

Another one of those “sounds too good to be true” gizmos?

PLUG IN

Pest Free II

Would you like to ensure that your home or property is always free of rats, mice and cockroaches? Of course you would. Have you considered installing Pest Free II in your home to achieve this? Hundreds of thousands of people apparently have in the years since 1995. But our advice is that you need not bother – we don't think it works.

By LEO SIMPSON

Pest Free II is marketed as an electromagnetic pest repellent. When it is turned on in your home, it is claimed to keep your home free of cockroaches, rats and mice while having no effect on your pet birds, cats, dogs or other animals.

According to the maker, when turned on “it modulates the existing electromagnetic field of your wiring. University tested for mice and rats. Testimonials from Australia and overseas confirm Pest Free affected the normal behaviour of mice, rats and cockroaches.”

One of our readers called our attention to this product and naturally, we just had to have one. We phoned and paid for it by credit card, \$124.95 including postage and a few days later it duly arrived via post.

It is quite compact and looks like an elongated 2-pin plug.

When we plugged it in, a bright blue LED came on and periodically, it flashed. We also noticed that after a while, the case became warm to the touch, although not unduly so. So was it modulating the electromagnetic field of our wiring?

As an initial test, we used a small portable AM radio to sense if it puts out any RF field. There was none.

Just by way of interest, if you do this test with a typical switchmode charger for a phone or other small appliance, you will usually hear a whistle or a tone from the radio. This is the frequency of the switchmode supply. It becomes audio in an AM radio because these supplies radiate RF interference in the AM band and the RF energy is modulated at the switchmode frequency.

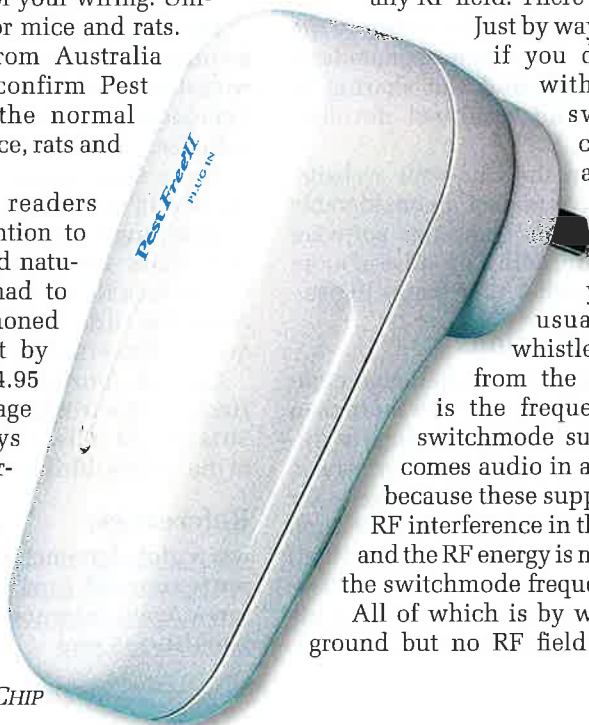
All of which is by way of background but no RF field appears to



be emitted from Pest Free. So if it is emitting any electromagnetic field by itself, it is either very low or of quite a low frequency.

If the unit contains an inductor, it should have an associated magnetic field which fluctuates with the switching of the 50Hz 230VAC mains supply. To test whether this was the case, we rigged up a coil of wire around the unit and connected it to an oscilloscope.

The results are shown in scope grabs 1 and 2. Taken at sweep speeds of 50ms/div and 500ms/div (ie, the trace taking 10 seconds to sweep across the screen) we see a small spike followed by about 325ms of ringing at an amplitude of about 400mV. As you see, it is not a huge signal by comparison with the background noise. If the unit has an inductor, we would expect a much larger signal, coincident with each flash of the blue LED.





“Approval No CS6455N”? That does NOT mean the NSW Office of Energy has checked the claims or even checked to see if it works – it simply means it’s passed safety checks. (We agree: it is well made). But you have to get approval for toasters and 3-pin plugs too!

Since there is a claim that the Pest Free modifies the magnetic field in your home, we decided to see if we could measure that. To do so, we rigged up a loop of 4-wire alarm cable around our large office. The four wires were connected in series so that we effectively had a 4-turn coil around the room. This was connected to an oscilloscope and we then monitored the voltage induced into that coil by the magnetic fields in the room.

