

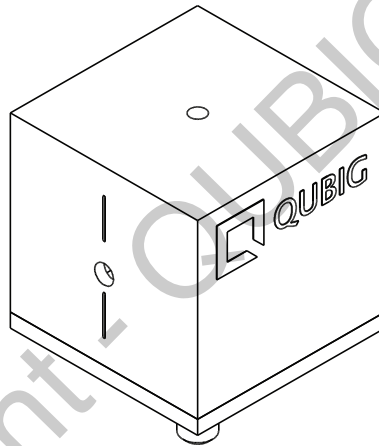
Test Data Sheet

PM7 - SWIR-1

(EO-T25L3-IR)

S/N: IB575

Resonant electro-optic phase modulator with - tunable resonance frequency



RF properties	Value	Unit
Resonance frequency: f_0 ¹⁾	22.9 - 26.1	MHz
Preset frequency: f_{set} ¹⁾	25	MHz
Bandwidth: $\Delta\nu$	270	kHz
Quality factor: Q	93	
Required RF power for 1rad @ 1550nm ²⁾	19.8	dBm
max. RF power: RF_{max} ³⁾	1	W

Optical properties		
EO crystal	LN	
Aperture	3x3	mm ²
Wavefront distortion (633nm)	$\lambda/6$	nm
recommended optical intensity (1550nm)	<1	W/mm ²
AR coating (R<0.5%)	1.0 - 1.7	um

¹⁾ at 22.3°C ²⁾ with 50Ω termination ³⁾ no damage with $RF_{in} < 2W$

Measured modulation

Fig. 1: Oscilloscope trace

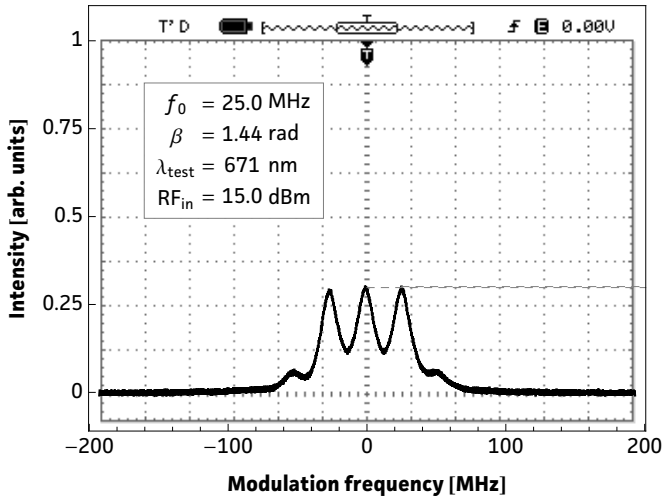


Fig. 2: Carrier/sideband ratio

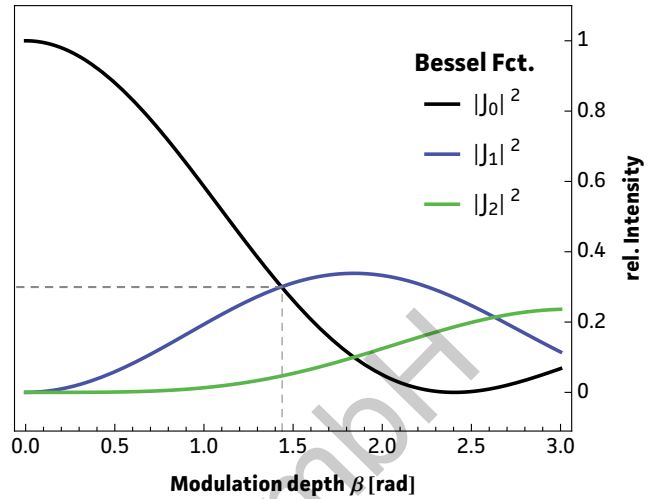


Table 1: Expected modulation

$\beta = 1 \text{ rad}$	unit	λ_1	λ_2
λ	nm	671	1550
P	dBm	11.9	19.8
P	mW	15	95
U	V_p	1.2	3.1
U_π	V_p	3.9	9.7
β / U	rad / V	0.81	0.32

Fig.1: Recorded oscilloscope trace retrieved from a test setup as illustrated below.

Fig.2: Squared absolute values of first-kind Bessel functions vs. modulation depth. Vertical lines reveal the ratio between the carrier $|J_0|^2$ and the i^{th} sideband $|J_i|^2$ at a specific β .

Fig.3: Dependency between RF amplitude and modulation depth for different wavelengths. Points on the curve allow to retrieve either the required RF amplitude for a specific/desired β or the max. achievable modulation depth for a given/available RF power.

Table 1: Expected RF-amplitude/-power values and conversion factors for the required wavelength at the reference modulation depth of 1 rad. **Note:** Experimentally recorded modulation depth displayed in Fig.1 might vary from the respective values ($\beta=1\text{rad}$) provided in the table.

