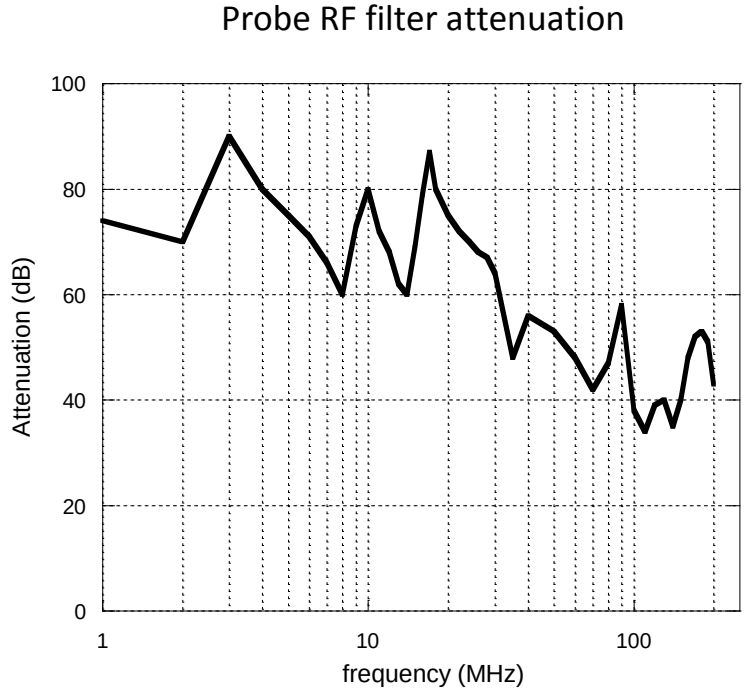

Probes filter response measured by the network analyzer HP3577A using 50 Ohm termination.

The attenuation of rf voltage in the measuring probe sheath $\beta = \beta_{50}$ x 50/Z, β(db) =20lgβ. Here, Z is the total complex impedance of the filter circuit between the plasma and the reference (compensation) probe. It is mainly defined by the impedance of the reference probe to the plasma at the probe floating potential $V_f \sim 4T_e$; $Z^{-1} = R^{-1} + j\omega C$; C is the reference probe-to-plasma capacitance at the floating potential.

This sheath resistance $R = T_e/Senv_s$, where **S** the ref. probe surface, electron charge, plasma density n and ion sound speed $v_s = (T_e/M)^{1/2}$. $C = e_0 S/d$, where d is the sheath thickness of the floating reference probe, $d \sim 3D_e$ (three Debay length).

For example, assuming Z= 1000 Ohm attenuation of the plasma potential voltage in the sheath $\beta = \beta_{50}$ x 50/1000 yielding at 10 MHz, when $\beta_{50} = 10^4$, β= 500. If the plasma rf potential V_{rfp} = 250 V, attenuation by β= 500 reduces rf voltage across the measuring probe sheath to V_{rfsh} = 0.5 V, which is substantially less than electron temperature in common stationary plasmas (Te ~ 3eV).