

Measurement files (with the extension s1p or s2p)

With the programs «zdisplay» and «fdisplay» , you can open these measurement files.

To do that : put the s1p and s2p files in the same directory than «zdisplay» and «fdisplay».

To open the s2p files, use «fdisplay» (to display the gain of two ports devices).

To open the s1p files, use «zdisplay» (to display the characteristics of one port devices).

To display the input and output characteristics of a two port device, use «zdisplay».

- **coax_cable_output_open.s1p** : measured impedance at the input of a coax cable, the output of the cable is open, the length of the cable is 8m, the characteristic impedance of the cable is 52.3 ohms. (30KHz – 60MHz, frequency scale = linear, 401 points)
- **coax_cable_output_short.s1p** : measured impedance at the input of the same coax cable, the output of the cable is shorted. (30KHz – 60MHz, frequency scale = linear, 401 points)
- **coax_cable_8m.s2p** : the same coax cable, as a two ports device. You can open this file with «fdisplay» to look at the attenuation of the cable when the source and load are 50 ohms. You can open this file with «zdisplay» to look at the input of the cable when the output is loaded with 50 ohms. (1MHz – 60MHz, frequency scale = logarithmic, 401 points).
- **R_input_of_the_analyzer.s1p** : measurement at the «R» input of the analyzer ; (200Hz – 60MHz, frequency scale = log, 401 points).
- **A_input_of_the_analyzer.s1p** : measurement at the «A» input of the analyzer ; (200Hz – 60MHz, frequency scale = log, 401 points).
- **Low_pass_filter_10MHz.s2p** : low pass filter designed to be used with 50 ohms source and load impedances ; (1MHz – 60MHz, frequency scale = logarithmic, 401 points).
- **Low_pass_filter_20MHz.s2p** : low pass filter designed to be used with 50 ohms source and load impedances ; (1MHz – 60MHz, frequency scale = logarithmic, 401 points).
- **self_150nH.s1p** : this 150nH inductor is used in the 60MHz DDS low pass filter ; (100kHz – 60MHz, frequency scale = logarithmic, 401 points).
- **capa_22uF_ceramic.s2p** : in this file, only the S21 parameter is measured; S11, S12 and S22 are filled with zeros ; (200Hz – 60MHz, frequency scale = logarithmic, 401 points). With this measurement , we can see the insertion «gain» of this capacitor when the source and load impedance are 50 ohms.
This file does not work with the s-parameter simulator RFSIM99, use Qucs.
- **capa_1000uF_tantale.s2p** : in this file, only the S21 parameter is measured; S11, S12 and S22 are filled with zeros ; (200Hz – 60MHz, frequency scale = logarithmic, 401 points). With this measurement , we can see the insertion «gain» of this capacitor when the source and load

impedance are 50 ohms.

This file does not work with the s-parameter simulator RFSIM99, use Qucs.

- **quartz_24MHz.s1p** : (23.990000MHz – 24.050000MHz, frequency scale = linear, 801 points)

To display |z| use the logarithmic scale.

the frequency of the series resonance is $f_s=23.995040\text{MHz}$

the frequency of the parallel resonance is $f_p=24.038525\text{MHz}$

the series resistance is $r_s=6.649\text{ ohms}$

the parallel capacitance is $c_p=2.042\text{pF}$ (c_p is measured at 20MHz)

We can calculate the motional capacitance $c_m=c_p*(f_p*f_p - f_s*f_s)/(f_s*f_s) = 7.407933522092\text{E-15 F}$

We can calculate the motional inductance $L_m=1/(c_p*4*\pi*\pi*(f_p*f_p - f_s*f_s)) = 0.00593882093\text{ H}$

S-parameter simulation softwares

With an S-parameter simulation software, you can use these s1p or s2p files.

We have verified that it works with Qucs and RFSIM99.

RFSIM99 is easy to use, but with some measurements, the program cannot handle the small values and the big values of S21 (the dynamic is limited).