

Noise sources affecting the radio shack

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As background, I moved to a new semi-rural QTH a few months back and in due course set up a new shack and workshop in a transportable building about 25 metres out behind the house proper. The only cabling that goes into the shack building is 240V power. I have ADSL at the front of the house with wireless access within the building itself but it peters out on my portable Netbook well before the shack building, even with a D-Link 6dB antenna on the router pointing in that direction.

If I was going to be able to access the web from the shack PCs, I was either going to have to lay physical cables or set up a wireless link. I have a few spare 2.4GHz gridpack antenna reflectors (24dBi style) available so duly went and bought another ADSL router with wireless inbuilt and ensured that it had WDS (Wireless Distribution System : http://en.wikipedia.org/wiki/Wireless_distribution_system (http://en.wikipedia.org/wiki/Wireless_distribution_system)) support built in. I set up both ends so that the shack wireless router created a transparent link through the ADSL-connected one and thus provided web access.

One immediate issue arose : wide band noise across several of the HF bands. That was quickly traced to the switch-mode power adapter supplied with the wireless router. I found a transformer-based one with the same voltage (12VDC) and current ratings in one of my boxes of bits, put a matching DC-series plug on the end and, voila, the router worked fine and the wide-band noise had gone. There is an extra moral to that story because one of the other power adapters used in the shack (a 19V version used for an Asus Netbook) was also switch-mode and it was found to also contribute some lower-level wide-band noise and was subsequently also replaced by a transformer-based device. At this stage I am only using some temporary full-size dipoles for 80, 40 and 20M but I am hearing weak signals that I would never have been able to hear at my previous QTH. Even a small amount of switch-mode hash is obvious and enough to cover some of the weaker signals.

A technical point here: I did reduce the hash levels by winding the figure-8 low voltage power leads from the power adapters around long ferrite rods and through clip-together ferrites and while it did not eradicate it, it was certainly reduced. The transformer-based supplies made the hash disappear altogether.

All seemed ok until after I set up an old HP Pavilion PC (it has 2 actual serial ports!) to use for logging for the 2013 Remembrance Day Contest and then started to hear some major birdies on the 20 metre band where there weren't any before. The main issues were the varying-level signals at 14163 (S9), a big one on 14183 (S9+20), another at 14213 and further up the band each 20 to 30 KHz. To shorten the details down, that was the way I operated during the RD contest and it didn't help to encounter these strong birdies overpowering some of the relatively weaker stations.

In the days following the RD, I set myself the task of discovering where these birdies were being generated. It had to be computer-hardware-related as I could hear occasional data-type noises rather than a steady heterodyne even when the computer was in hibernate mode - i.e. nominally off. Notice that I state "nominally off" because it still has power applied and it's internal power supply is still functioning at a reduced power level but usually enough to sense LAN-socket activity. I should probably state that this Pavilion PC was connected to the router by a CAT5 cable and it didn't take long to discover that as soon as I unplugged the cable from the router's socket, the heterodynes on all except 14213 basically completely disappeared. The signal on 14213 dropped down into the noise. The easy solution : fit a PCI-series wireless-N card into the Pavilion and wireless-network it, rather than CAT5 hardwire it, into a router just 40cm away !

Interestingly, the internals plus the power supply in the Pavilion is quiet (note: full metal box case) - there is no discernable change in the HF noise level whether it is unplugged, hibernated or turned on. I intentionally bought a wide-screen LED backlit monitor for shack use and it is quiet too. The HF dipoles are within 6 metres of the PC at this point (although the other side of a colourbond metal wall & roof) so it is a good test of how much noise is generated.

So many of the products currently on the market contain switch-mode supplies so if your HF noise level rises after a new equipment purchase, unplug it and confirm if it is the source.