

450 MHz Validation Dipole Antenna Parameters against lossy simulated tissue

M/N: UTVD-450
S/N: 0001

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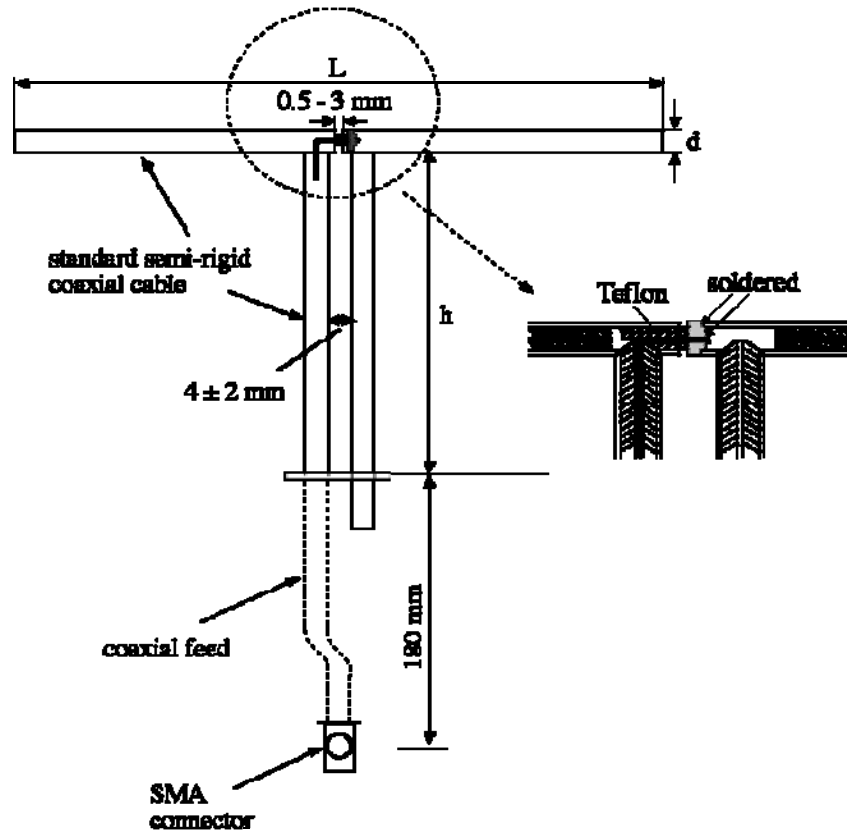


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SL2-IN-E-1119R

1. Dimension of the validation dipole



The balanced dipole was manufactured according to the dimension given in Table G.1 of IEEE 1528 for the specific frequency of interest. It is made from semi-rigid 50 Ohm coaxial cable, which is joined by soldering.

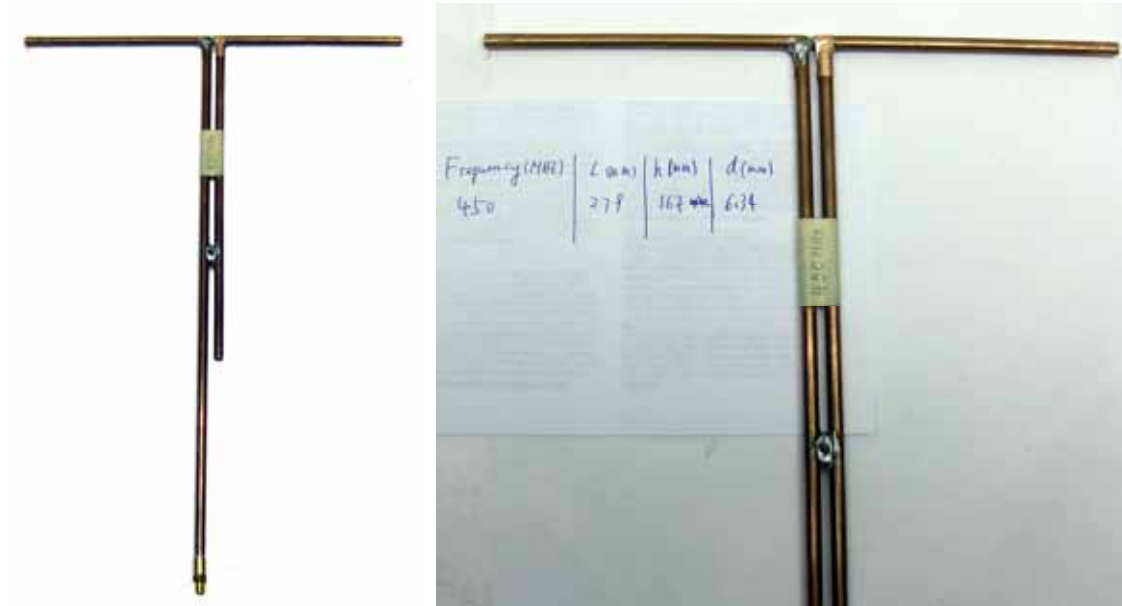
Table G.1 – Mechanical dimensions of the reference dipoles

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	396.0	250.0	6.0
450	270.0	166.7	6.0
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.5	30.4	3.6
3000	41.5	25.0	3.6

NOTE: Dimensions for 300 MHz and 450 MHz were derived using a flat phantom shell with $\epsilon_r' = 3.7$ and 6.3 mm thickness; the values for 835 MHz-3 GHz are from a 2 mm shell thickness. The L , h , and d dimensions should be within $\pm 1\%$ tolerance.

