

# PiLas Test Report:

Date: March 28, 2018

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## Item:                      Characteristics:

**Head**                      PiL085X                      R25=220, R7=108, R9/10=980, R11/22=980  
Serial number:              903C                      D1-2 \*32 LOT34989, D3 \*22 LOT33683 wire, C12/13=1n, C13=22p

**Controller**                      EIG2000DX                      max. PRF 100MHz, R31=3M, R32=1M//1 $\mu$ F, RS232 enabled  
Serial number:              903                      V1.1AEb, V1=12.0V, V2=10.0V, V3=6.0V, K24  
T\_head: 30°C at 100MHz(ON)

**Laserdiode**                      WT1700  
Chip:                      1  
Wavelength:              849.2nm                      (measured at 40MHz)  
Spectral width:              6.4nm                      (measured at 40MHz)

### **Optics**

**Laserdiode Collimator**              50CL-A4.5-02  
Focal length:              4.5mm  
Numerical aperture:              0.55  
Beam diameter (1/e<sup>2</sup>):              4.1mm x 1.2mm @ 0.5m  
Beam divergence\* (1/e<sup>2</sup>): 0.26mrad x 0.9mrad

*\* full angle*

**Fiber Coupler**                      n/a  
Focal length:  
Numerical aperture:

**Fiber**                      n/a  
Index-type:  
core / MFD:  
NA:  
Connectors:

**LD TEC**                      On  
Thermistor:              NTC 10 k $\Omega$  at 25°C  
Temp-SP:              1.25V (23°C)

**Laser Class: 3B**  
IEC 60825-1:2014  
see manual for laser  
warning label  
reproduction

## Test measurements:

### Setup:

Warm-up time of the entire running system is 10 min, ambient temperature 25 °C.

### Optical power measurement:

average power: a) HP8152A power meter + 81520A/81521B optical heads b) 1936-R power meter + 918D-UV/918D-ST-IR optical heads

Measurement is done at the collimated free space output or at fiber end in case of fiber option.

The peak power is calculated by the ratio average power / duty cycle (as taken from photodetector results).

### Spectral measurements:

Wavelength and spectral width are measured with OSA Q8381A.

### Dynamic measurement:

Optical setup: Collimated or fiber coupled laser light is coupled to the New Focus mod1024 detector.

Photodetector: New Focus mod1024 detector

Oscilloscope: 86100A + 83484A / HP54750A + 54752B, (50 GHz channel, Agilent)

### 1. Frequency scan with oscilloscope, photodetector and optical power meter:

Frequency (MHz)	Tune value (%)	FWHM (ps)	RMS - Jitter (ps)	after collimator	after collimator	after collimator
				Av. power (µW)	Energy (pJ)	Peak power (mW)
0.1	40	32	1.5	1.194	12	295
1	37	32	1.4	11.92	12	305
10	36	32	1.3	119.7	12	315
20	36	31	1.3	249	12	330
30	40	31	1.3	360	12	310
40	40	31	1.3	501	12	340
50	42	31	1.4	598	12	330
60	46	31	1.4	722	12	325
70	39	31	1.4	834	12	325
80	59	32	1.4	942	12	330
90	44	32	1.4	1056	12	325
100	35	32	1.4	1166	12	310

## **2. Tune scan with oscilloscope, photodetector and optical power meter at selected frequency:**

Device: Oscilloscope

Frequency	Tune value (%)	FWHM (ps)	relative to norm pulse	after collimator	after collimator	after collimator
				Av. power ( $\mu$ W)	Energy (pJ)	Peak power (mW)
40 MHz	60	41	below	217	5	120
40 MHz	40	31	Norm pulse	500	12	340
40 MHz	20	30	above	800	20	485

## **3. Enclosed Views:**

Pulse development with oscilloscope: Rep.-rate: 40MHz: Tuning rates 60, 40 and 20% with pulse data.

Pulse measurements with oscilloscope and photodetector: Rep.-rate: 40MHz, tune 40%. time base 50ps.

Jitter measurements with oscilloscope and photodetector: Rep.-rate: 40MHz, tune 40%. time base 50ps.

Optical spectrum at 40MHz norm pulse.

## **4. Remarks:**

TUNE values can be changed if TUNE mode is set to "manual" only.

After switching the frequency some time is required for power stabilization.