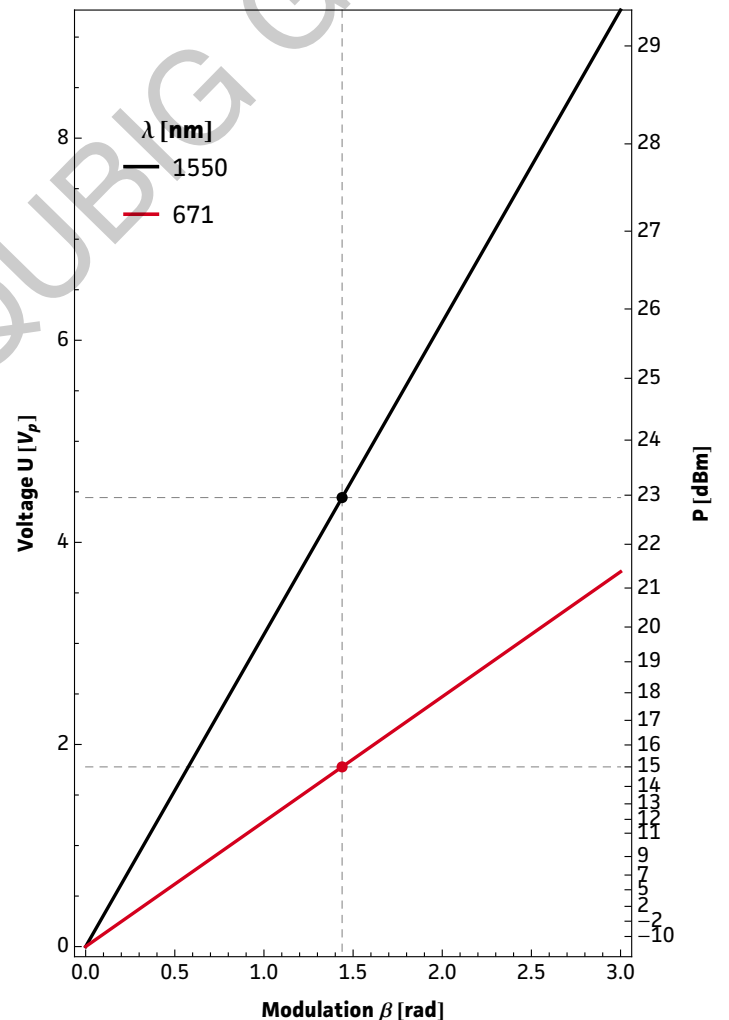
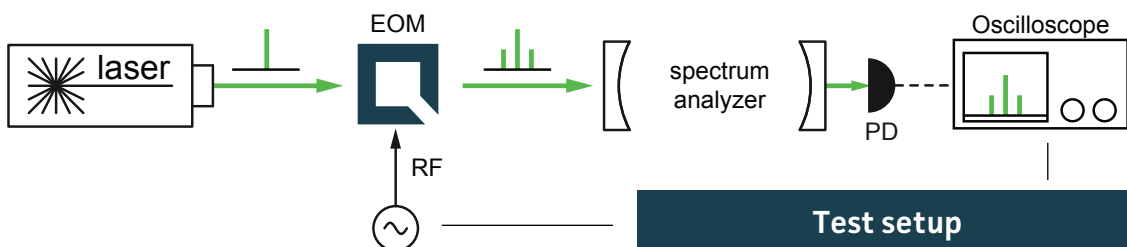
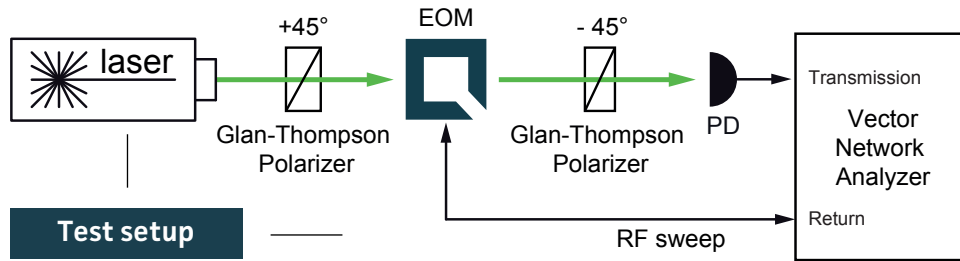


