MIREGA
COMPACT GAS ANALYZER

Fiber Fabry-Pérot
TEST REPORT

FFP-030

Date:	2026-05-06
Specifitcations:	FSR=10 THz
Operator:	Clément
Options:	-
Archive name:	FFP-030

Mirega SAS – 161 route du Replat – 38410 Saint Martin d'Uriage – France
+33 749 613 613 – SIRET 94932342200012 – FR32949323422 – www.mirega.fr

Compliance matrix

The table hereafter summarizes the compliance test results of your FFP-030:

Property	Spec.	Result	Unit	Pass / Fail
FSR	10 ± 10%	10.925	THz	Pass
Finesse at 1550 nm	>20000	20800	-	Pass
Filter bandwidth @1550 nm	<550	526	MHz	Pass
Required voltage per FSR	<320	221	Vpp	Pass

The following items are compliant by design:

Property	Spec.	Unit
Maximum tuning voltage	+/- 320	V
Maximum optical output power at resonance	2	mW
Single-mode fibers with FC/APC connectors	-	-
First mechanical resonance frequency	50	kHz
Capacitance	< 10	nF

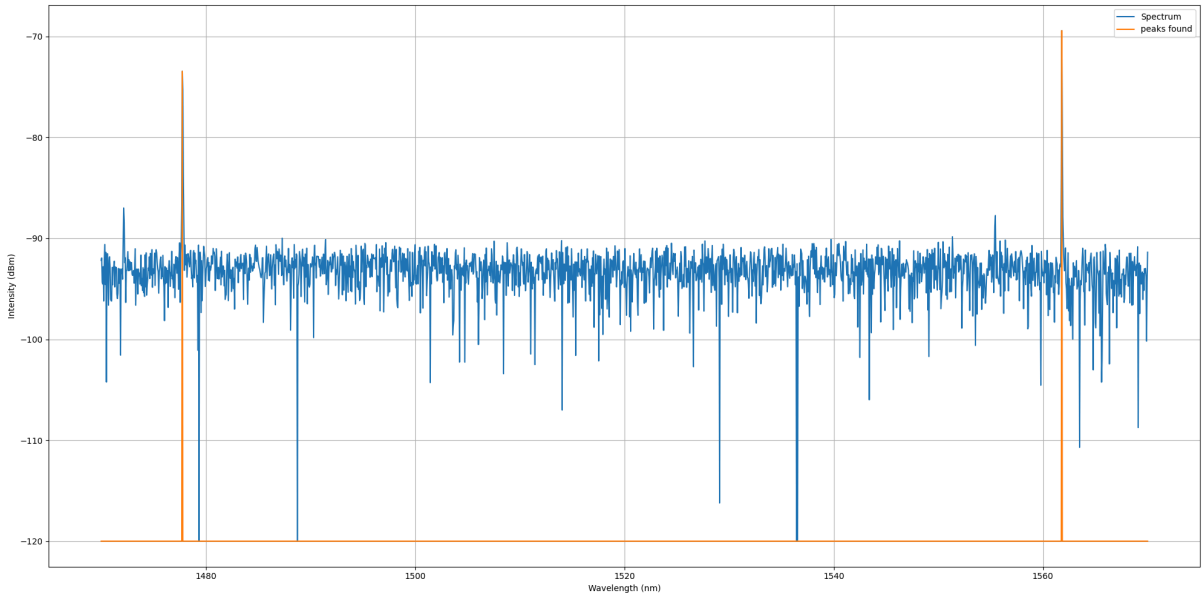
For information, additional tests have been performed on your FFP-030:

Property	Result	Unit
Center wavelength (@0 V and @24.7 °C)	1561.8	nm
Insertion loss	10.5	dB
Minimum extinction ratio for second order mode	16.58	dB

Free Spectral Range

The full Free Spectral Range (FSR) of the cavity has been measured using a white light source and a spectrum analyzer around 1550 nm to scan a full FSR and detect the resonance peak wavelengths. The optical length of the cavity is then calculated from the full FSR.

