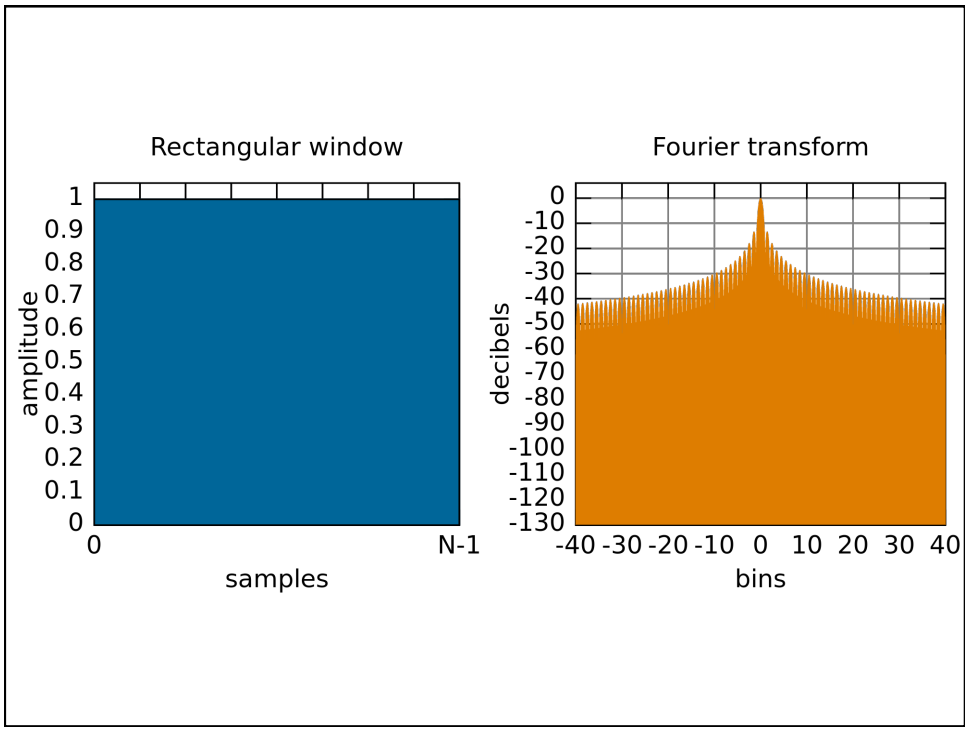
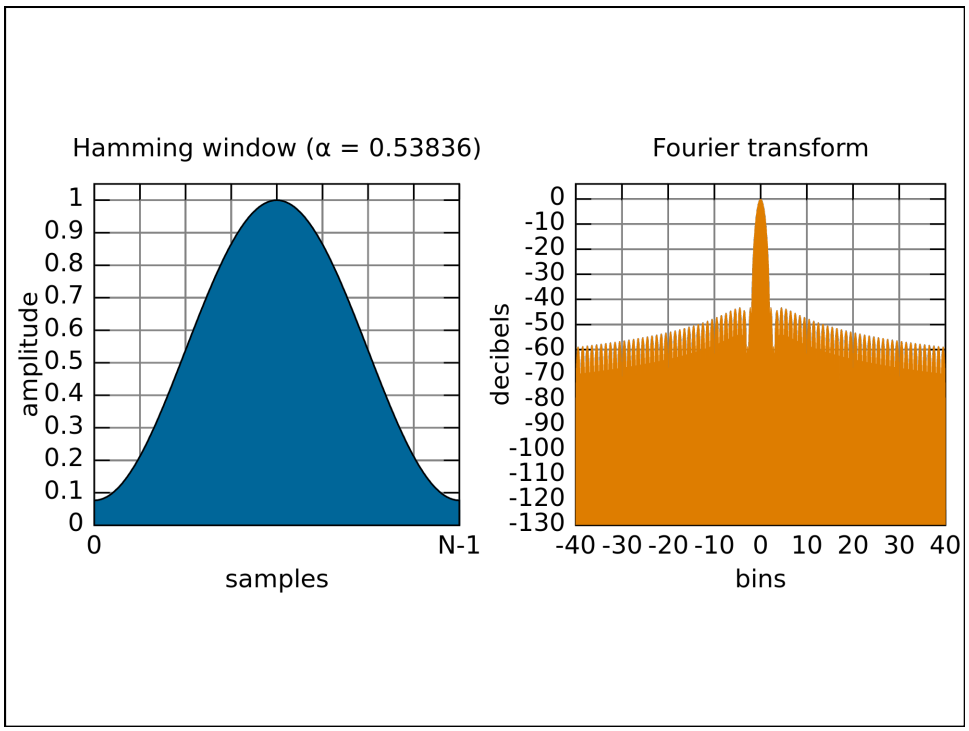
