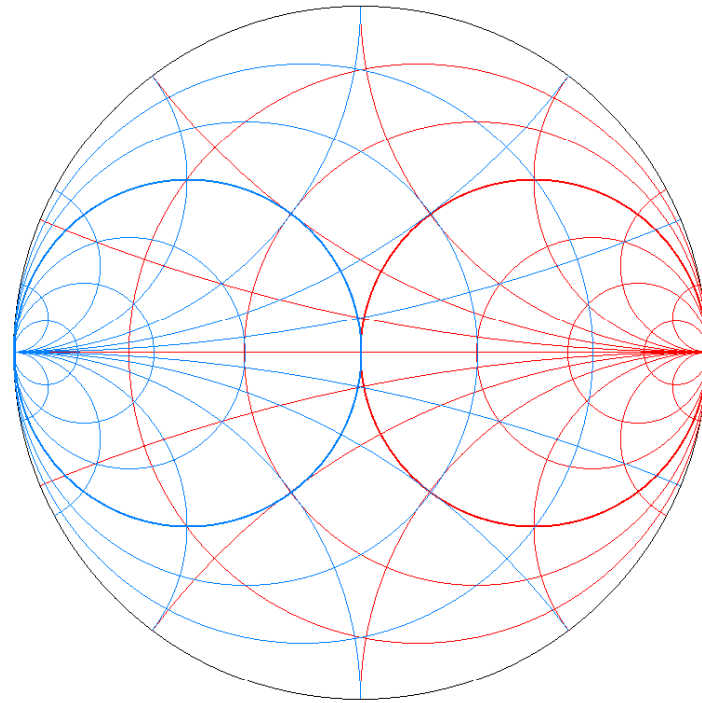


What's New

May 2010

Smith V3.10



Smith-Chart

New Features:

- Sweep versus frequency or datapoints
- Serial transmission line with loss
- Export datapoint and circle info to ASCII-file for post-processing in spreadsheets or math software

S-Plot

New Features:

- Linear or logarithmic frequency axis
- cursor readout at gain and return loss graphs.

System requirements:

Windows XP, Windows Vista, Windows 7
.NET Framework 3.5

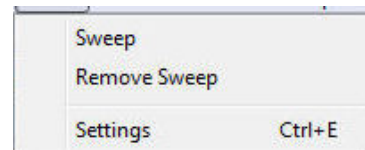
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Sweeps

There are two possibilities to sweep a network:

- Frequency sweep
- Datapoint Sweep

Use menu “Extras”, “Sweep” (“Remove Sweep”) or button in toolbox to invoke or clear a sweep.

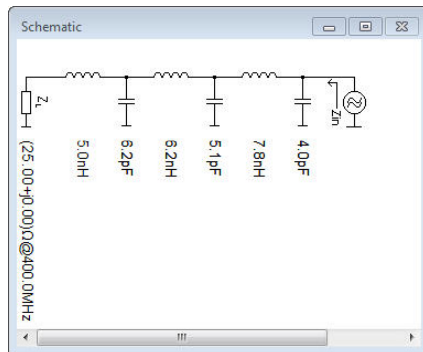
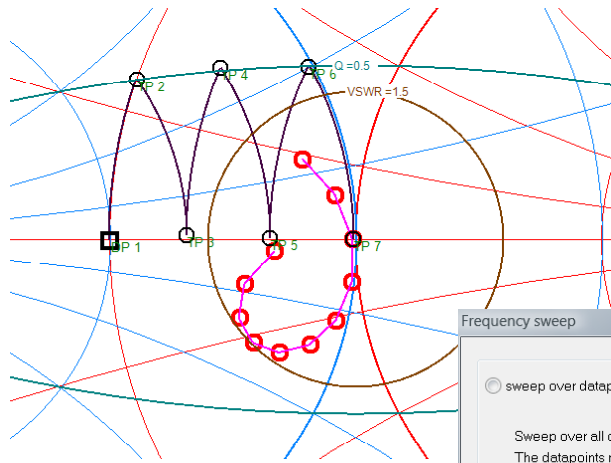


Before doing a sweep design a network starting from one datapoint. For datapoint sweep all datapoints must be input before starting a sweep.

