1 Method 1

Use field cal data to determine cable $[S_{ij}]$ contemporaneous w/ cascade measurements.

I first read lab measurements of Γ_{20}, Γ_{50}, Γ_{200}; field measurements of Γ_{20}, Γ_{50}, Γ_{200}; and files for the antenna measurements. Then, I calculated

$$\begin{pmatrix} S_{11} \\ -|[S]| \\ S_{22} \end{pmatrix} = \begin{pmatrix} 1 & \Gamma_{20,lab} & \Gamma_{20,field}\Gamma_{20,lab} \\ 1 & \Gamma_{50,lab} & \Gamma_{50,field}\Gamma_{50,lab} \\ 1 & \Gamma_{200,lab} & \Gamma_{200,field}\Gamma_{200,lab} \end{pmatrix}^{-1} \begin{pmatrix} \Gamma_{20,field} \\ \Gamma_{50,field} \\ \Gamma_{200,field} \end{pmatrix}$$

where Γ are extracted from the s2p files with S11DB (in dB) and S11A (degree). They are converted to complex reflection coefficients via

$$\Gamma = 10^{0.05\times S11_{DB}} \exp\left(i\frac{S11_{deg}\pi}{180}\right); \tag{1.1}$$

and the impedance is $Z = 50(1+\Gamma)/(1-\Gamma)$.

Later the S parameters are used to solve for the actual antenna impedance

$$\Gamma_{ant} = \frac{\Gamma_{ant,\ field} - S_{11}}{(-|[S]|) + S_{22}\Gamma_{ant,\,field}}. \tag{1.2}$$

Note, that I compared this with Edwards result and we both got resonance around 45 MHz. So I was assuming this method is robust, but maybe there is a bug?

2 Method 2

Using Edward's lab-serived cable $[S_{ij}]$ calculate

$$\Gamma_{ant} = \frac{\Gamma_{ant,\ field} - S_{11}}{(-|[S]|) + S_{22}\Gamma_{ant,\,field}}. \tag{2.3}$$

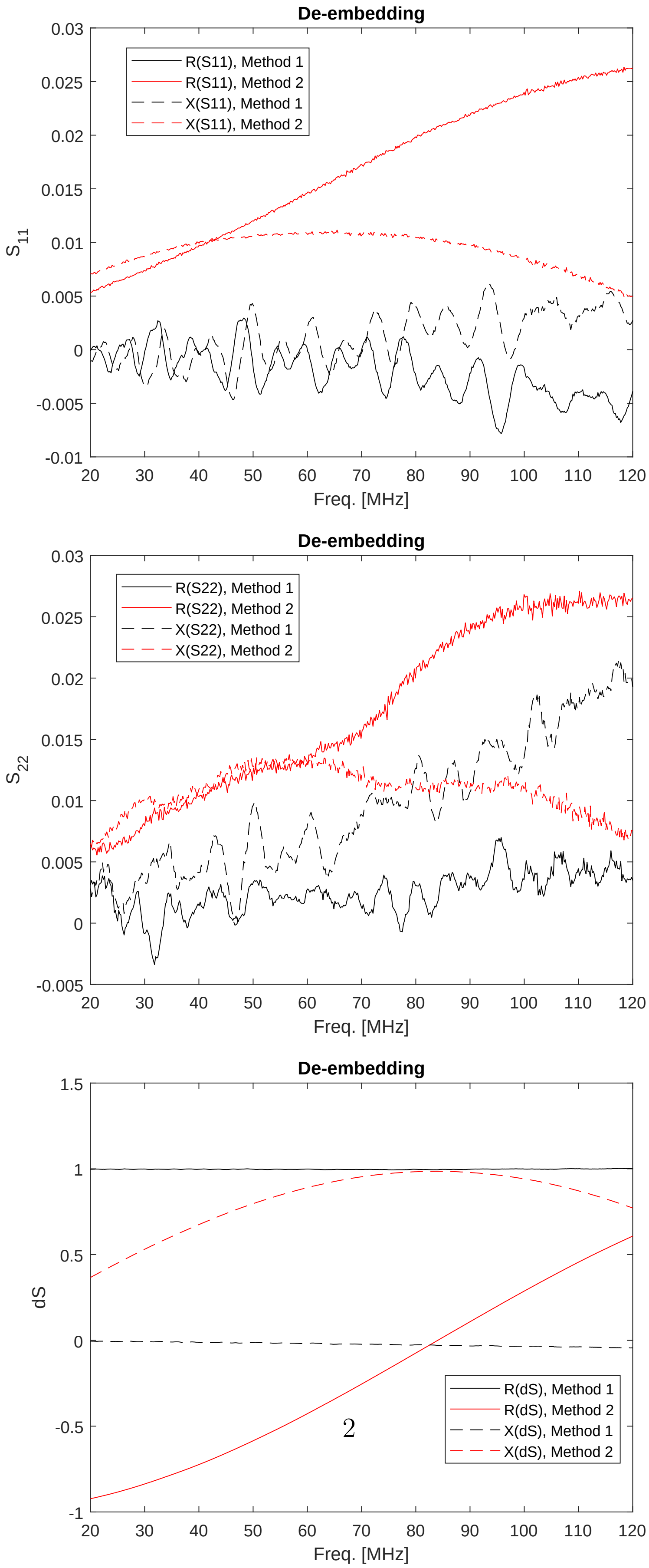

Figure 1: De-embedding.