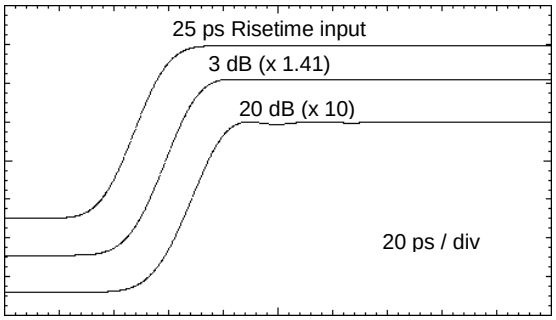
# Model 5510
**Attenuators**

- **SMA DC to 18 GHz**
- **8 ps Risetime**

The PSPL Model 5510 Attenuators address a need that has been totally ignored by other microwave component manufacturers who specify their products in the frequency domain, but ignore the time domain responses. For time domain measurements, it is important to also know the transient response of attenuators used in a test set-up. These SMA attenuators have 8 ps risetimes and are recommended for measuring pulses with risetimes of 25 ps or slower. For frequency domain measurements, the useful frequency range is DC to 18 GHz. The 6 dB, 12 dB, 14 dB, and 20 dB values are popular for use as oscilloscope attenuators because they give simple, integer, voltage ratios of 2x, 4x, 5x, and 10x, respectively. PSPL also offers 2.92 mm, 40 GHz and 1.85 mm, 60 GHz attenuators.

| | | | |
|---|---|---|---|
| **Model Number** | 5510-110-XdB | **Values Available** | 1, 2, 3, 6, 10, 12, 14, & 20 dB |
| **Frequency Range** | DC to 18 GHz | **Connectors** | SMA jack & plug |
| **Risetime** (10-90%) (see typ. plots, p. 2) | 8 ps, typical, when tested with 20 ps risetime pulse | **Impedance – DC** | 50 Ω<br><± 1 Ω typical<br><+ 7.5 Ω, – 6.5 Ω max |
| **DC Attenuation Accuracy** | ±0.3 dB (1-6 dB)<br>±0.5 dB (10-20 dB)<br>max. limits | **Return Loss – DC**<br>**VSWR – DC** | > 40 dB typ, 23 dB min<br>< 1.02 typ, 1.15 max |
| **Attenuation Flatness** (typ. plots, p. 2), f < 18GHz | < ±0.3 dB (1-6 dB)<br>< ±0.6 dB (10-20 dB) | **Return Loss – AC** (see typ. plots, p. 2) | > 23 dB, f < 4 GHz<br>> 15 dB, f < 18 GHz |
| **Delay** | 74 ps (1 - 12 dB) 83 ps (14 & 20 dB) (see typical group delay plots, p. 2) | | |
| **Max. Power Input** | 2 W avg at 25C, derated linearly to 0.5W at 125C, 250 W peak, < 5 µs pulse | | |
| **Temperature Range** | -65 C to +125 C operating and storage, 0.0001 dB/dB/C temp. coeff. | | |
| **Length & Weight** | 19.2 mm, 4.1 gm (1-12 dB) 22.5 mm, 4.9 gm (14 & 20 dB), 5/16" hex body | | |
| **Material** | stainless steel | | |
| **Serial Number** | no | | |
| **Warranty** | One Year. See PSPL Terms & Conditions of Sale for details | | |

**Note**: All parameters listed are typical unless max/min guaranteed limits are provided.




## Ordering Information

| Model Number | Connector Configuration |
|---|---|
| 5510-110-XDB<br>where X=attenuation in dB | SMA Jack — Plug |

