Worksheet 7.7. page 1

$$D := \begin{pmatrix} 0.2 & 430 & -9020 & \text{"58nF"} \\ 1 & 190 & -2700 & \text{"53nF"} \\ 2 & 93 & -1400 & \text{"53nF"} \\ 3 & 71 & -975 & \text{"54nF"} \\ 5 & 30 & -554 & \text{"54nF"} \\ 10 & 30 & -251 & \text{"62nF"} \\ 21.6 & 49 & -53 & \text{"0"} \\ 30 & 30 & 60 & \text{"396pH"} \\ 50 & 27 & 221 & \text{"696pH"} \\ 100 & 79 & 553 & \text{"877pH"} \\ 300 & 400 & 1670 & \text{"881pH"} \\ 500 & 944 & 2500 & \text{"793pH"} \\ 1000 & 2500 & 3700 & \text{"586pH"} \end{pmatrix}$$

column 1: frequency, MHz
column 2: resistance, mΩ
column 3: reactance, mΩ
column 4: text.

$s := 1 .. \mathrm{rows}(D)$

$f_s := D_{s,1} \cdot 10^6$

$R_s := D_{s,2} \cdot 10^{-3}$

$X_s := D_{s,3} \cdot 10^{-3}$

$ZTt_s := \left| R_s + j \cdot X_s \right|$

Data copied from:
www.ediss-electric.com/bypass_caps_pdf/1_100n0201X5R_murata.pdf

Figure 7.7.5 Calculating frequency response of transfer impedance from test data

Worksheet 7.7. page 2 see figure 7.7.2

$R1 := 0.050\ \Omega$ $C1 := 55\cdot10^{-9}\ F$ $L1 := 850\cdot10^{-12}\ H$

$Rn := 50\ \Omega$ $Rf := 50\ \Omega$

$i := 2..10000$ $F_i := i\cdot10^5$ $V := \begin{pmatrix}1\\0\end{pmatrix}\ V$

$$
ZTm_i := \left|
\begin{array}{l}
\omega \leftarrow 2\cdot\pi\cdot F_i \\
Z11 \leftarrow Rn + R1 + \dfrac{1}{j\cdot\omega\cdot C1} + j\cdot\omega\cdot L1 \\
Z12 \leftarrow -\left(R1 + \dfrac{1}{j\cdot\omega\cdot C1} + j\cdot\omega\cdot L1\right) \\
Z22 \leftarrow Rf + R1 + \dfrac{1}{j\cdot\omega\cdot C1} + j\cdot\omega\cdot L1 \\
Z \leftarrow \begin{pmatrix} Z11 & Z12 \\ Z12 & Z22 \end{pmatrix} \\
I \leftarrow \mathrm{lsolve}(Z, V) \\
Vout \leftarrow \left|I_2\cdot Rf\right| \\
Iin \leftarrow \left|I_1\right| \\
\dfrac{Vout}{Iin}
\end{array}
\right.
$$

Figure 7.7.6 Calculating frequency response of transfer impedance of circuit model

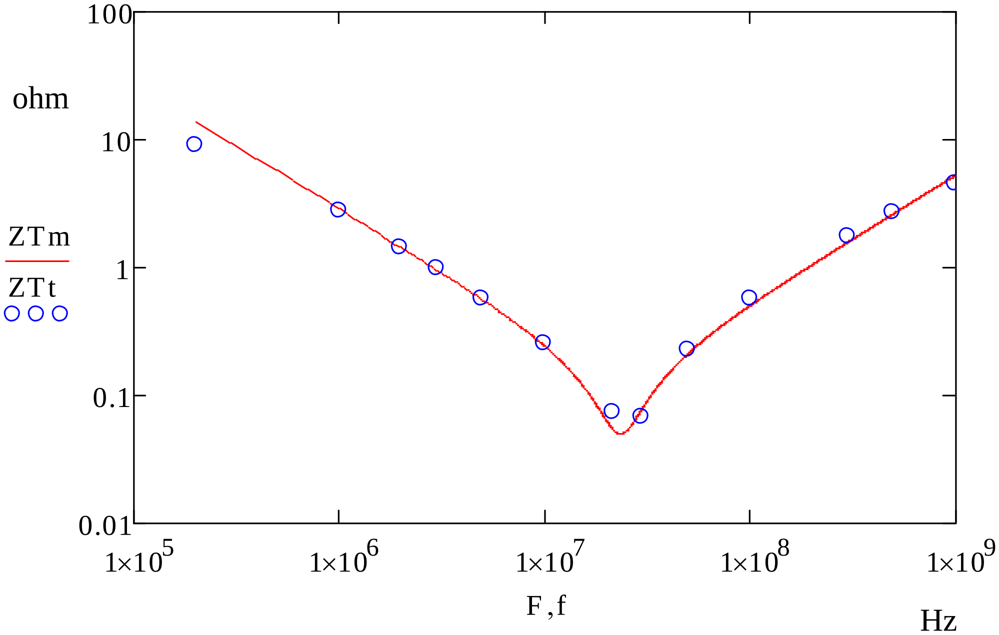

Figure 7.7.3 Transfer admittance of test setup and circuit model