Frequency sweep

Example:

At 400 MHz match $25\ \Omega$ to $50\ \Omega$ using a 6 element lowpass. Use a frequency sweep from 300 MHz to 800 MHz to find out the matching performance (VSWR) for this network versus the frequency range from 300 MHz to 800 MHz.



Frequency sweep

☐ sweep over datapoints
Sweep over all datapoints
The datapoints may have different frequencies

☒ sweep over frequency (single datapoint)

start frequency
300 MHz

stop frequency
800 MHz

step
50 MHz

number of points
11

Draw

OK Cancel Help

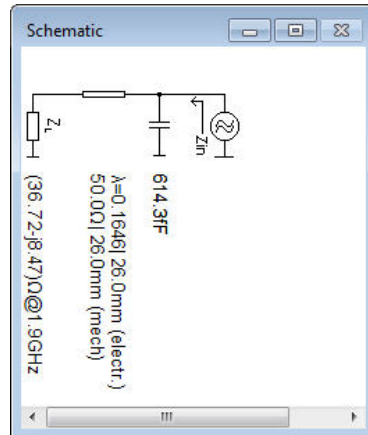
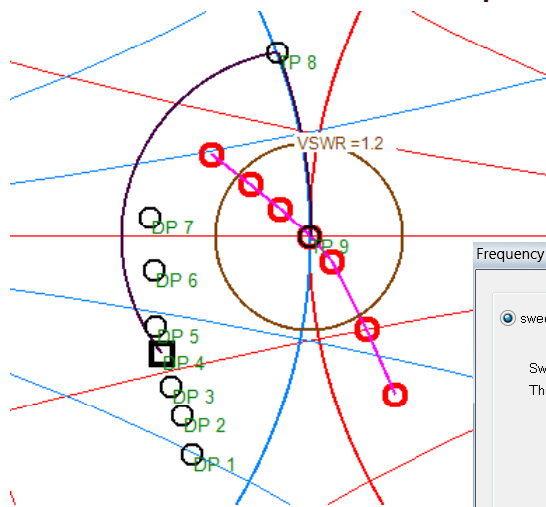
Datapoints				
Start	Point	Z	Q	Frequency
☒	DP 1	(25.000 + j0.000) Ω	Q=0.000	400.0MHz
	TP 2	(25.000 + j12.566) Ω	Q=0.503	400.0MHz
	TP 3	(31.310 + j0.437) Ω	Q=0.014	400.0MHz
	TP 4	(31.310 + j16.020) Ω	Q=0.512	400.0MHz
	TP 5	(39.506 + j0.223) Ω	Q=0.006	400.0MHz
	TP 6	(39.506 + j19.827) Ω	Q=0.502	400.0MHz
	TP 7	(49.455 + j0.232) Ω	Q=0.005	400.0MHz
	SP 1	(42.248 + j9.426) Ω	Q=0.223	300.0MHz
	SP 2	(46.841 + j5.814) Ω	Q=0.124	350.0MHz
	SP 3	(49.455 + j0.232) Ω	Q=0.005	400.0MHz
	SP 4	(49.117 - j5.750) Ω	Q=0.117	450.0MHz
	SP 5	(46.285 - j10.270) Ω	Q=0.222	500.0MHz
	SP 6	(42.419 - j12.407) Ω	Q=0.292	550.0MHz
	SP 7	(38.890 - j12.319) Ω	Q=0.317	600.0MHz
	SP 8	(36.505 - j10.616) Ω	Q=0.291	650.0MHz
	SP 9	(35.674 - j7.886) Ω	Q=0.221	700.0MHz
	SP 10	(36.728 - j4.600) Ω	Q=0.125	750.0MHz
	SP 11	(40.165 - j1.278) Ω	Q=0.032	800.0MHz

➤ After invoke of a sweep, edit element values to watch changes of swept points.