The results are shown in the accompanying oscilloscope screen grabs. These show the field with and without the Pest Free active, ie, when its LED was flashing and not. As you can see,

Hmmm. It “modulates the existing electro magnetic field of your wiring. University tested ...”

Yes, we found a tiny spike on the mains wiring (see scope grabs) but we got a much larger spike from fluorescent lights, computers, etc.

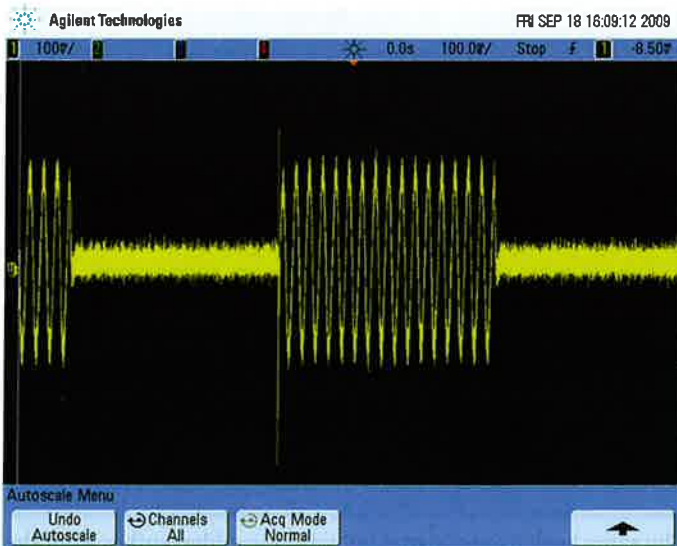
the measured induced voltages are quite low and mainly consist of pulse noise coincident with the zero-voltage crossings of the 50Hz mains sinewave. This pulse noise would no doubt be caused by all the switchmode power supplies in our office in computers, printers and so on. Some of it would undoubtedly also come from the fluorescent lighting in our building.

Anyway, we were able to see the effect on the induced voltage waveform when Pest Free was active. Each time the blue LED flashed, there was a coincident impulse superimposed on the waveform every 640 milliseconds, ie, about five pulses in three seconds. But does this

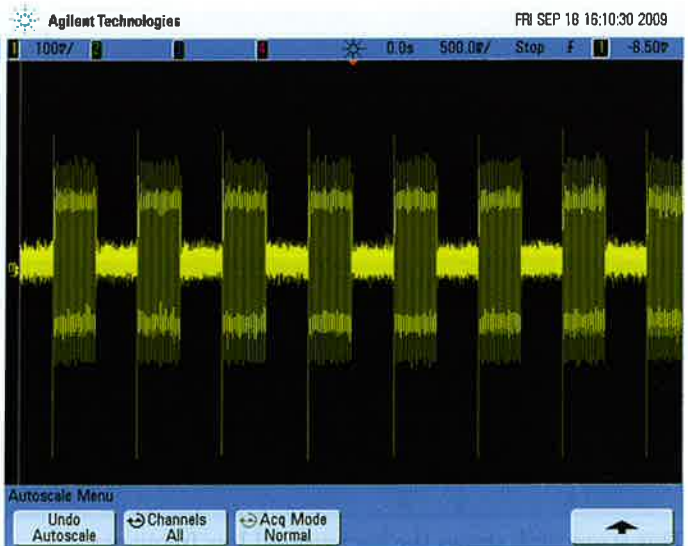
amount to a major disruption of the ambient magnetic field? Clearly, the effect is extremely slight. Either cockroaches, rats and mice are extremely sensitive to electromagnetic fields (unlikely) or Pest FreeII doesn’t work.

We should also note that the act of turning on all the fluorescent lights in the office generated a much bigger “disruption of electromagnetic fields” than Pest FreeII. That is what you would expect, since each fluorescent light fitting has a substantial electromagnet in the form of the ballast inductor.

We seriously doubt whether mice, rats or cockroaches are affected in anyway by the modest electromagnetic fields



Taken from a large coil of wire around the Pest Free, this is the signal radiated by the unit when the blue LED is flashing. This scope grab is taken at a sweep speed of 50ms/div (quite slow).



This is the same signal radiated by the Pest Free but taken at a sweep speed of 500ms/div (very slow – it takes 10 seconds for the trace to sweep across the screen).



Pretty blue LED: every time it flashed (at about 640ms rate) a very short duration impulse appears on the mains. We wonder what is so special about this rate – and if this was the “proven frequency” which repelled mice, rats and cockies. Proven by whom?

your hair will stand on end. You will probably find this unpleasant, just like cockroaches apparently do!

