

## Antennas and Amps

Written by Jim Kinter, K5KTF - Last Updated Saturday, 13 April 2019 08:28

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We have had a number of people write regarding amps and antennas.

I sat and did some calculations ( <http://www.csgnetwork.com/antennaecalc.html> ).

|   |                            |            |
|---|----------------------------|------------|
| With 79mW (stock) power from the node into a: | 3.5dBi (stock rubber duck) | 176W EIRP  |
| 9dBi (yagi/omni/dish)                         |                            | .62W EIRP  |
| 14dBi   |                            | 1.9W EIRP  |
| 24dBi   |                            | 19.8W EIRP |

If you go with a 1/2W BDA (bi-directional amp--about \$60-\$80) into a:

|                            |            |
|----------------------------|------------|
| 3.5dBi (stock rubber duck) | 1.1W EIRP  |
| 9dBi (yagi/omni/dish)      | 3.9W EIRP  |
| 14dBi                      | 12.6W EIRP |
| 24dBi                      | 126W EIRP  |

And then, even a 2 watt BDA (\$60-?00's ):

|                            |             |
|----------------------------|-------------|
| 3.5dBi (stock rubber duck) | 4.47W EIRP  |
| 9dBi (yagi/omni/dish)      | 15.8W EIRP  |
| 14dBi                      | 50.24W EIRP |
| 24dBi                      | 502.4W EIRP |

As you can see, no matter how many watts your pushing, having a better antenna ALWAYS helps out more than the amp, especially when you factor in cost.

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I have seen a 25W BDA, for a couple thousand dollars, and drive that into a 3.5dBi Omni, your still only getting about 55W EIRP. (But that into a 24dBi dish will give you 6.2KW EIRP, enough to get fried pheasant/robin/bat/etc every night for dinner!-- If you cant hit your target with that, you must have too much dirt and concrete between sites.)

So your best bet will always be trying to connect with a good antenna first. If you connect, but its weak, THEN try an add a 100mW or a 1/2W BDA. Unless you like having dead birds on your property (already cooked!).

Dumping wattage into a weak antenna only propagates noise and makes things tougher for all.

Now that you are playing up in the microwaves, you have to rethink how you do things. Its not MY rules, or the FCC rules... Its the laws of physics and RF up thiis high. If you cannot physically SEE your target (binoculars/small telescope), dumping more power into the system probably will not help. In fact you are just taking your money and turning it into heat, while ramping up the noise factors for everyone else.

Forget the old ham ways of buying wattage. That doesnt work up here. Buy directional gain instead!