Datapoint sweep

Example:

An antenna has different impedances at different frequencies. This datapoints are loaded from a SII-file. Match the antenna at 1.9 GHz to 50 Ω using a 50 Ω transmission line and a parallel capacitor. Use a datapoint sweep to find out the matching performance (VSWR) for this network for all datapoints.



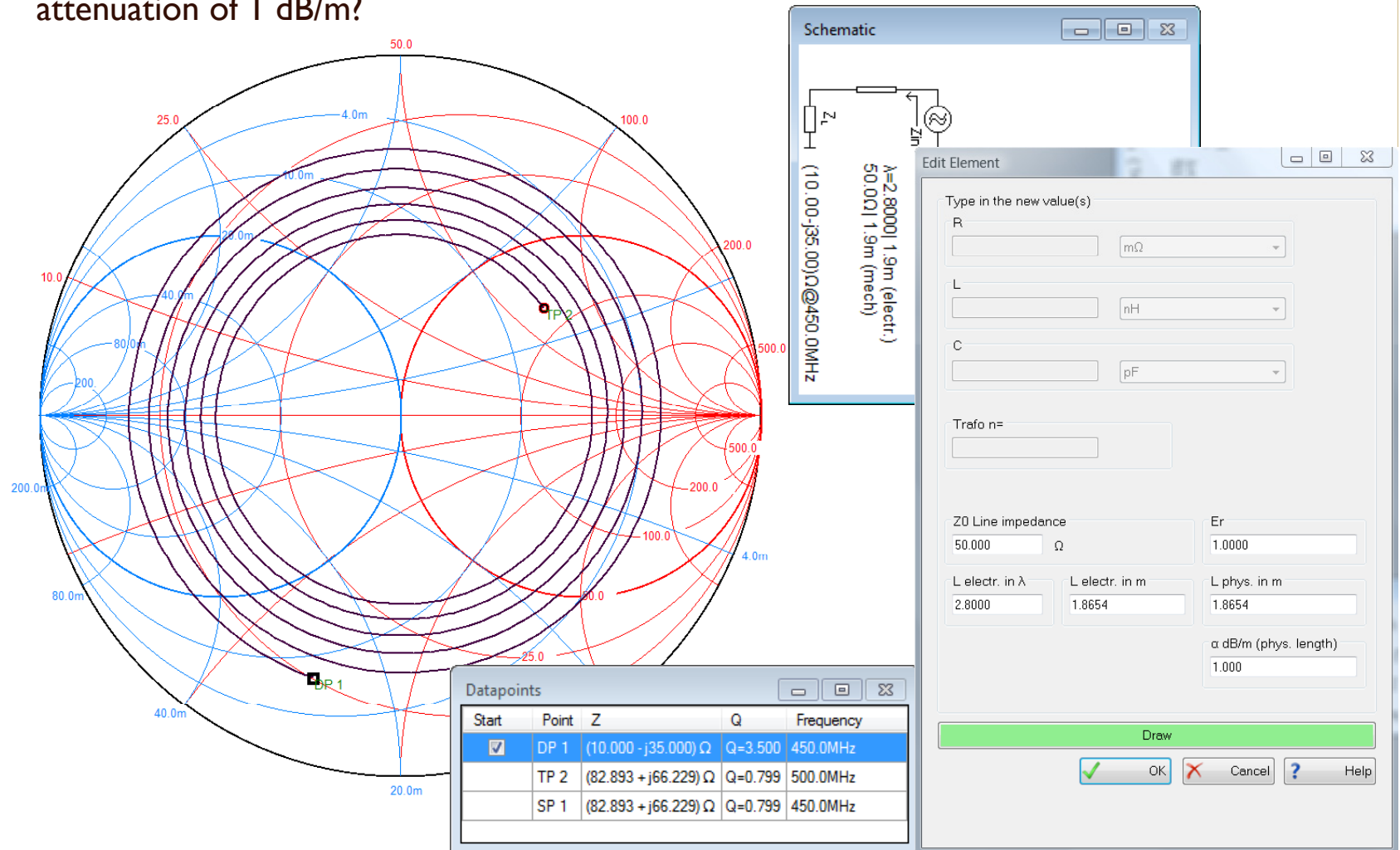
Start	Point	Z	Q	Frequency
☐	DP 1	(36.769 -j16.397) Ω	Q=0.446	1.6GHz
☐	DP 2	(37.020 -j13.376) Ω	Q=0.361	1.7GHz
☐	DP 3	(36.883 -j11.032) Ω	Q=0.299	1.8GHz
☒	DP 4	(36.717 -j8.469) Ω	Q=0.231	1.9GHz
☐	DP 5	(36.569 -j6.544) Ω	Q=0.179	2.0GHz
☐	DP 6	(36.937 -j2.442) Ω	Q=0.066	2.2GHz
☐	DP 7	(36.701 +j1.474) Ω	Q=0.040	2.4GHz
	TP 8	(44.249 +j16.309) Ω	Q=0.369	1.9GHz
	TP 9	(50.261 +j0.000) Ω	Q=0.000	1.9GHz
	SP 1	(41.058 +j6.678) Ω	Q=0.163	1.6GHz
	SP 2	(44.466 +j4.588) Ω	Q=0.103	1.7GHz
	SP 3	(47.276 +j2.638) Ω	Q=0.056	1.8GHz
	SP 4	(50.261 -j0.000) Ω	Q=0.000	1.9GHz
	SP 5	(52.359 -j2.654) Ω	Q=0.051	2.0GHz
	SP 6	(54.964 -j9.992) Ω	Q=0.182	2.2GHz
	SP 7	(56.117 -j17.675) Ω	Q=0.315	2.4GHz

