalisations to get people started.

Finally, its an impossible goal to put all this information in one place anyway. The best one can do is put up as much general info as possible to get people thinking about it, then give them more details as their own skills progress.

Best regards and 73's
SurvivalTechEU

[Sean Ware](#) | [2014 January 27 at 03:59](#) |



And that is very true — and why the comparison at this time falls a bit short of truly comparing radios bands, modes and services.

All known modes, identical antenna types and heights, scaled to their wavelength, and similar Rf levels are vital parameters for true comparisons, And although the article above DOES clearly illustrate present PEACetime comparisons, it should think out of the box, because there may not be a box.

Currently-mandated operational limitations such as RF output power level, mode bandwidth, time of day/season and other variables are artificially imposed by governments and man. They should be thrown out completely for the purposes of this investigation.

And yes,I realize this is why the results are currently so skewed in my view. To have proceeded any other way would've gone-afoul of "the man" — to break the "LAW". So I understand why we have this result. I'm jus sayin —

It is not accurate, and can never be, until some brave patriot who has all that different gear uses it in ways that break current mandates. YES, I am advocating breaking existing law in the interest of acquiring this vital data, and would be happy to conduct further testing, if only I had green for the gear. — UNcle Charles can kiss my A-!!!

Again, with all tests done in a similar mode,similar power, and wavelength-scaled antenna configurations,while totally disregarding the FCC and any normal "band agreements" imposed by any other man-made organizations, we'll have a well-organized grubby comm net.

The FCC, the ARRL et al should be totally ignored ONLY for the purposes of this study. Because those organizations may very well be non-viable in grubby times. Keep the test parameters the same in order to get a very accurate comparison, which for example, may end up being a VHF terminal node controller running at 24Kbaud that is hooked into an HF radio that is running in LSB mode on 29MHz... It might far surpass anything recognizable today. NONE of those were meant to be linked at the source as it stands now, with all the governing bodies dictating what can/cannot be used, but who knows? It may be way better for whatever form of data communications needed for a certain application at a certain time of day when the rubber meets the road..

I know I'm not making myself clear. I'm lousy at expressing my thoughts... I AM trying tho.

[George Csahanin](#) | [2014 March 16 at 20:09](#) | [Reply](#)



Technically, all of the non-amateur communications on MF and HF voice is USB. Many of the non-ham radios will not do LSB. Most now will allow for LSB as it is easier to do, adds no cost. It is only in the ham world where it is LSB 40m and below, now also excepting the 60 meter channels where it is USB. One other thing to remember is the non-ham radios are strictly channelized. On

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CB/Freeband I have noted that LSB seems to be a bit more common. For some reason the primary use I have seen on SSB CB has always been LSB first. And a very odd thing I notice here in Texas is the USB users seems to be speaking Spanish. These aren't local, probably central/South America. So if anybody decides to buy, say, a Micom-S radio, it can be USB only. The "Oddball HF Radio" nets have several meeting frequencies on 40/75 that are USB to take this into account. Nice website, guys, good info.

radiofreeq | [2013 December 31 at 03:44](#) | [Reply](#)

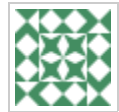


@ Joel "Jo Jo" ,

The freeband SSB operating situation is quite different from your experience with ham radio.

The information posted about SSB on RadioMaster Reports is accurate. There are differences in statistical operating trends between USB and LSB, resulting in various interference and channel occupancy patterns. Also, the offset frequencies of the various gaps between channels is different.

Sean Ware | [2014 January 8 at 14:47](#) | [Reply](#)



I think a comparison using identical modes, RF power levels and resonant antennas of the same design (IE; A 3-el yagi), identical antenna height, ground topography, would yield a more realistic result. In grubby times, the last concern would be FCC-imposed power limits, modes, or "license" class.

dave | [2014 March 1 at 23:07](#) | [Reply](#)



once the stuff hits the fan , you need not worry about FCC or laws, its on you to communicate in any way possible , so do what you have to do to be safe and informed.

fdafdas | [2014 March 19 at 02:51](#) | [Reply](#)



Yeah, definatley agree

Arthemis300 | [2014 May 21 at 20:24](#) | [Reply](#)



Reblogged this on [arthemis300](#).

Mark | [2014 May 26 at 19:52](#) | [Reply](#)



Dave, not sure exactly what your overall point is, but I'll say this. As a HAM, I can tell you that there are a lot of licensed folks on the air that are not reliable – it;s like any other hobby, there are good and not so good members. If you forgoe a HAM license and only use radio in an emergency, you are doomed to fall prey to these characters and they are not always intentionally deceptive. Having a license and interacting with a regular group of HAMs, you'll know in an emergency which information is reliable and which is not, mostly because you'll know who to trust. At the very least, I encourage you to at least monitor the HF and VHF frequencies, so you will know ahead of time who the reliable folks are.

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