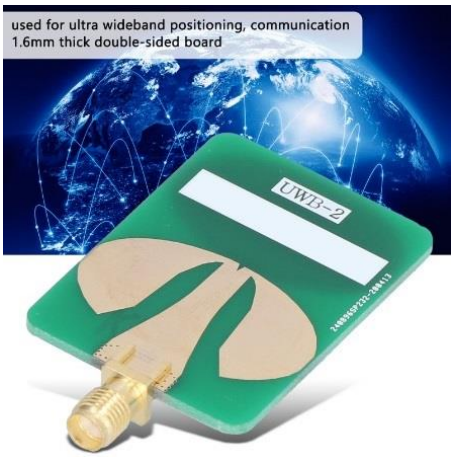
THE STORY OF AN 'ULTRA WIDE BAND' ANTENNA ON eBAY

--as told by Doug Friend, VK4OE.



Cruising around on eBay one day recently (as one does), I came across an interesting item for sale at Item 405124188866. See image to the right….

Now, I wasn't really looking for a wideband antenna, but this image had me pondering just how it might work and what its specifications might be like. Intriguingly, the image from the item description only shows one side of the PCB, and this side creates more questions than providing answers….like, why is this strange "umbrella shaped" track etched on the board connected only to the ground of the SMA connector? I'd have to admit that 'curiosity got the better of me' so I ended up purchasing two of these antennas for not too great an outlay. Having two pieces would allow examination of both sides of the PCB at the same time. So, about three weeks later I had them in my hands, courtesy of 'China Post', and the following is my report on them.

An explanation of how this antenna works:

The two images at the left are of the front and back sides of this PCB antenna. The right-hand image needs to be imagined as having been printed exactly behind the left-hand image.

The resonant element here is the oval-shaped "patch" at the top of the right-hand image. Because the connection to the 'patch' is at the middle of the lower edge of the oval, the polarisation of the antenna would be vertical when the SMA connector is facing downwards (or upwards).

The PCB track from the centre of the SMA connector to the edge of the 'patch', together with the 'trunk-of-a-tree-shaped' grounded track on the 'front' of the board, work together to 'match' the nominal 50 ohm impedance of the SMA connector to the medium-high impedance of the edge-fed 'patch' element.

Finally, the two 'drooping leaves' connected to the 'ground' land approximately in the middle of the left-hand image provide broadband decoupling to the point where the matching section connects to the feed-point of the 'patch' element.

Analogous to the PCB antennas featured in this report, one might imagine a VHF or UHF "half-wave ground plane" antenna, with matching section, simply made from brass or copper wires. The bandwidth of the wire antenna will be relatively 'sharp' compared to this little PCB antenna, particularly due to the shape and dimensions of the oval shaped 'patch' element, plus the shape and dimensions of the 'drooping leaves' decoupling components (which in the VHF-UHF situation are merely one quarter wavelength rods).

Measurements of Return Loss:

	2.4 GHz	3.4 GHz	5.7 GHz
UWB #1	-5.0 dB	-25 dB	-8 dB
UWB #2	-5.5 dB	-30 dB	-18 dB

Comments: These 'UWB' antennas are definitely broader in useable frequency than a mere dipole would be, but not remarkably so in terms of amateur radio bands covered. Best performance is from approximately 3 GHz to approximately 5 GHz.

An amateur radio enthusiast might use such an antenna for indoor or close distance testing, but these antennas are not all that remarkable, other than being of interest to an RF-PCB designer.