- After invoke of a sweep, edit element values to watch changes of swept points.

Serial transmission line with loss

Example:

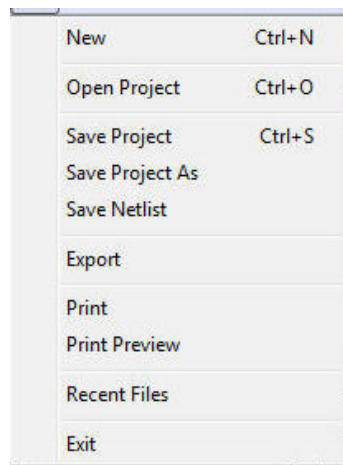
An antenna has an impedance of $(10-j35) \Omega$ at 450 MHz. What impedance do you see, if you connect the antenna with a coaxial cable that has an electrical length of 2.8λ and an attenuation of 1 dB/m?



Export data

Export datapoints or circle data to an ASCII-file for post-processing in spreadsheets or math software. Delimiter format: None, semicolon or comma.

- Select “Export” in menu “File”.



Data file examples:

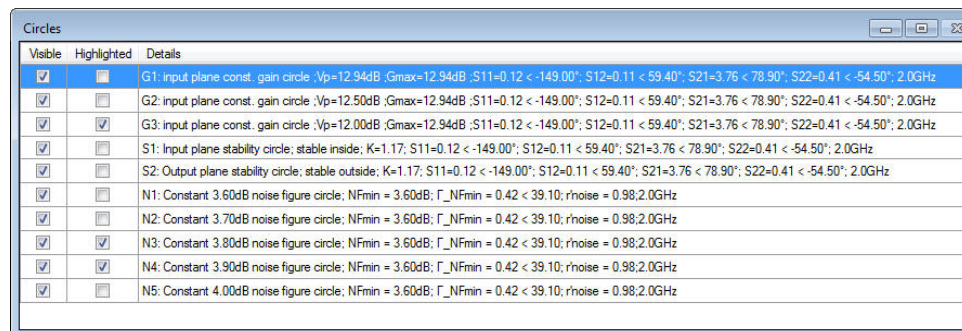
Export datapoints

Start DP	Point	R[Ohm]	X[Ohm]	Q	Frequency[Hz]
true;	1;		20.000;	-12.000;	0.600; 450000000.000
false;	2;		20.000;	12.033; 0.602;	450000000.000
false;	3;		27.180;	1.281; 0.047;	450000000.000
false;	4;		27.180;	16.280; 0.599;	450000000.000