Picosecond Pulse Labs

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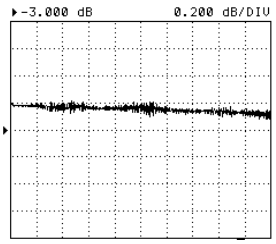
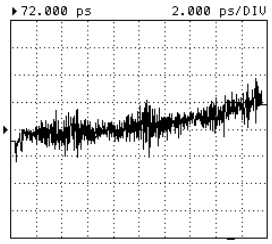
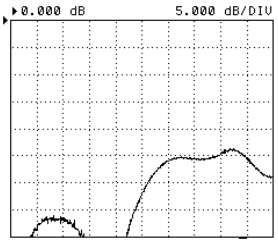
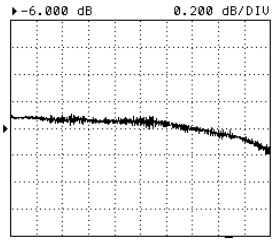
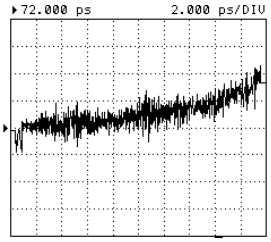
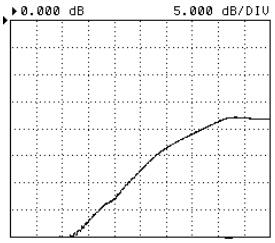
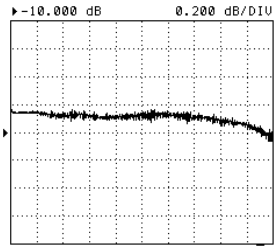
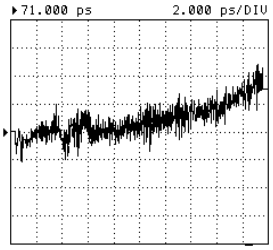
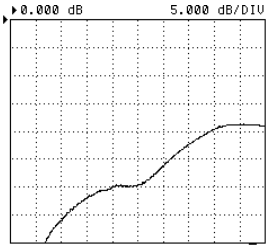
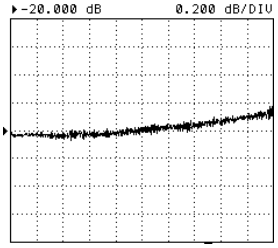
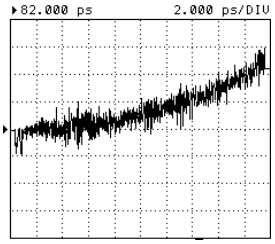
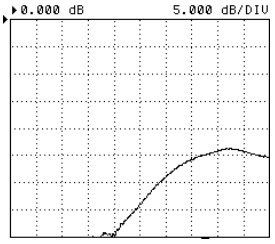
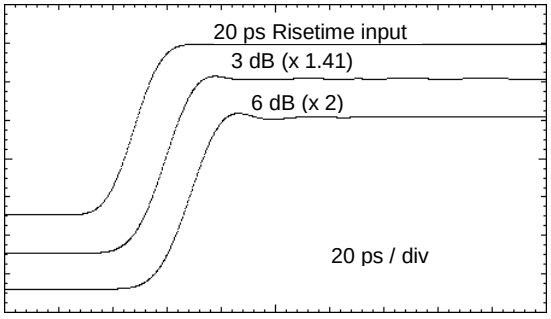
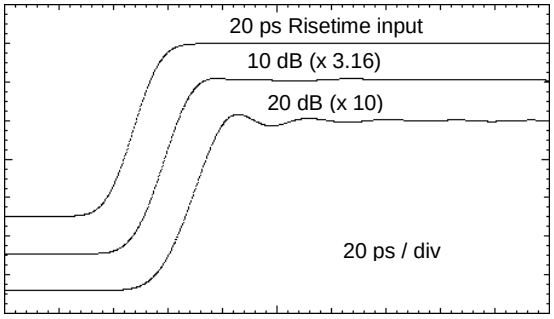
| | Insertion Loss, $S_{21}$<br>0.2 dB/div, 2 GHz/div | Group Delay, $S_{21}$<br>2 ps/div, 2 GHz/div | Return Loss, $S_{11}$<br>5 dB/div, 2 GHz/div |
|---|---|---|---|
| **5510-3dB** |  |  |  |
| **5510-6dB** |  |  |  |
| **5510-10dB** |  |  |  |
| **5510-20dB** |  |  |  |




**Notes:** All plots are from randomly selected samples. The 20 ps step responses were measured using a PSPL Model 4015C pulse generator and an HP-54750, 50 GHz oscilloscope. The frequency responses were measured using an Anritsu 37397A, 65 GHz vector network analyzer.