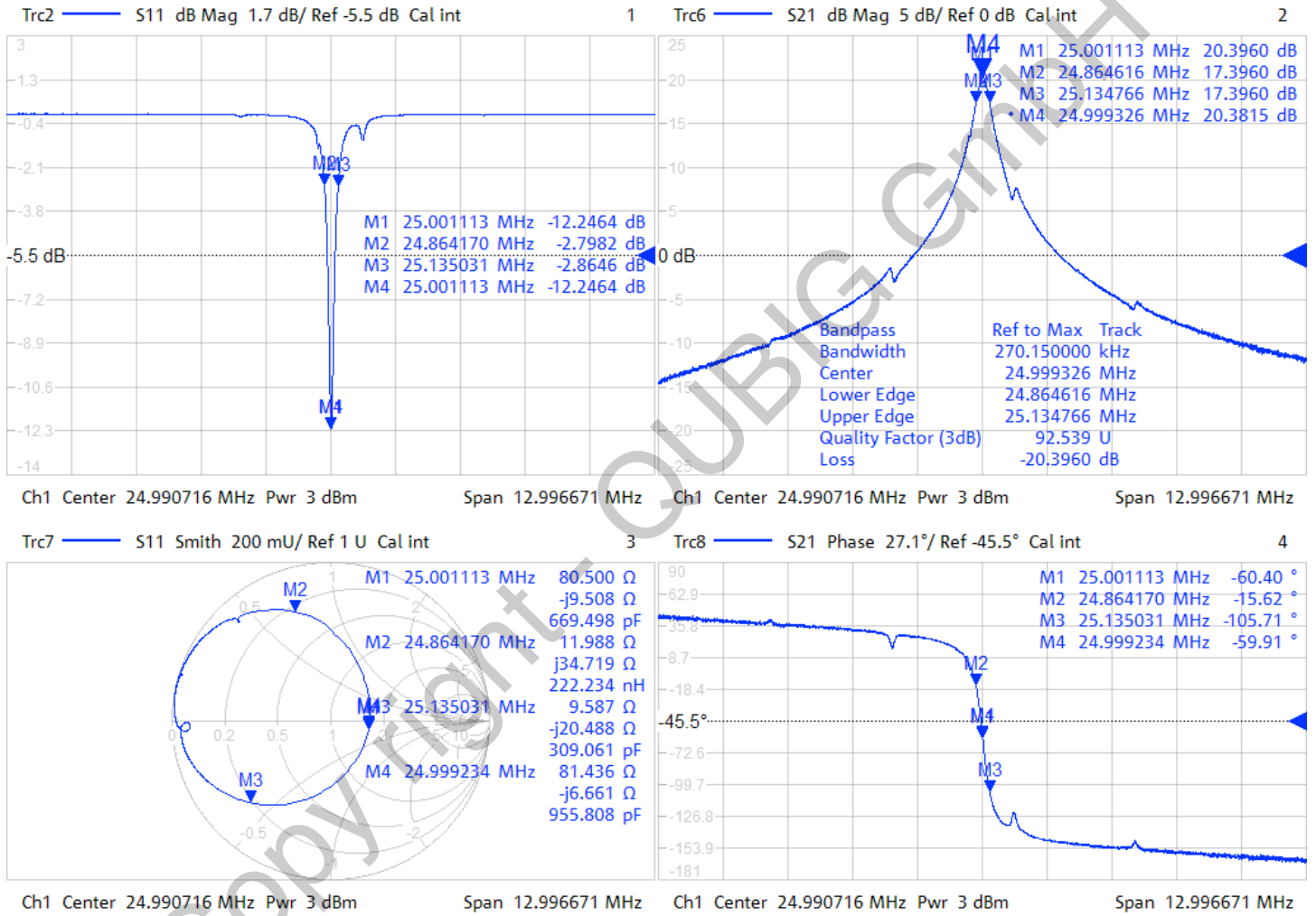
Fig. 3: RF-signal amplitude vs. modulation depth



Resonance characteristics



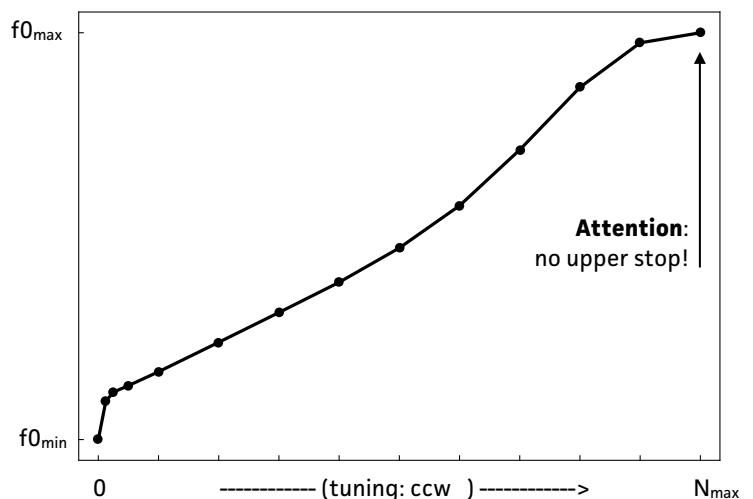
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Tuning performance