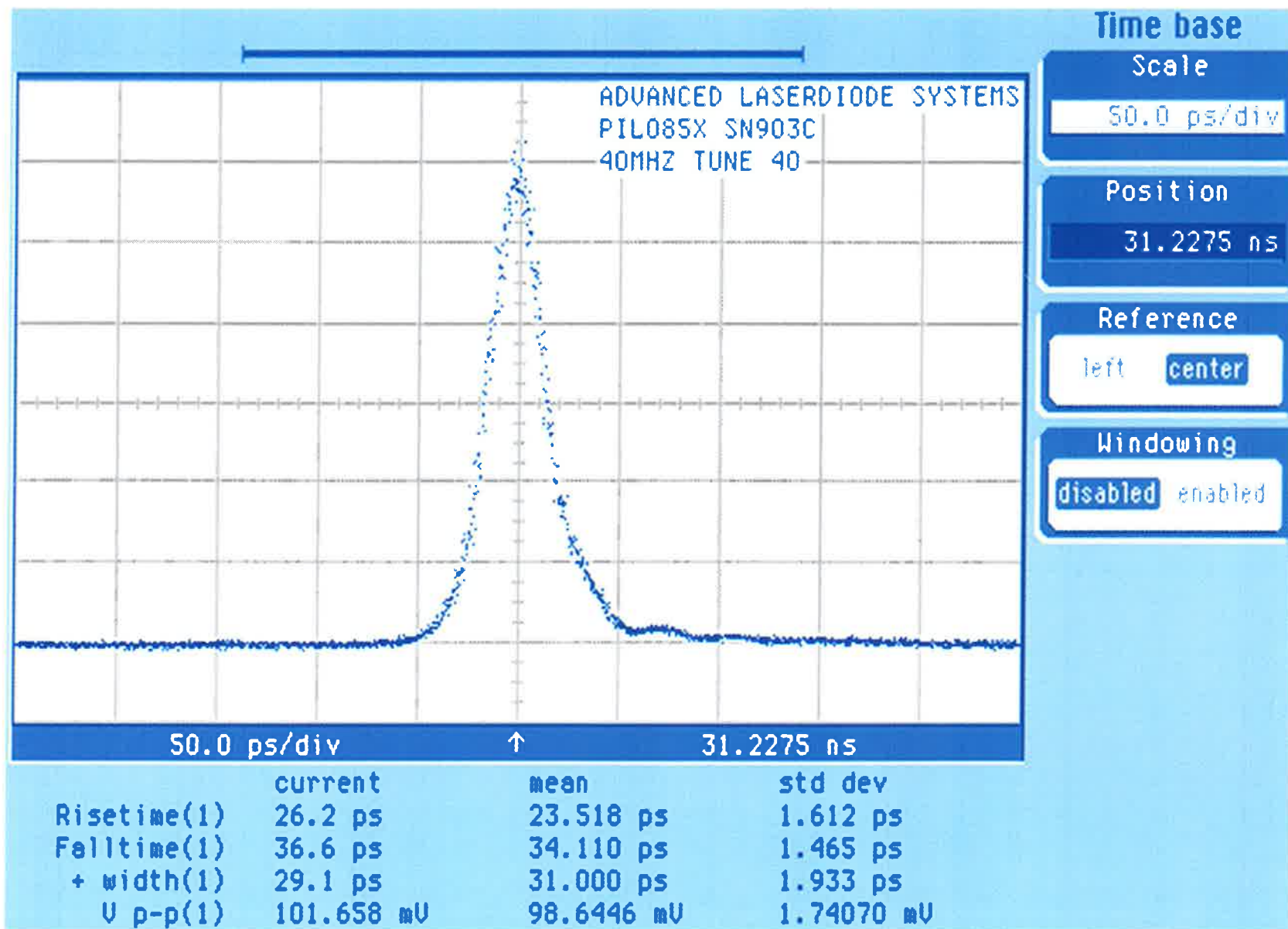
For higher frequencies (>80MHz) mounting the laser head on a metal platform for additional cooling is required.

For external triggering start with TTL Trigger input. If no triggering is possible use +5/-5V Trigger input and modify trigger threshold.

