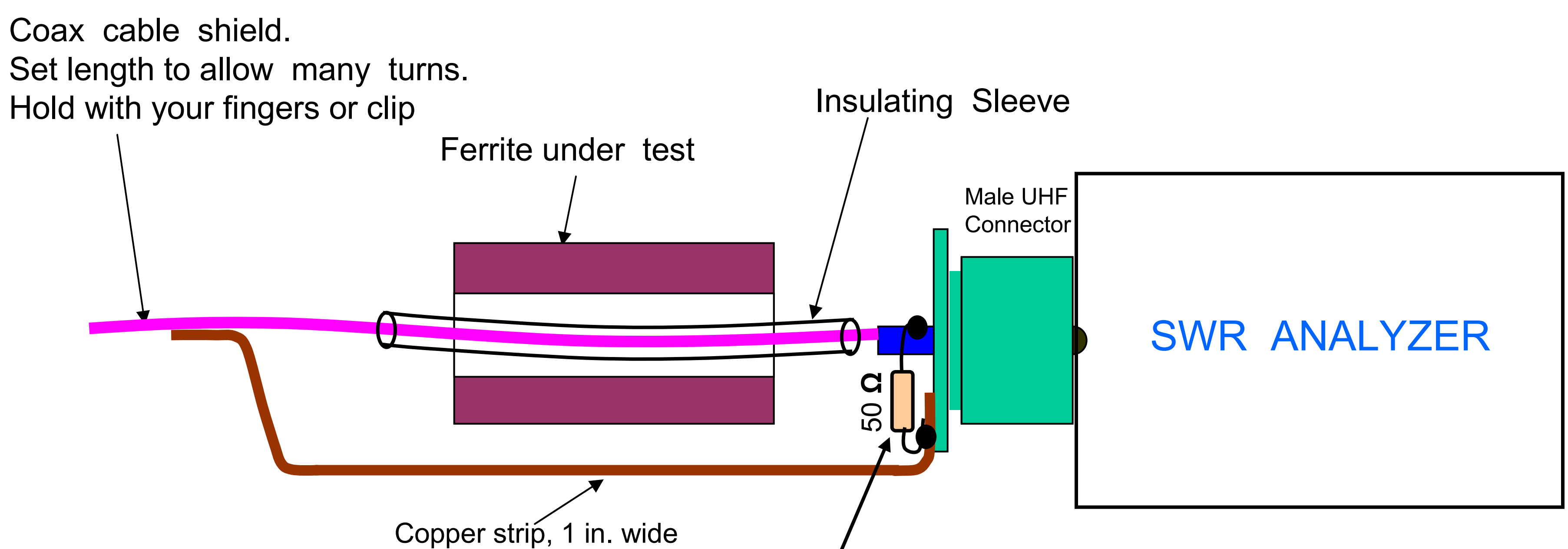
CHECK YOUR FERRITES WITH YOUR SWR ANALYZER

FROM SWR MEASUREMENTS

NOTE: This technique may be used to check the impedance of an antenna, or any other device, by using a coaxial Tee and a 50Ω termination.



The ferrite is in parallel with the 50 ohms (1%) termination

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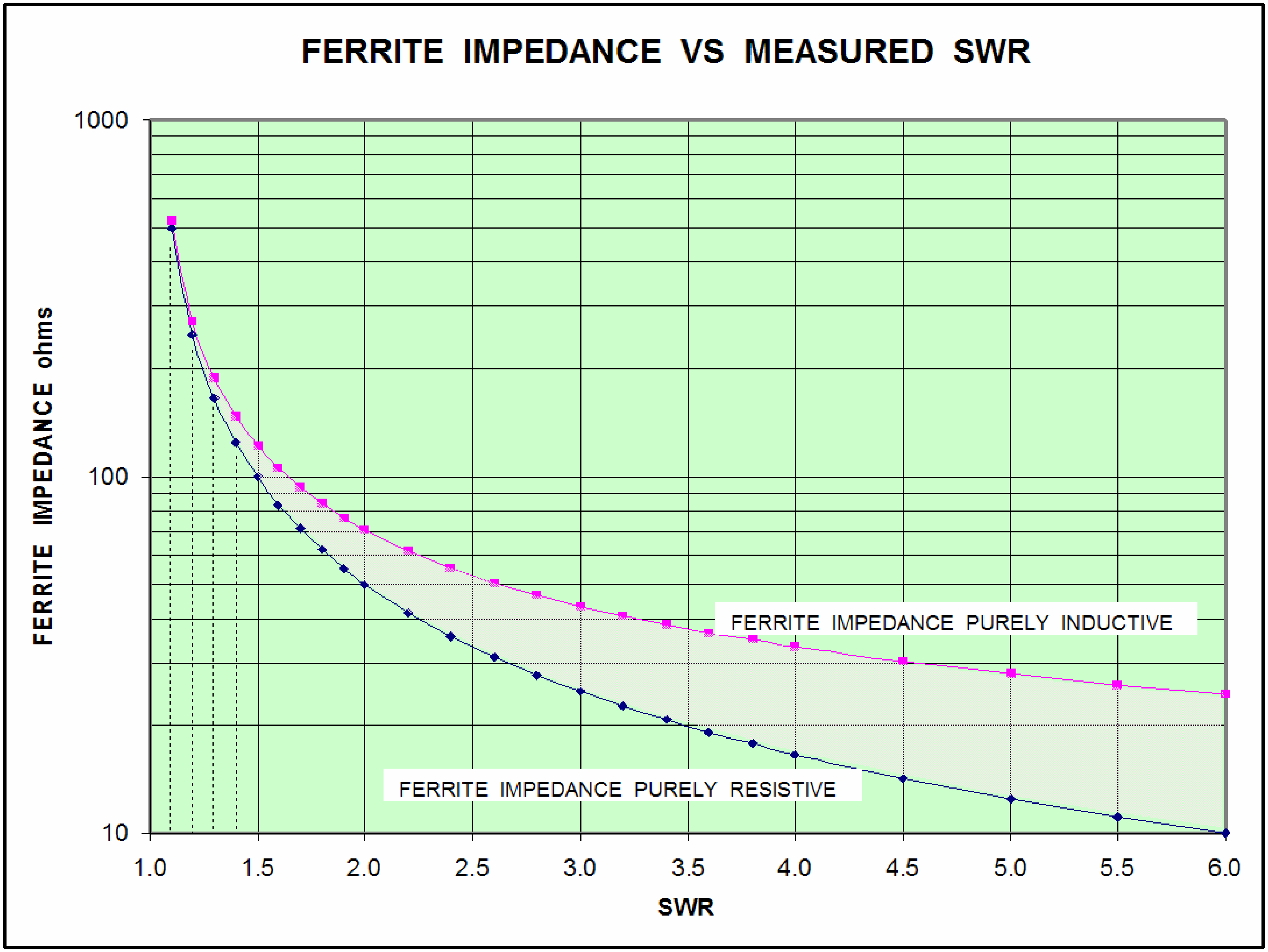