MAX resonance frequency	$f_0 \text{ max}$	26.1	MHz
MIN resonance frequency	$f_0 \text{ min}$	22.9	MHz
number of turns	N_{max}	5	
counter clock-wise turns ↻	higher f_0 ↑		
clock-wise turns ↻	lower f_0 ↓		

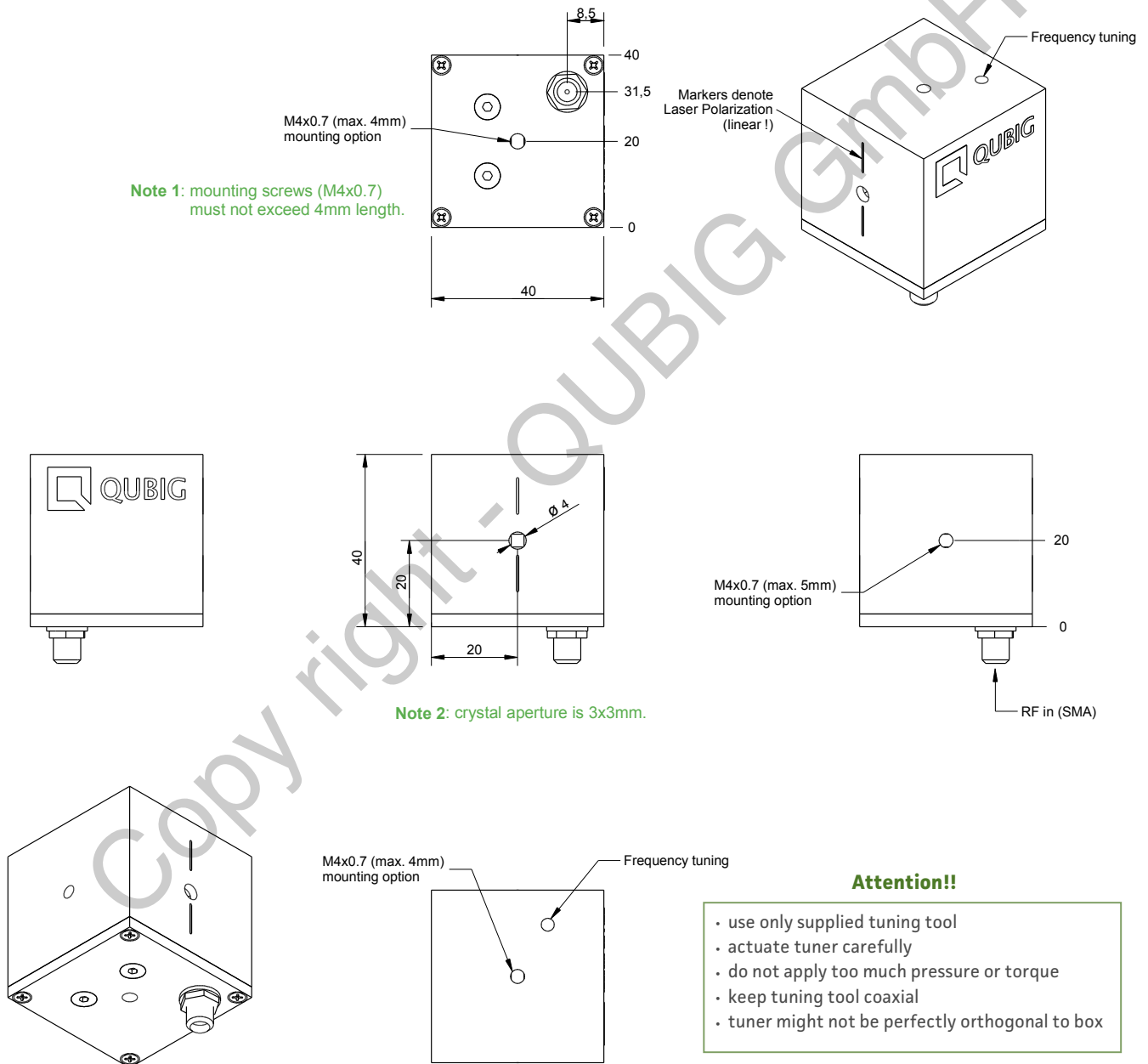
- actuate tuner carefully with supplied tuning tool
- tuner might not be perfectly perpendicular
- there might be no hard upper or lower stops (!)



Handling instructions

- Input laser polarization must be aligned with respect to the white markers on the housing
- Please handle device carefully. Avoid shock. Don't drop.
- After turn on the resonance frequency might drift slightly with applied RF power. Please compensate by tuning the RF drive frequency until steady-state (~min).
- Slight angle adjustment can reduce unwanted residual amplitude modulation (RAM)

Package drawing



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