If you want evidence that cockroaches are not affected by magnetic fields, you only have to consider their behaviour inside the cases of microwave ovens, ie, inside the case, not inside the oven itself.

fields on rats and mice? Again, we could find no evidence along these lines.

In fact, some years ago NASA apparently did some experiments on levitating mice in the intense fields generated by superconducting magnets but after a short period of exposure, the mice carried on as if everything was normal. We wonder if they liked levitating!

Finally, we measured the power consumption of the device. The fact that it gets warm indicates that it uses significant power, perhaps as much as 10 watts continuously. In fact, we measured the power consumption at close to 7 watts, the figure claimed by the manufacturer.

Just so you know, since it is intended to be on all the time, over a year that will cost you \$9.57, based on Sydney’s Energy Australia domestic electricity tariff of 15.6 cents/kilowatt-hour. You might think that just under ten dollars per annum is a low price to pay to be free of cockroaches, rats & mice. It would be – if it worked. Based on what it appears to do (or not do), we have serious doubts.

Internal examination

Having pussy-footed around with the “black box” approach, we decided to take a more investigative approach, by breaking the thing open! We duly squeezed it judiciously in a vice until it cracked – the case, that is. We were then able to bare it to the world. And this is what it contains.

At one end it has a coil wound on

in household wiring, electrical appliances or any other electrical equipment – otherwise you would think they wouldn’t infest any building with electrical wiring.

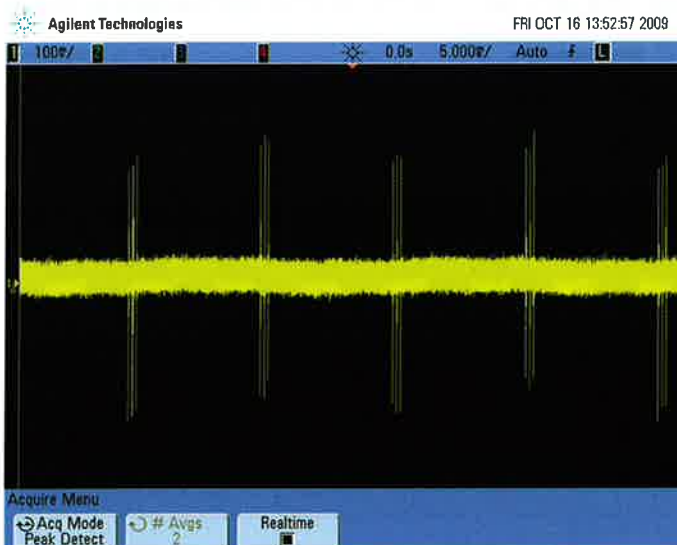
In fact, as far as we can tell after searching for information on the subject, there is no evidence that cockroaches are affected by magnetic fields in any way.

Interestingly, cockroaches are sensitive to high voltage electrostatic fields and they will avoid such fields. Their antennae detect the fields. If their antennae are cut off, they are in no way affected. Mind you, if you stand within a very high voltage electrostatic field,

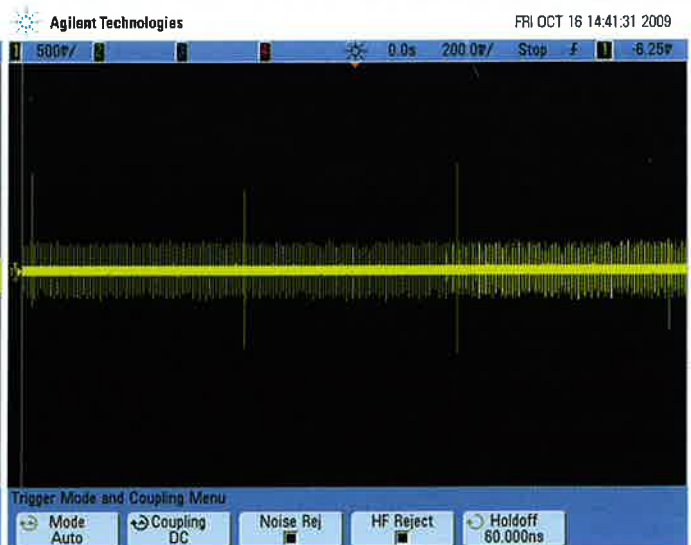
When a microwave oven is on, both its large transformer and the magnetron will generate significant magnetic fields but there is no evidence that the cockies make any effort to decamp – they love the warmth generated by the fact that a microwave is always on standby and they are probably attracted by the grease and food deposits inside the cabinet.

