

## Re: Power line interference?

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**From:** Robertwgross (robertwgross\_at\_cs.com)

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Peter wrote:

- >The amount of metal mass should not be an issue. The amount of
- >expansion would be controlled by the type of metal and the temperature
- >change, not by the mass involved. E.g. 10 gauge and 20 gauge copper
- >wires will lengthen by the same amount if exposed to the same
- >temperature increase.
- >However, the coax cable may not have the same metal in the center
- >conductor as in the sheath and if it's exposed to the sun there could be
- >a more rapid rise in the sheath temperature compared to the core. Both
- >of these effects could lead to differential expansion and result in poor
- >connections.
- >But I note that in Greschki's installation the GPS receiver seems to be
- >located very near the antenna:
- >"GPS antenna (which also houses the GPS board itself, and that is on top
- >of the building)." So there is no long coax cable connecting the two.

There is at least one brand that I am aware of that used to have all of its receiver electronics up in the antenna structure. Then a downconverted signal would flow down to the timing system electronics inside the building. The problem with this, as I see it, is that you have your GPS electronics exposed to a more hostile environment (temperature, interference, vandalism). I always liked to put the cheap antenna on the roof and then keep all of the expensive electronics (atomic clocks and synthesizers) down in the equipment room.

The other temperature factor is that many roofs have lots of ugly black tar and similar materials that get hot and expand. That can put more stress on the coaxial cable, depending on where bends and joints are.

One rooftop antenna installation seemed to fail daily. The customer chased around forever and could not figure it out. I posted myself on the roof (with a good sun umbrella) and watched. Finally, I saw that the antenna crapped out when the elevator ran. There was a huge spike of interference coming from the elevator motor that was within five feet of the antenna.

Pager transmitters can also give you headaches. They can jump from low power to high power, and that might correlate to low interference and high interference (which fails the GPS).

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---Bob Gross---