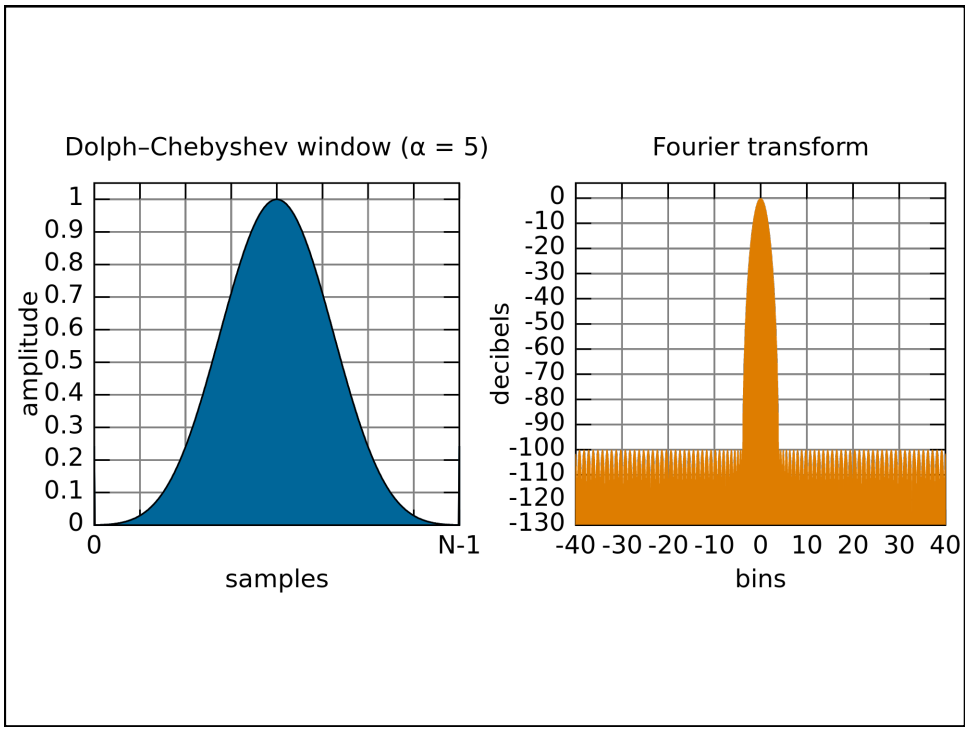
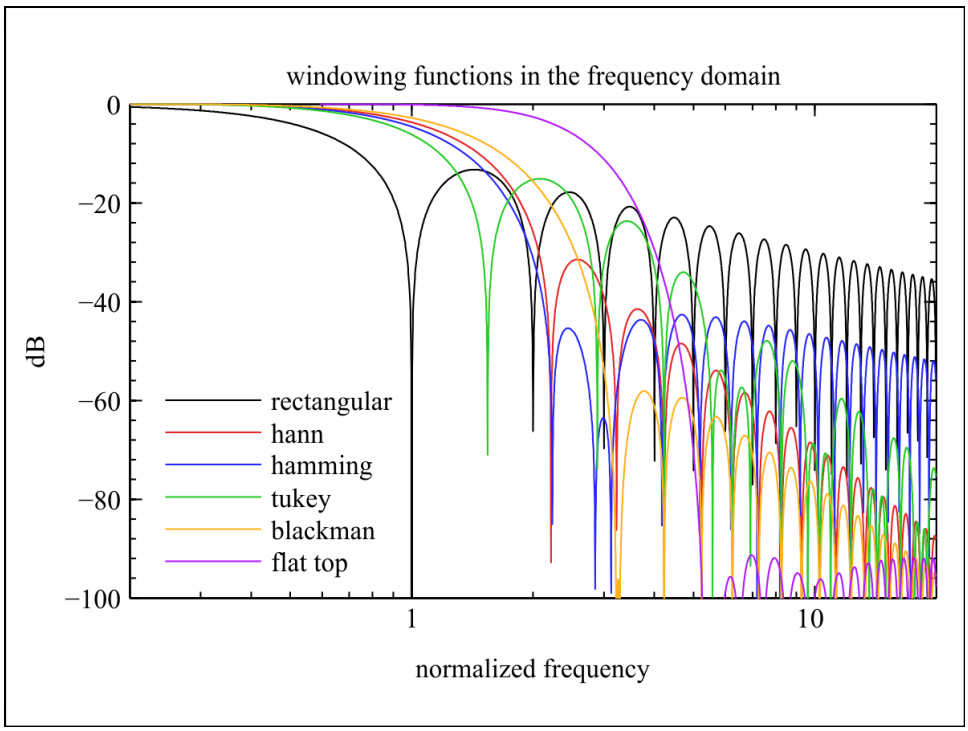

