WHY SWR IS IRRELEVANT BUT VERY IMPORTANT ?

The buzz words in Hamdom today are SWR, VSWR, and Return Loss so why do I consider SWR to be a minor problem? The word is on the airwaves that bad SWR will prevent you from getting a signal out of your backyard. The VSWR on my Dummy-Load measures nearly perfect on all HF frequencies but I can hardly talk to the neighbor a block away. It's obvious that all the power goes into the resistive element and creates heat. So if the signal isn't getting out of the yard then where does it go? Line loss will be negligible on HF with good coax like LMR-400 but what about all that power reflected back to the transmitter? That power that is reflected back is, for the most part, reflected back toward the antenna so loss in the transmitters is small too. The power is, in fact, being radiated ! So an antenna with a 10:1 SWR will work stations quite well. Our modern solid-state transceivers have SWR sensors that decrease the power when the SWR reaches something like 1:1.3 and cut to 20% power before reaching 1:3 which is still a very good antenna. Many of these radios also have an internal antenna tuner or matching network which will, at the push of the magic button, correct the SWR problem and give us full 100 Watts. Note that the SWR didn't change but the radio accommodated the bad match nicely so we can use that antenna.

BUT a high SWR becomes very important when running high power. So why is high-power different from low? Because things can burn up, smoke and melt. Feedlines whether they are coax, ladder-line or open wire, have certain limits for voltage and current. When the SWR is 1:1 the current and voltage are evenly distributed all along the line. There are no extreme peaks in voltage or current. As SWR becomes greater, there are voltage maximums and minimums to worry about and there is slightly less to worry about with the current maximums and minimums that occur. Now these extreme voltage points become a serious problem because they may exceed the working voltage of the coax connectors, and any gas traps used for lightning protection. Voltage limits for ladder-line are very rarely exceeded and never for open-wire. A flash and a sizzle is never good for the equipment or the nerves. That "full legal limit" antenna tuner will not save us from the coax breakdown problem. If you insist on using antennas with high SWR then larger coax or ladder-line is necessary. Ladder-line is more efficient and economical but beware of high-voltages and keep it away from people and property.

There are more serious problems than SWR that prevent us from getting a signal out of the backyard. Ground loss, copper loss and surrounding objects are a few. Trees are nice for supporting antennas but lush foliage creates loss. So high SWR doesn't keep the antenna from radiating but it may cause the transceiver to reduce power drastically. **WATCH OUT FOR THIS POWER CUTBACK because you may have a 5W QRP station and not realize it.**

73 de Ken, KØKS