false;	5;		36.855;	1.679; 0.046;	450000000.000
false;	6;		36.855;	21.754; 0.590;	450000000.000
false;	7;		49.695;	0.006; 0.000;	450000000.000

Export circles

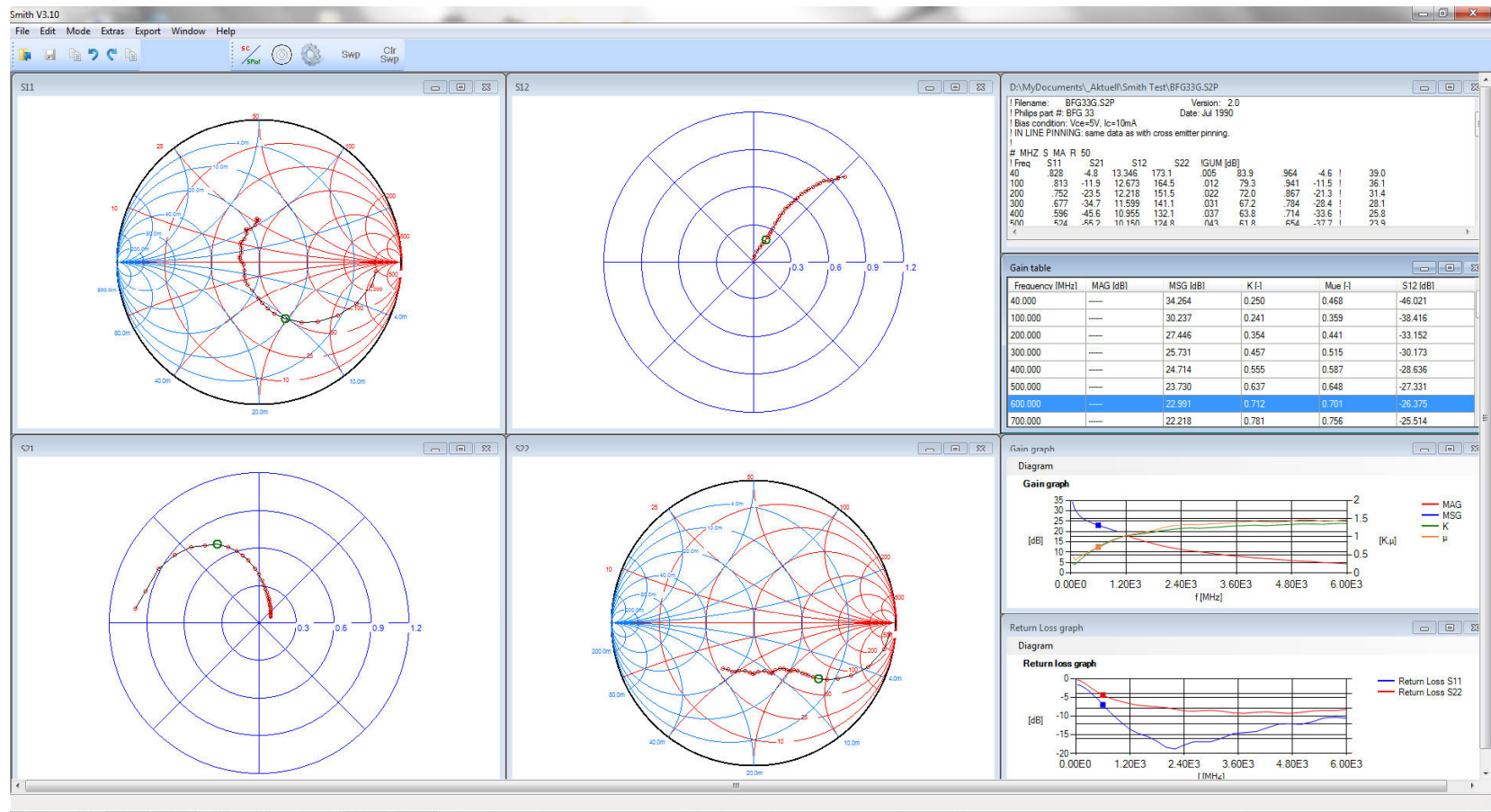
G1;input plane const. gain circle;12.94;12.94;0.12;-149.00;0.11;59.40;3.76;78.90;0.41;-54.50;2.0GHz;
 G2;input plane const. gain circle;12.50;12.94;0.12;-149.00;0.11;59.40;3.76;78.90;0.41;-54.50;2.0GHz;
 G3;input plane const. gain circle;12.00;12.94;0.12;-149.00;0.11;59.40;3.76;78.90;0.41;-54.50;2.0GHz;
 N1;3.60;3.60;0.42;39.10;0.98;2.0GHz;
 N2;3.70;3.60;0.42;39.10;0.98;2.0GHz;
 N3;3.80;3.60;0.42;39.10;0.98;2.0GHz;
 N4;3.90;3.60;0.42;39.10;0.98;2.0GHz;
 N5;4.00;3.60;0.42;39.10;0.98;2.0GHz;
 S1;Input plane stability circle;stable outside;1.17;0.12;-149.00;0.11;59.40;3.76;78.90;0.41;-54.50;2.0GHz;
 S2;Output plane stability circle;stable outside;1.17;0.12;-149.00;0.11;59.40;3.76;78.90;0.41;-54.50;2.0GHz;

