ECEN452: ULTRA HIGH FREQUENCY TECHNIQUE
LAB11
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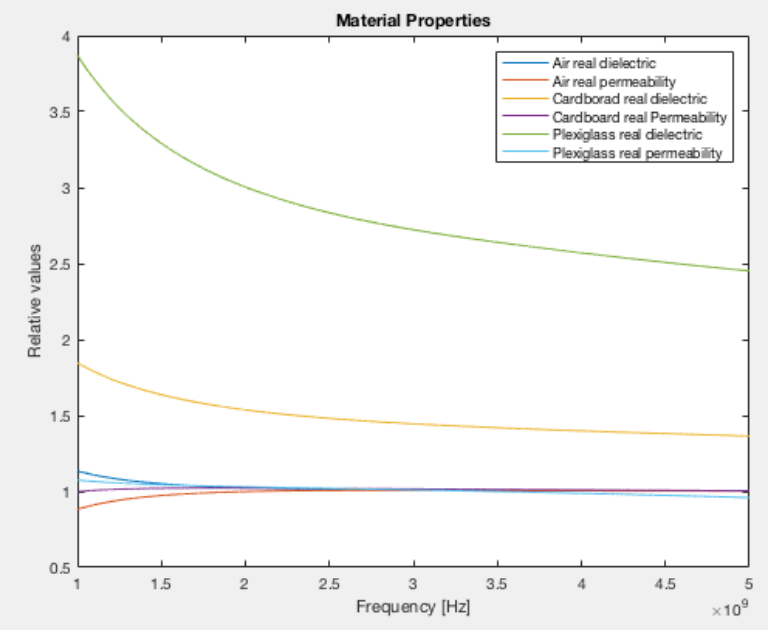
LAB MEASUREMENT:



Figure

In this figure, the real part of the relative permittivity of Plexiglas is the highest whereas that of water is the lowest. The following is more information about this Plexiglas.

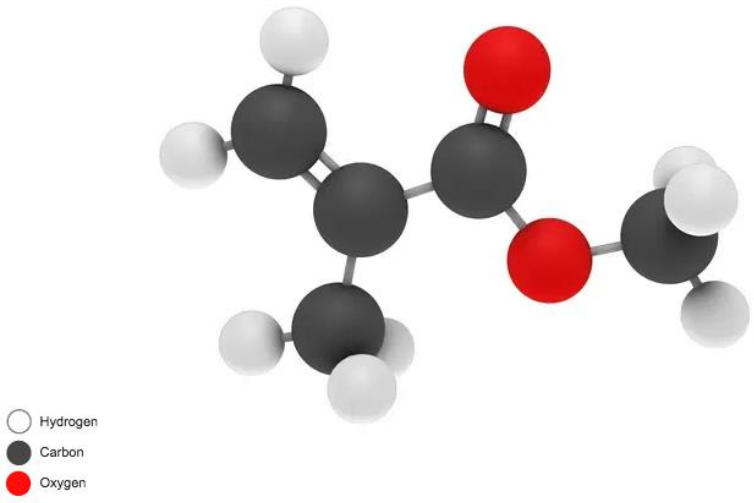


Figure. Molecule structure of Poly(methyl methacrylate)

It is a transparent thermoplastic used as a shatter-resistant alternative to glass. It seems like a glass in simple word.