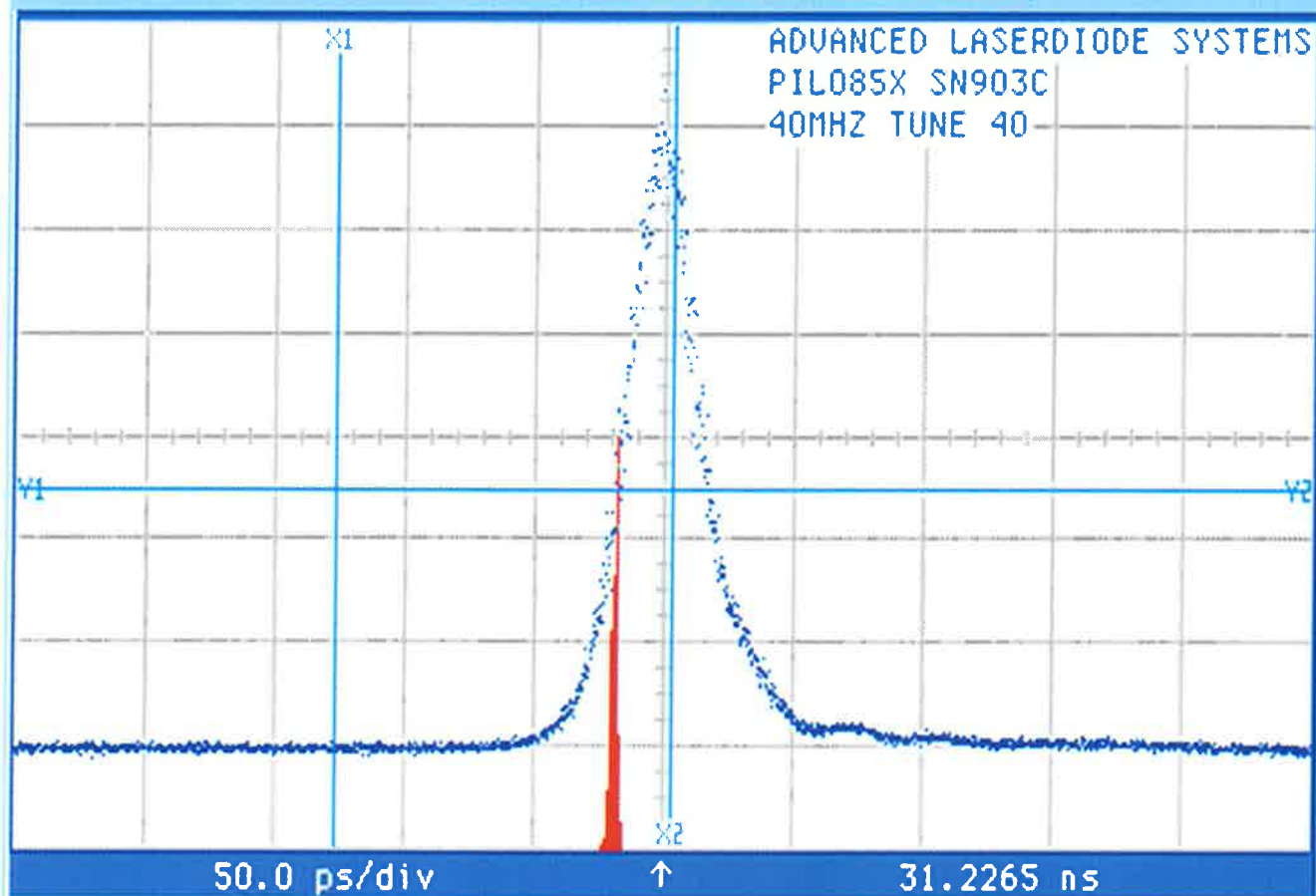
For external triggering the corresponding trigger mode must be enabled (ext. TTL or ext. Adj.)

The average power at external triggering should correspond to average power at nearest internal frequency.

Do not apply higher frequencies than maximum ordered one (see purchase information).