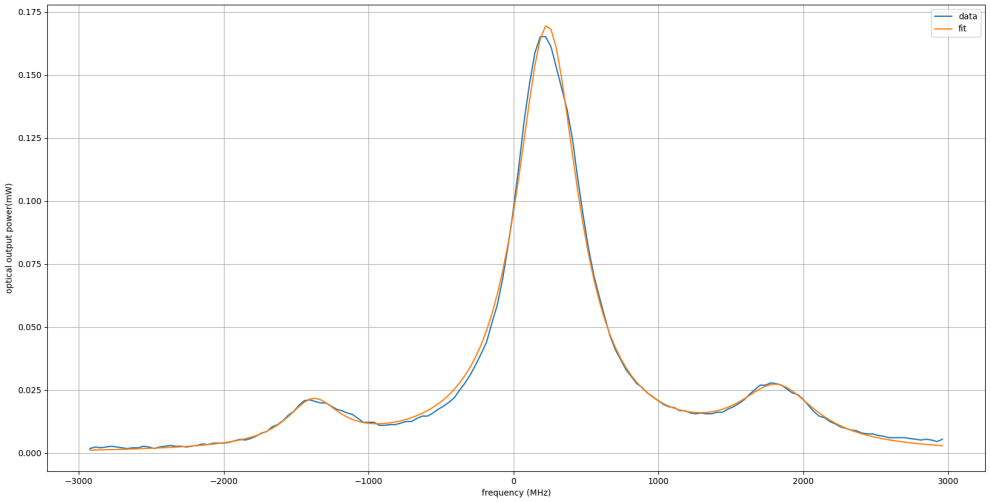
Please note that this measurement is noise-limited by the spectrometer. Position and relative amplitude of the peaks are correct but amplitudes may not be fully accurate.



FSR measurement with spectrometer
FSR = 10.925 THz (89.02 nm @ 1561.8 nm)

Finesse and bandwidth

Finesse is calculated by first measuring the bandwidth of the filter using a tunable laser with modulation sidebands serving as frequency reference. We then calculate the Finesse as $F = \frac{\mathrm{FSR}}{\mathrm{bandwidth}}$.
Characterization was done using a 1550 nm laser. As the reflectivity of the coating is similar at 1550 nm and 1550 nm, the filter bandwidth is identical.



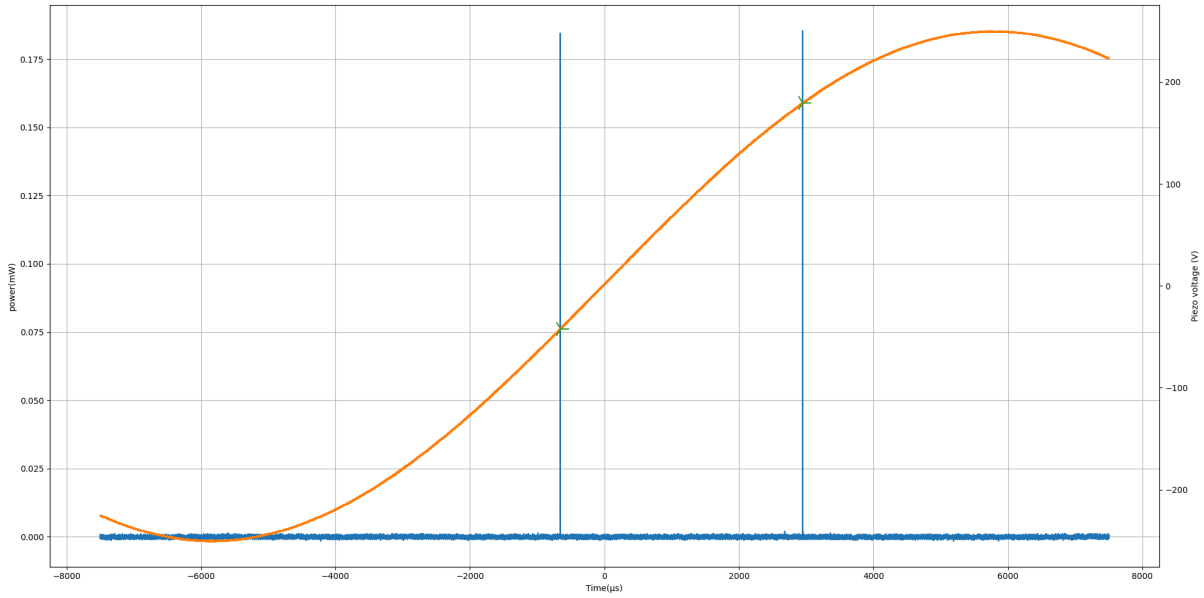
Resonance peak @1550 nm with 1600 MHz sidebands

Bandwidth: 526 MHz

Finesse: $\boldsymbol{F = \frac{10.925\ \mathrm{THz}}{526\ \mathrm{MHz}} = 20800}$

Tuning voltage per FSR

An entire Free Spectral Range is scanned to measure the required voltage necessary to scan this complete FSR.