As our Serviceman often tells, many a microwave oven has been disabled by cockroaches inside the cabinet but unless they have the misfortune to come into contact with high voltages they are not harmed at all.

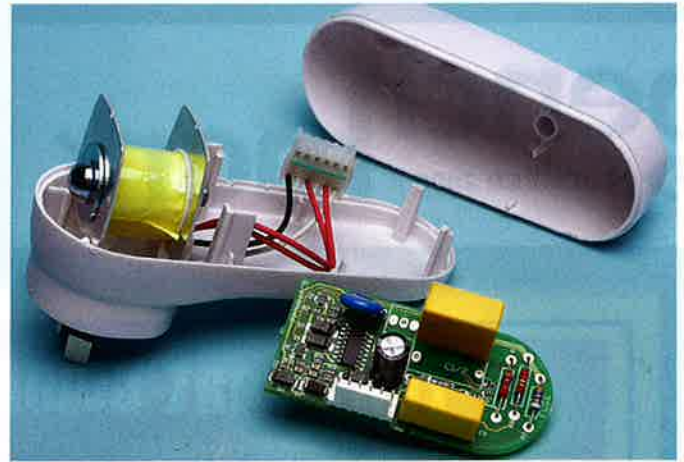
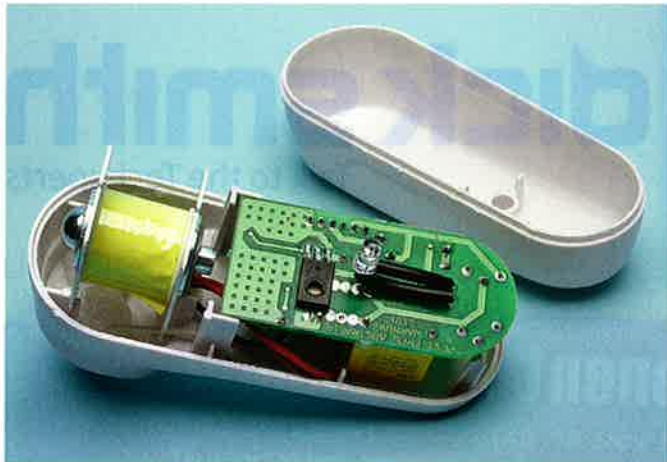
What about the effect of magnetic



This scope grab shows the background low frequency electromagnetic signal from a large inductive loop in our office. The groups of spikes at 10ms intervals are switching hash from computer power supplies.



The same background signal but with the added spikes from the Pest Free device at intervals of about 640ms. The Pest Free spikes are still relatively low in amplitude and quite small compared to those produced when switching on the office lights.



Inquisitive types that we are, we cracked open the case of the Pest FreeII to find a PC board with a mix of components.

The one that intrigued us the most is that large inductor (top left), complete with two face plates forming shorted turns!

what appears to be a 5mm bolt and fitted with aluminium cheek plates. There is also a small PC board with two X2-rated (yellow) capacitors, a 220uF 25V electrolytic capacitor, a metal oxide varistor (MOV) and a small number of leaded and SMD components including what appears to be a microcontroller, all on the topside of the board.

On the other side of the PC board is the aforementioned blue LED and a triac made by On Semiconductor. Hmm. So how can it actually radiate much in the way of electromagnetic fields? We have already demonstrated that it does not but now that we see that coil with the aluminium cheeks, it is clear

that it simply cannot. Those aluminium cheeks constitute two shorted turns!

That choke (or coil) cannot act as an effective electromagnet, tank coil or whatever. Whether deliberately made to function in that way or not, it just won't work.

Conclusion

If you did not already suspect it, the likelihood of Pest FreeII having any effect on cockroaches, rats and mice (but no other animals!) must be close to zero.

As for the "Scientifically Tested and Proven through a Leading Australian University" claim, we had a lot of trouble finding any such justification, especially here in Australia. We finally

tracked one down on the Pest Free NZ website (www.pluginpestfree.co.nz/testimonial_uni_new_eng.pdf)

But if you read through it, you'll probably notice something odd: not a single mention of a cockie!

And as far as the product having "received multiple research development and exporting grants from the Australian Federal Government" we can say that Pest FreeII has evidently been the recipient of taxpayers' money but that does not amount to any official endorsement.

Pest FreeII is promoted on the website www.pestfree.com.au
Read it and be amazed.

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