

Laser Driver Bandwidth at Low Current Output

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The analog modulation bandwidth* of the LDC500, LDC501 and LDC502 is specified for operation at 50% of full scale DC output (50% FS). When the DC current setting is very low, say 2% FS, the bandwidth will be lower. To achieve higher frequency modulation at low DC bias, directly injecting RF current into the laser diode can be used, which is described in another application note on our website.

A series of measurements was performed on several units of LDC500, LDC501 and LDC502. Typical

frequency responses for LDC500/501, and LDC502, are shown in Figures 1 and 2.

From the figure, when the current setting is above 40% FS, the bandwidth is measured to be around 1MHz. For example, at low range on the LDC501, full scale is 250mA. 40% FS gives 100mA. When the current setting is only 2% FS, or 5mA, the bandwidth is around 150kHz.

* defined as the -3dB frequency for small-signal response

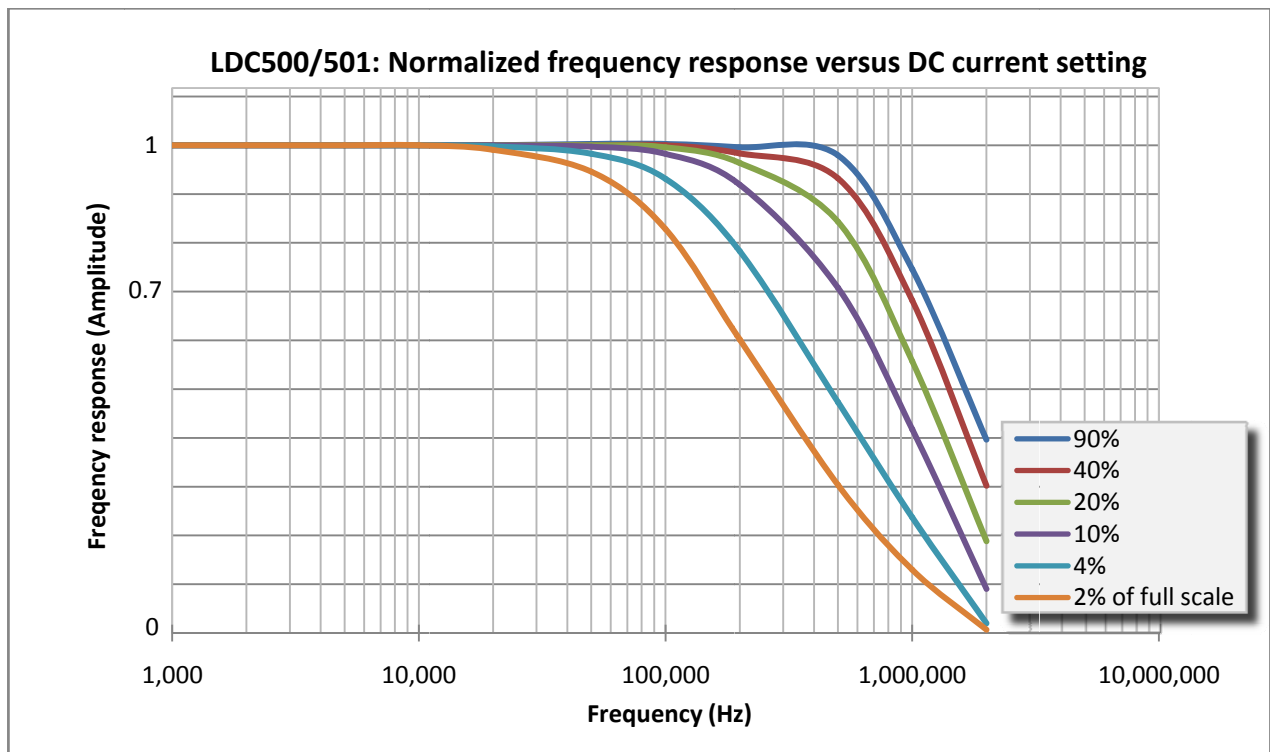


Fig.1 Frequency response measured with LDC500 or LDC501

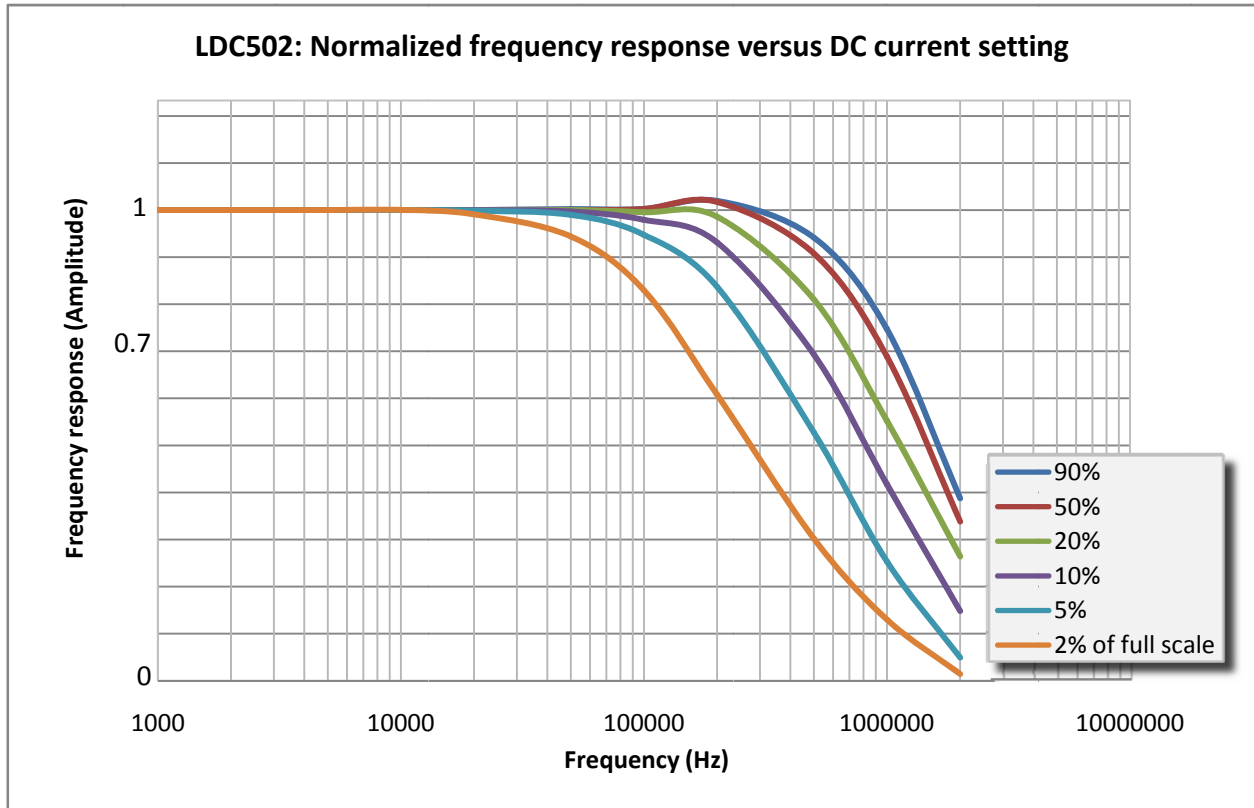


Fig.2 Frequency response measured with LDC502

The measurements were performed using an AC voltmeter (Agilent 34401A), a function generator (SRS DS335), a 6ft laser cable (O500C3, from SRS), and several high-stability metal film or foil resistors as the load: 50Ω/1W for LDC500, 10Ω/5W for LDC501 and 4Ω/20W for LDC502. The load resistors are fixed on appropriate heat-sinks. The AC voltmeter is connected across the load resistor with the LOW line connecting

the laser anode terminal (note, however, a simple resistor is the load in this test).

The input modulation voltage is a 0.1V_{PK} sine wave for all tests, corresponding to a modulation of 1% of full scale for all settings. The bandwidth results are insensitive to reducing the modulation amplitude.