Validation Dipole @ 450 MHz, M/N: UTVD-450, S/N: 001			
Frequency (MHz)	L (mm)	h (mm)	d (mm)
450	279	167	6.34

Antenna length (L) was determined by observing maximum return loss was yielded when it is positioned against the brain simulated tissue of the target frequency at 15 mm separation distance (including 2mm of thickness of the base of the flat phantom).



2. Antenna parameters of the validation dipole against the lossy simulated tissue.

The validation dipole antenna is designed to have low return loss only when it is placed against the flat phantom filled with the simulated tissue for the specific frequency.

2.1. Simulated Tissue

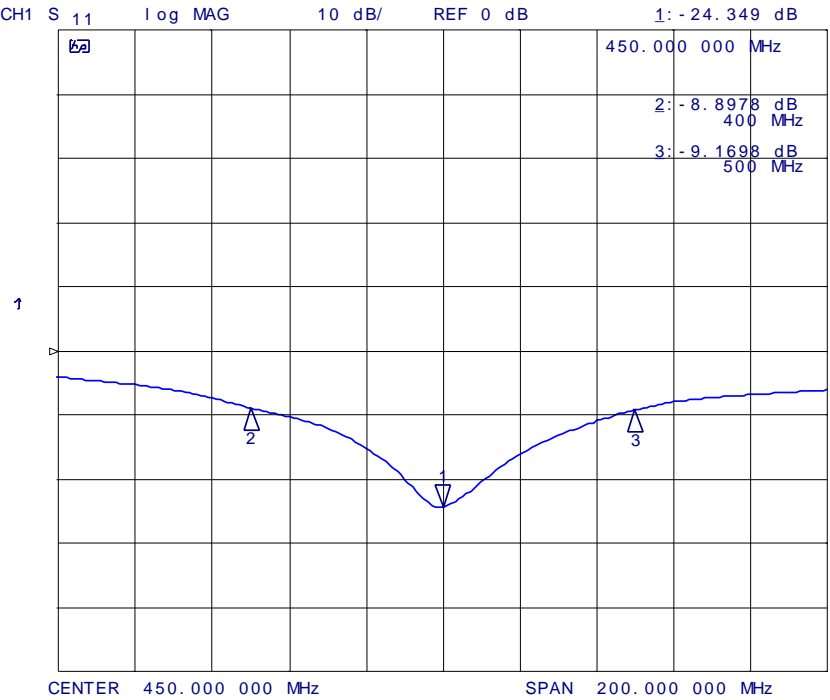
Type of Tissue	Brain
Test Frequency [MHz]	450
Measured Dielectric Constant	43.3 (-0.5 %)
Target Dielectric Constant	43.5
Measured Conductivity [S/m]	0.88 (+1.1 %)
Target Conductivity [S/m]	0.87
Penetration Depth (Plane Wave Excitation) [mm]	42.5

2.2. Test Equipment List

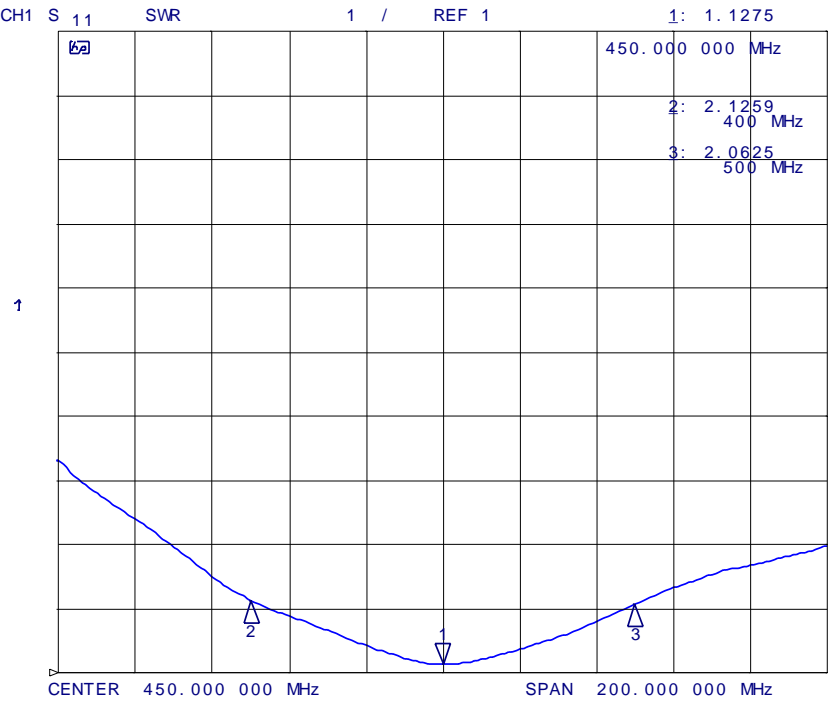
Test Instruments	Manufacturer	Model No.	Serial No.
Network Analyzer	Hewlett Packard	8753D	3410j02042
Cable	Hewlett Packard	8120-6192	00927596

2.3. Test Result

Plot 1. Antenna Parameter #1-1 – Return Loss



Plot 2. Antenna Parameter #1-2 – Return Loss



Plot 3. Antenna Parameter #2 – Impedance