For meaning of values see window “Circles”



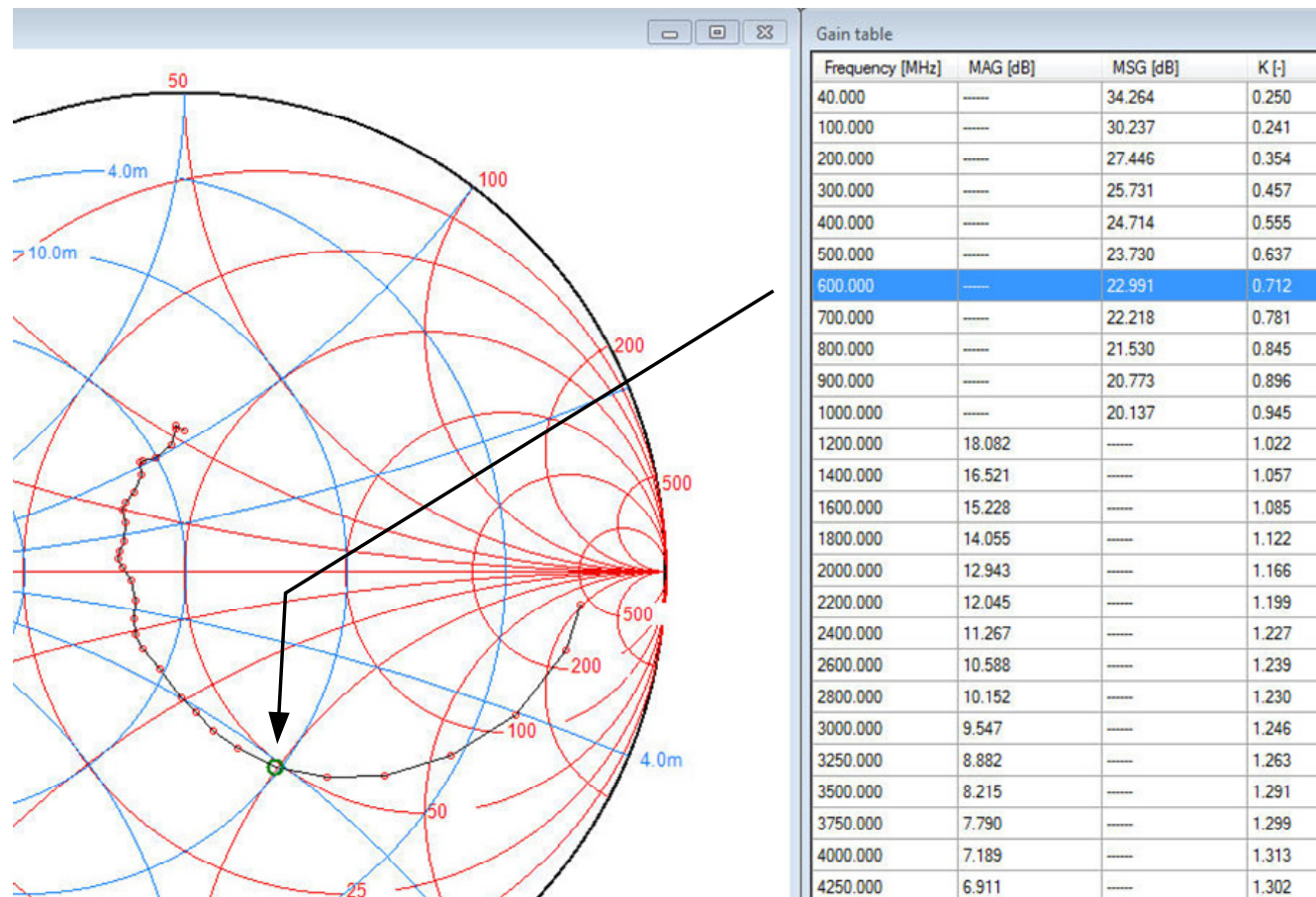
S-Plot

New Gain and Return Loss graphs



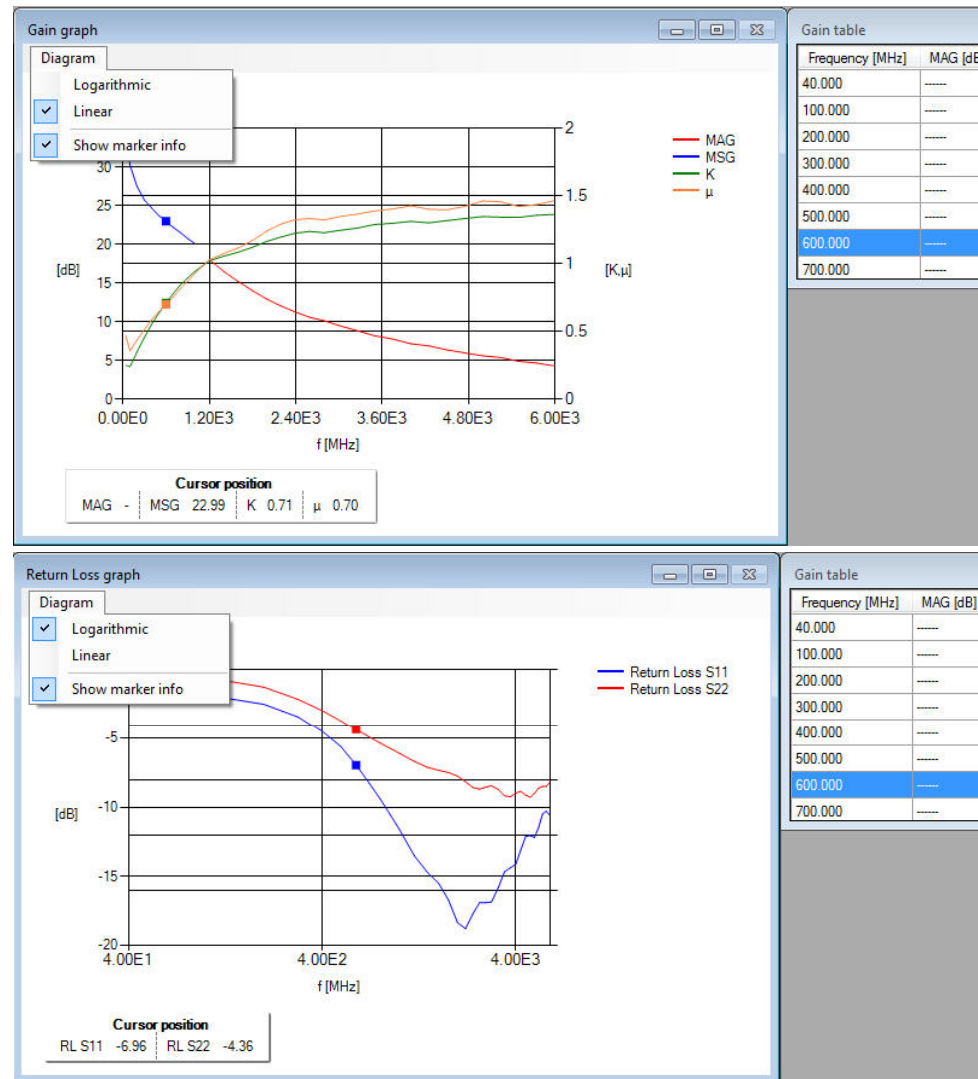
S-Plot

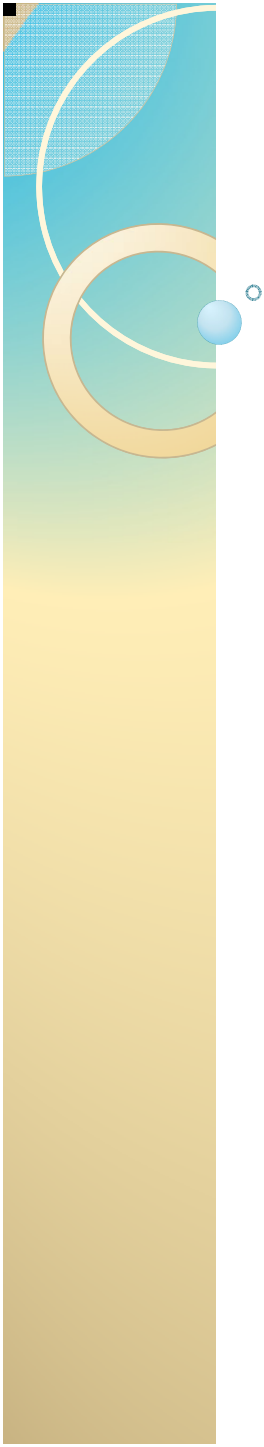
The selected line in window “Gain table” highlights the corresponding datapoint in all graphs.



S-Plot

- New Gain and Return Loss graphs with linear or logarithmic frequency axis and cursor readout:





License, Demoversion and Contact

The unlicensed Demoversion allows 5 elements and 5 datapoints only. Save project and save netlist are disabled.

If you are interested in a licensed version with full capabilities send an e-mail to

fritz.dellsperger@bfh.ch

or

fritz@dellsperger.net

Commercial licenses are priced to US\$ 100

Licenses for universities, students and Ham's with callsign are priced to US\$ 70

Demoversion and additional documents related to the Smith-Chart can be downloaded at

www.fritz.dellsperger.net

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