Rectangular window
amplitude
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
N-1
samples
Fourier transform
decibels
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-40 -30 -20 -10 0 10 20 30 40
bins


Hamming window (α = 0.53836)
amplitude
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
N-1
samples
Fourier transform
decibels
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-40 -30 -20 -10 0 10 20 30 40
bins


Dolph–Chebyshev window (α = 5)
amplitude
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
N-1
samples
Fourier transform
decibels
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-40 -30 -20 -10 0 10 20 30 40
bins


windowing functions in the frequency domain
dB
0
−20
−40
−60
−80
−100
rectangular
hann
hamming
tukey
blackman
flat top
1
10
normalized frequency

To select a window, press (System) TRANSFORM MENU WINDOW. A menu is presented that allows the selection of three window types (see **Table** 6-12).

Table 6-12. Impulse Width, **Sidelobe** Level, and Windowing Values

Window **Type**	**Impulse Sidelobe** Level	**Low Pass Impulse** Width (50%)	**Step Sidelobe** Level	**Step Rise Time** (10 - 90%)
Minimum	**-13 dB**	**0.60/Freq** Span	-21 **dB**	**0.45/Freq** Span
Normal	**-44 dB**	**0.98/Freq** Span	-60 **dB**	**0.99/Freq** Span
Maximum	-75 **dB**	**1.39/Freq** Span	-70 **dB**	**1.48/Freq** Span

NOTE: The **bandpass** mode simulates an impulse **stimulus. Bandpass** impulse width is twice that of low pass impulse width. The **bandpass** impulse **sidelobe** levels are the same as low pass impulse **sidelobe** levels.

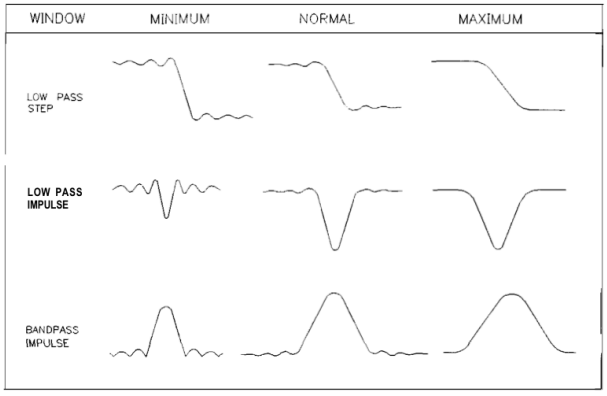


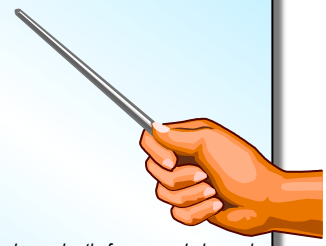
Figure 6-72. The Effects of Windowing on the Time Domain Responses of a Short Circuit

Table 6-13. Gate Characteristics

Gate Shape	Passband Ripple	Sidelobe Levels	Cutoff Time	Minimum Gate span
Gate Span Minimum	±0.10 dB	−48 dB	1.4/Freq Span	2.8/Freq Span
Normal	• 0.01 dB	-68 dB	2.8/Freq Span	5.6/Freq Span
Wide	±0.01 dB	-57 dB	4.4/Freq Span	8.8/Freq Span
Maximum	±0.01 dB	-70 dB	12.7/Freq Span	25.4/Freq Span