FERRITE IMPEDANCE VS MEASURED SWR
1000
100
10
FERRITE IMPEDANCE ohms
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
SWR
FERRITE IMPEDANCE PURELY INDUCTIVE
FERRITE IMPEDANCE PURELY RESISTIVE

NOTES

The center (red) wire is a coax shield to simulate the way the ferrite is normally used over a coax shield. I used the shield from some sort of RG-8 and stretched it, after removing the insulation and center conductor. However this is not critical. Using a thinner conductor will increase the inductance slightly.

Note that the lower conductor is a 1 inch wide copper strip, that minimizes inductance.

Using 2 turns around the ferrite will multiply the impedance by 4. (approx.)

A normal SWR meter will be OK, as long as the power is below 1 watt or so,and the 50 ohm resistor can absorb the power. SWR analyzers are low power devices and only use a few milliwatts.

There is no way to tell if the impedance is resistive or reactive, with this simple set-up.
So you may take the worst case value (lowest impedance).
For ferrites that are meant to be used at HF, the impedance tends to be partly inductive (reactive) and resistive at the lower frequencies, below say 10 MHz.
At the higher frequencies, generally above 10 MHz or so, it is mostly reactive.

For suppressing coaxial currents, in general, one doesn't care if the impedance is resistive or reactive. However a ferrite with resistive impedance will allow ferrite heating if the outer coaxial current squared X the ferrite resistance (= power) is above a few watts. This will happen if the ferrite RF resistance is too low, since it allows higher currents. (The power is proportional to the current squared). Remember that there is no power dissipated in the reactive part of the impedance. In general, using 500 ohms of RF resistance on the outer shield will not cause overheating of the ferrites at the 100 W level, when driving a dipole. It's a good idea to check.

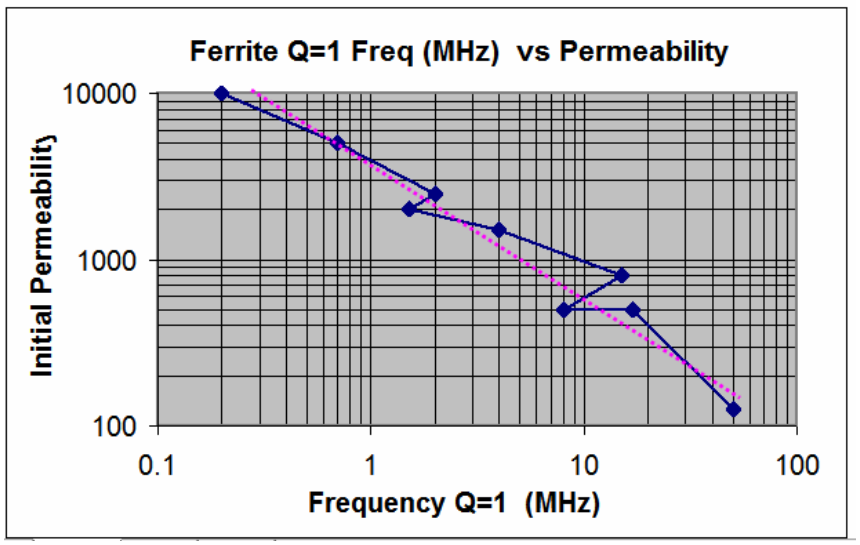
Identify Ferrite Material and Permeability

Using a vector impedance analyzer:
Wind two turns around the ferrite under test.

Find the frequency where the reactance X = resistance R (Q=1)

Based on Fair Rite Data: F(X=R) is approximate

	Init Perm.	F(X=R)	F(X=R) MAX
Material	**µi**	**MHz**	**MHz**
61	125	50	
44	500	17	
46	500	8	
43	800	15	30
31	1500	4	10
77 (72)	2000	1.5	
73	2500	2	
75 (J)	5000	0.7	
76 (W)	10000	0.2	



NOTES:

- The 50Ω resistor must be removed (ref. page 1)

- The impedance analyzer does not need to display the sign of the reactance.

- Above **F(X=R),** the inductance drops and the ferrite becomes resistive.