Full FSR characterization scanning the piezoelectric actuator

Required voltage span: 221 Vpp

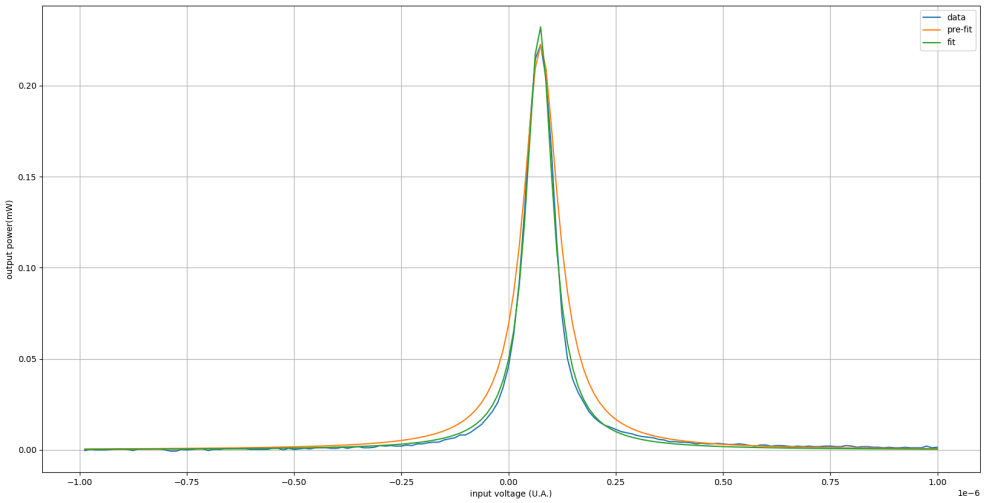
Due to the non-linearity and specific behavior of the piezoelectric actuators, higher voltage might be necessary depending on the sweep frequency and voltage offset. Please contact us for further information.
Please note that the difference in peak heights is due to the sample rate of the oscilloscope and not related to any actual power fluctuation.

Maximum output power

Output power is limited by design to 2 mW.

Additional tests: Insertion loss

Insertion loss is measured by comparing the peak transmission and the reflected signal as reference for the optical power.

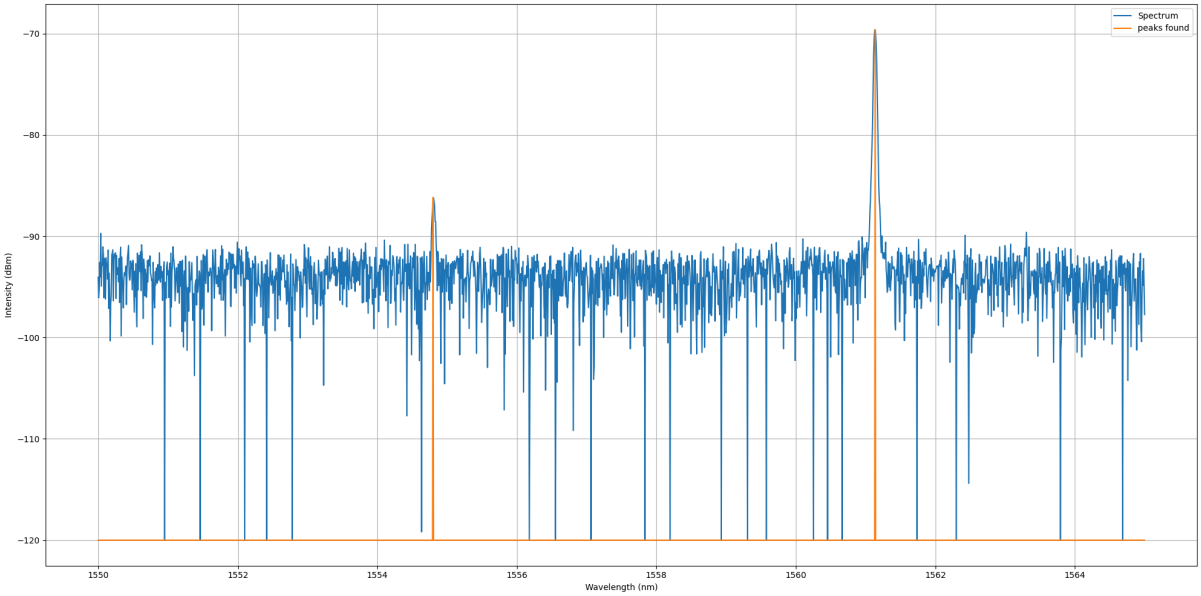


Transmission signal of the filter swept around 1550 nm

Transmission ratio: $\frac{\mathbf{0.23\ mW}}{\mathbf{2.6\ mW}} = 8.8\%$
Insertion loss: 10.5 dB

Additional tests: Secondary mode

As with any optical cavity, secondary modes can appear due to slight fluctuations in the assembly. While we try to minimize those to a absolute minimum, we cannot always fully suppress every mode. The main resonance peak is known as the TEM_{00} mode and has the largest amplitude (several orders of magnitude above any secondary mode).



Transmission of the cavity around the main resonance peak

Minimum extinction ratio: 16.58 dB

Distance to the first secondary mode: 6.34 nm