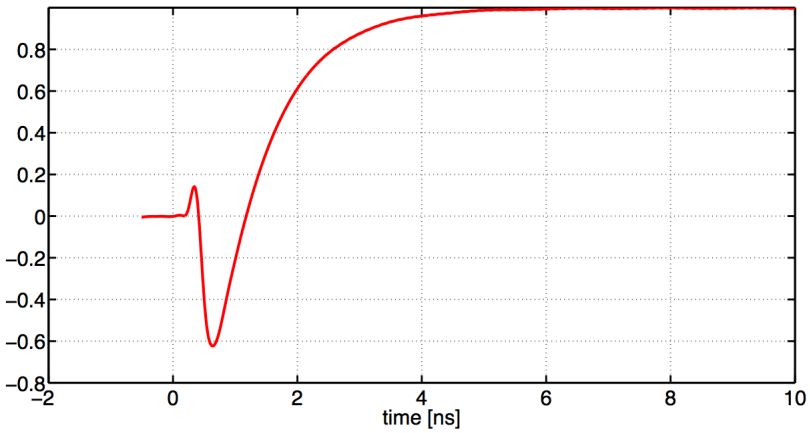
Ten Steps for Performing TDR (Low Pass Step)

1. Set up desired frequency range (need wide span for good spatial resolution)
2. Under SYSTEM, transform menu, press "set freq low pass“
3. Perform one- or two-port calibration
4. Select S11 measurement *
5. Turn on transform (low pass step) *
6. Set format to real *
7. Adjust transform window to trade off rise time with ringing and overshoot *
8. Adjust start and stop times if desired
9. For gating:
   - set start and stop frequencies for gate
   - turn gating on *
   - adjust gate shape to trade off resolution with ripple *
10. To display gated response in frequency domain
    - turn transform off (leave gating on) *
    - change format to log-magnitude *