Histogram is enabled...



histogram

scale	23 hits/div	offset	0 hits		
mean	31.20811 ns	median	31.20777 ns	$\mu \pm 1\sigma$	80.9%
std dev	1.3369 ps	hits	246 hits	$\mu \pm 2\sigma$	97.2%
p-p	8.9 ps	peak	91 hits	$\mu \pm 3\sigma$	100%

Hist window

Scale source

channel 1

X1 Position

31.1000 ns

Y1 Position

40.00 mV

X2 Position

31.2300 ns

Y2 Position

40.00 mV

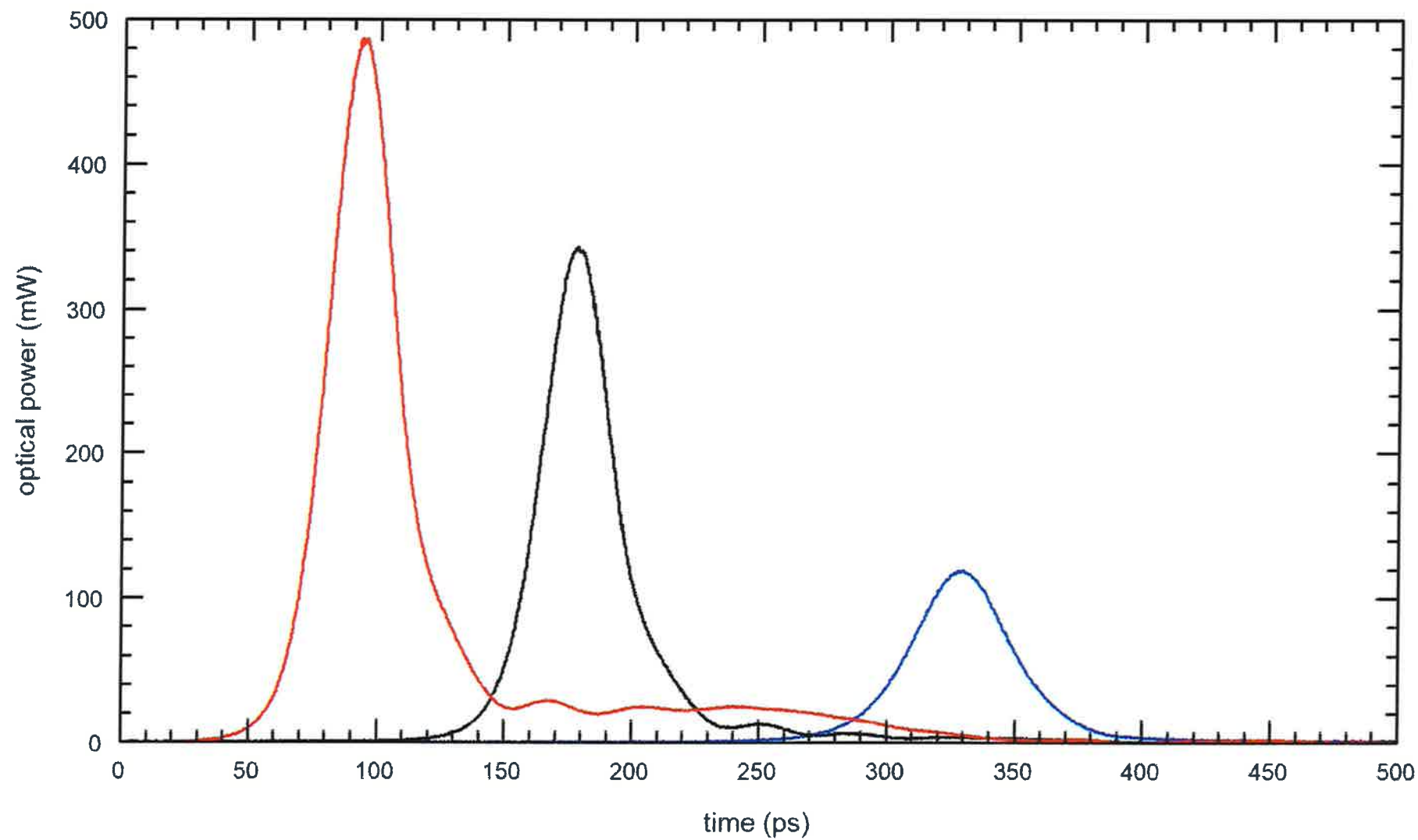
Default

window

Done

PiL085X SN903C oscilloscope scan at 40 MHz after collimator

tune 60%: 41ps-120mW (blue), 40%: 31ps-343mW (nominal black) and 20%: 30ps-487mW (red)



# PiL085X SN903C optical spectrum at 40MHz standard pulse



27.03.2018 11:07:47  
0,860

