# Earths

By G8MNY (New Nov 08)
(8 Bit ASCII Graphics use code page 473 or 850)

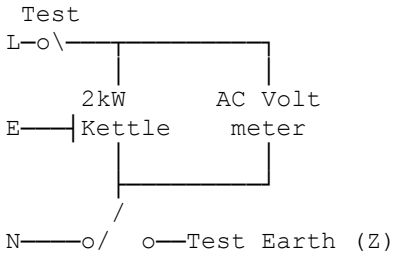
## Z VALUES

To quickly blow a 13A fuse, a current > 26A must flow. So @ 220V that needs a total loop resistance < 9Û. However with high current main ring circuits of 30A to blow a ring fuse quickly needs a current > 60A, which needs loop resistance < 3Û. These are much lower values than you can get with external earths.

## AC TESTING A TOWER EARTH SYSTEM

I once tested a large unused radio tower & earth system with a simple if dangerous electric kettle test (no kit on tower!). I was horrified to find it was
originally about 40Û!

Note do not attempt this method if there are ELCB trips.




This high current & voltage test overcomes some of the errors of low current & voltage testing due to corrosion etc. As direct mains is envolved some basic safety needs to be considered. And if you have just filled the kettle are U wet !

## CALCULATIONS

Assuming the mains is good!

$$\frac{Vm - Vt}{Vt}$$

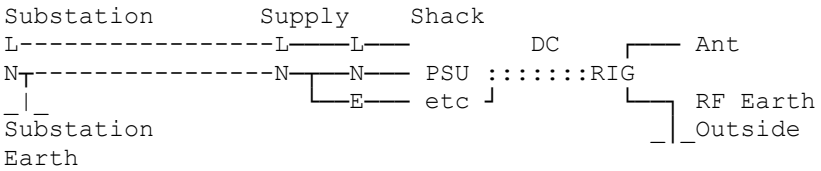
Where Vm is On load mains across kettle.
Vt is Volts Live to test.
R is Resistance of Kettle (e.g. 24Û)

## MEASUREMENTS from old GB3HV mast..

| | Z CALCULATION |
|---|---|
| Live to Neutral 240V on load | 0 Û reference |
| Mast to live 150v. | $Rm = \frac{240-150}{150} \times 24 = 14.4$ Û |
| New Stake to live 169v. | $Rs = \frac{240-169}{169} \times 24 = 9.9$ Û |
| Theoretical total with 2 earth stakes | $Rt = \frac{4.95 \times 14.4}{4.95 + 14.4} = 3.7$ Û |

Mains Earth tested at 0 Û.

P.M.E.
With UK's Permanent Multiple Earthing system on modern housing, a mast or outside earth can be considered "dangerous". This is because there is no safety earth provided, just "neutral" called earth in the house. all appliances you can touch are at this potential so your safe. This is a cost cutting scheme introduced by the electric supply companies & they effectively deemed it safe.




Now suppose the Neutral is not at ground, say 100V off ground due to unbalanced load 3 phase loads or someone is blowing a fuse. The 100V now sees your path to earth as an alternate rout to the substation. How many amps can your rig take from aerial to PSU & PSU mains lead? None of this is fused all can just burn out/catch fire!

Solutions.

1/ Connect a heavy 100A lead between the external earth & the mains earth point, this may save your kit, but ensure the RF earth is noisy!
2/ Fuse the external earth. This will protect your kit, but if it blows will you know?
3/ Use an isolation transformer to feed the sack. This overcomes many of the problems but does introduce non earthed safety issues.
4/ Ask your supplier to provide a suitable proper earth system.

Why don't U send an interesting bul?

73 de John G8MNY @ GB7CIP