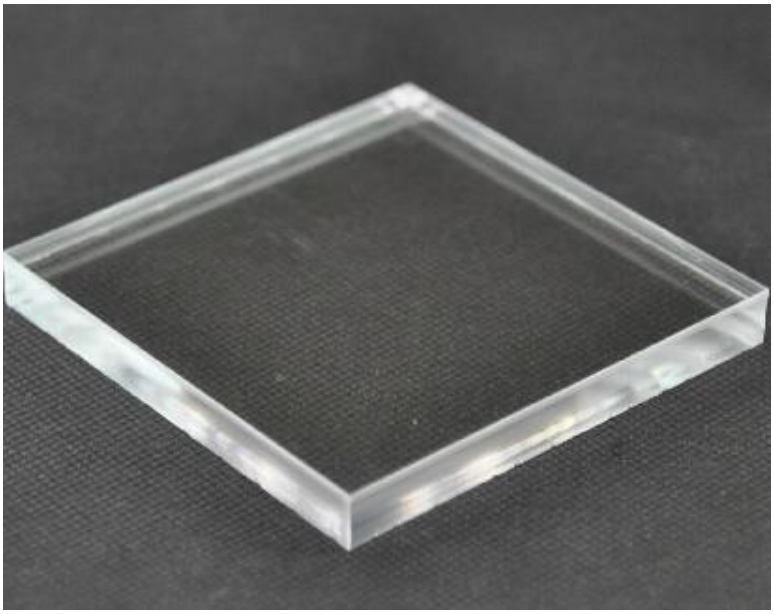
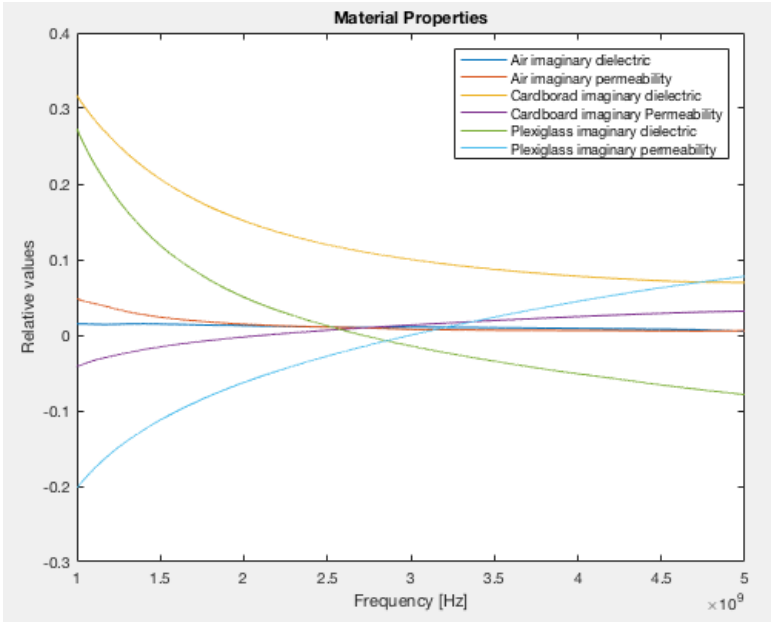
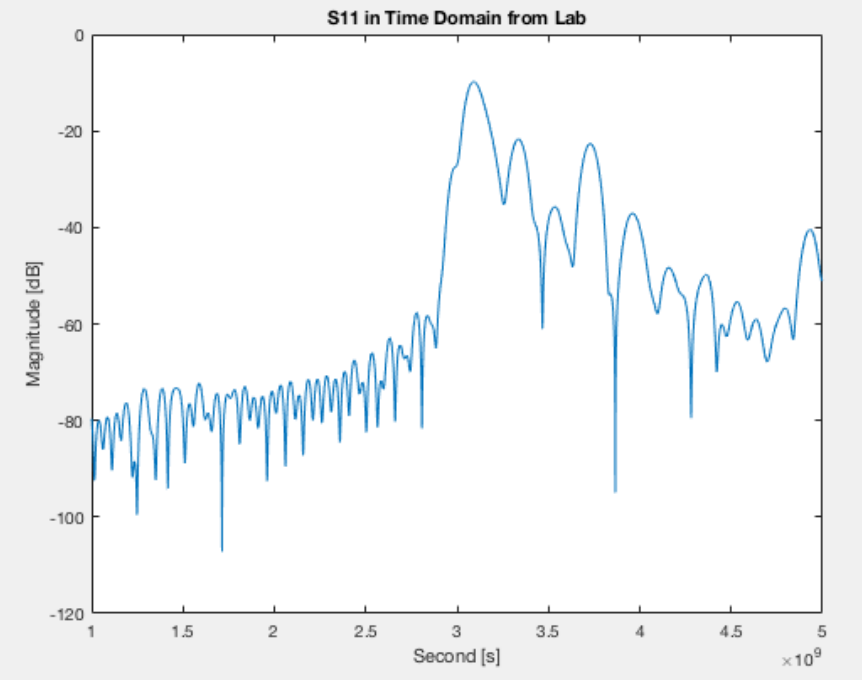


Figure. Photo of Plexiglas



Figure



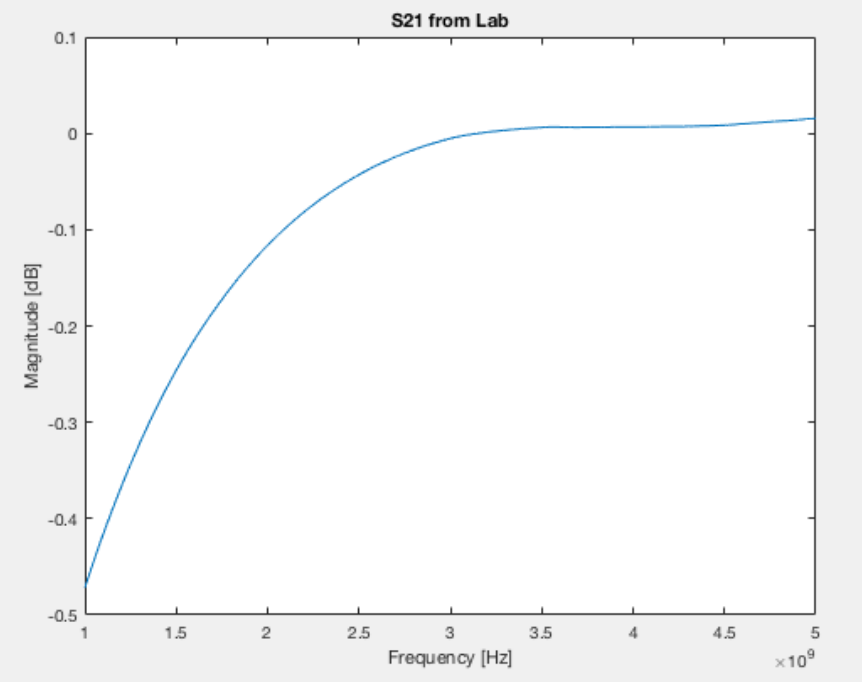
Figure

One advantage from using time domain method is measuring the delay which is generated within a process where we receive the reflected wave from the M.U.T.

Note that this plot is in Time Domain. Time domain method can be applied to measure material properties by applying electromagnetic excitation and see how it reacts with it over time. In other words, by knowing the return loss at port 1, we can calculate the real and imaginary part of relative permittivity of the material.

In the lab, we investigated a "reflection" detection (around 4ns in the above plot) in time domain response after placing a plate between the waveguides. This simply demonstrates that we can calculate material properties by measuring how it deals with our excitation.

I think we can improve the result by using the same material (if we decide to stick with the same material) but with more thickness so that it affects the return loss and affects the calibration in turn.



Figure

The above plot was followed by S21 Thru magnitude (Transmission coefficient) data over frequency range which was generated from the lab. This calibration has been applied in order to enhance finding the location of M.U.T.