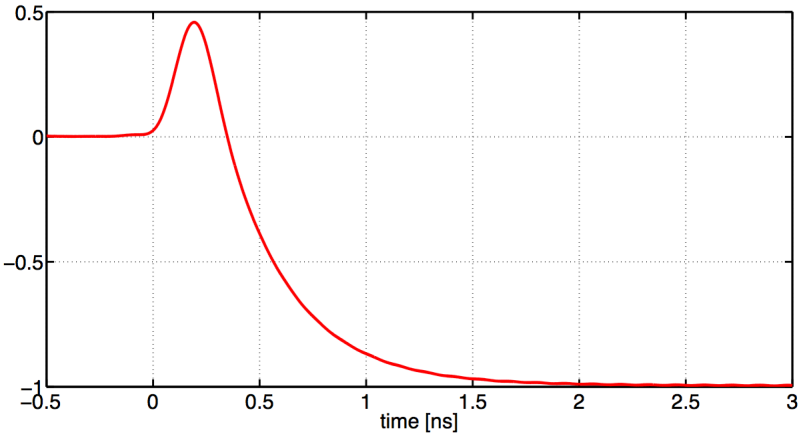


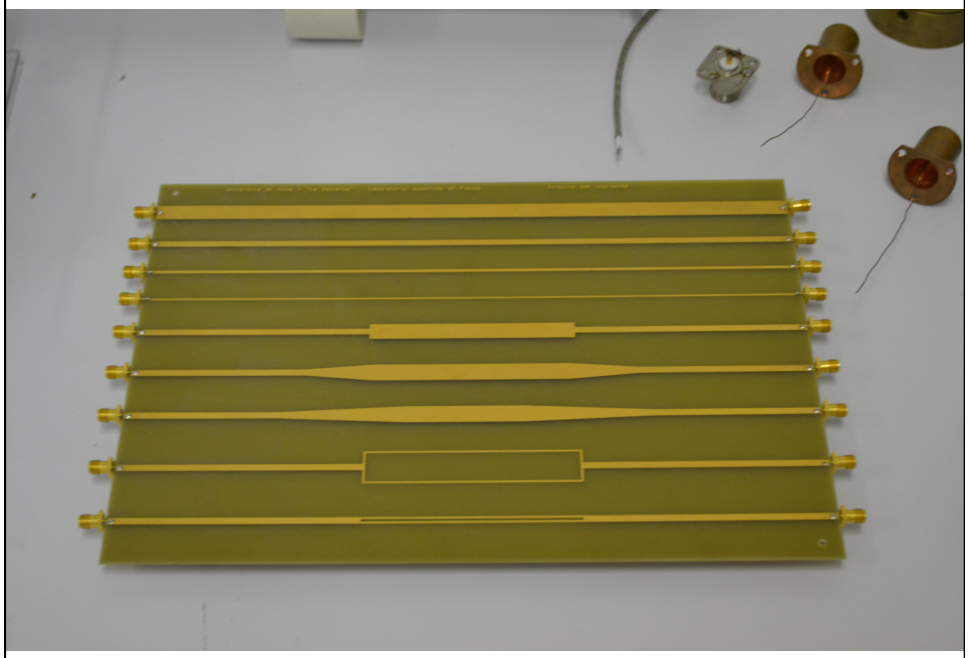
** If using two channels (even if coupled), these parameters must be set independently for second channel*

20 pF CAPACITOR

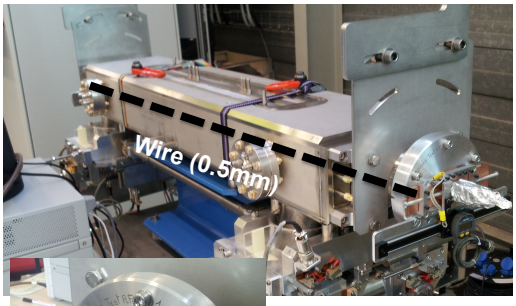


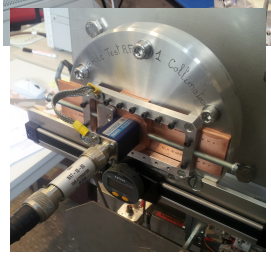
19 nH INDUCTANCE

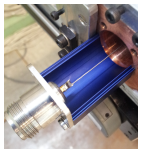


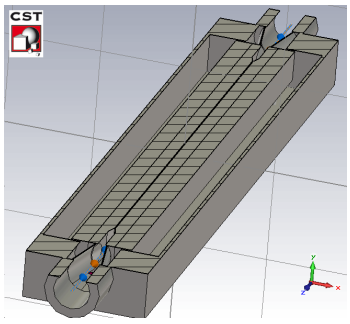


LHC TCTP COLLIMATOR WIRE MEASUREMENT

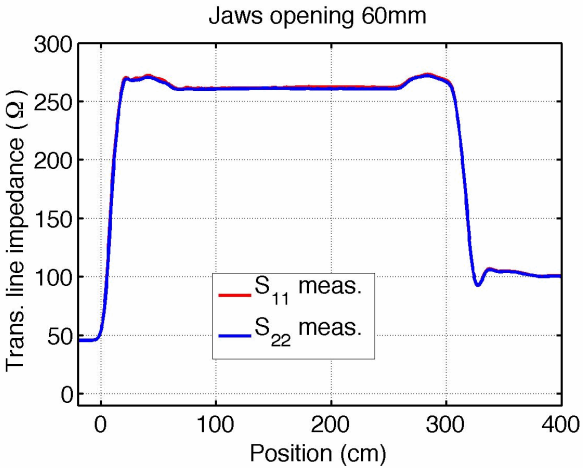


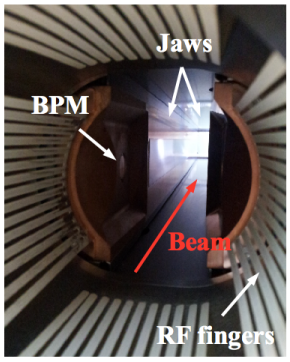


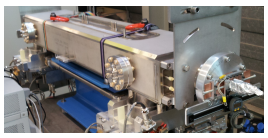




COAXIAL TRANSMISSION LINE PROPERTIES







Matching in impedance measurement is critical.

N. Biancacci et al., TCTP collimator meas., 2014