# T1000479-v1
# Test Plan for D1002163-v1
# aLIGO PSL locking photodiode

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Test plan for: D1002163-v1

Serial number: _____

Test date (DD.MM.YY): _____

Tested by: _____

Data file location: _____

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| | $R_2$ | $C_2$ | $C_4$ | $C_5$ |
|---|---|---|---|---|
| PMC locking PD | 1 kΩ | 2.7 pF | - | 50 pF |
| IJ locking PD | 820 Ω | 3,3 pF | 5,6 pF | 150 pF |

Table 1: values for $R_2$ and $C_2$ for different configuraions of the locking PD

The first few tests (1–4) can and should be performed without the actual photodiode being soldered to the PCB.

# 1 Current draw

a) **+24V:** Design value: 25 mA ±5 mA. Measured value:_____

b) **-24V:** Design value: 25 mA ±5 mA. Measured value:_____

# 2 Test voltage regulator outputs

a) **+5V:** Design value: +5 V ±0.25 V. Measured value:_____

b) **-5V:** Design value: -5 V ±0.25 V. Measured value:_____

c) **Test power indicator LED:**

d) **Voltage reference:** Measure the bias voltage and set it with P1 to 5 V.
Design value: +5 V ±0.1 V. Measured value:_____

Choose correct values for $R_2$, $C_2$, $C_4$ and $C_5$ and solder these components in. Equip the PCB with the photodiode (FCI-InGaAs-1000) itself.

$R_2$:_____
$C_2$:_____
$C_4$:_____
$C_5$:_____

# 3 Noise measurements

Measure the linear spectral noise density of the output signal. Use a network analyzer with high impedance inputs. The photodiode must be covered.

a) **DC signal:** Marker at 220 Hz.
Design value: 20 nV/$\sqrt{\text{Hz}}$ ±10 nV/$\sqrt{\text{Hz}}$. Measured value:_____

b) **AC signal:** Marker at 35.5 MHz.
Design value: 30 nV/$\sqrt{\text{Hz}}$ $\pm$15 nV/$\sqrt{\text{Hz}}$. Measured value:_____

## 4 Test signal outputs

Cover the photodiode for the next tests.

a) **DC output:** Design value: 0 mV $\pm$20 mV. Measured value:_____

b) **AC output:** Design value: 0 mV $\pm$20 mV. Measured value:_____

## 5 Optical transfer functions

Use a photodiode tester to measure the following TFs. Use a network analyzer with high impedance inputs. Choose an appropriate attenuator to ensure that the photodiode is not saturated.

a) **Light to DC signal:**
Measure and save TF from light modulation to DC signal. Measure the low pass -3 dB point.

Design value: 85 MHz $\pm$2 MHz. Measured value:_____
File:_____

b) **Light to AC signal:**
Measure and save TF from light modulation to AC signal. Measure the band pass -3 dB points.

high pass:
Design value: 3.1 MHz $\pm$0.3 MHz. Measured value:_____
low pass:
Design value: 100 MHz $\pm$3 MHz. Measured value:_____
File:_____

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END