

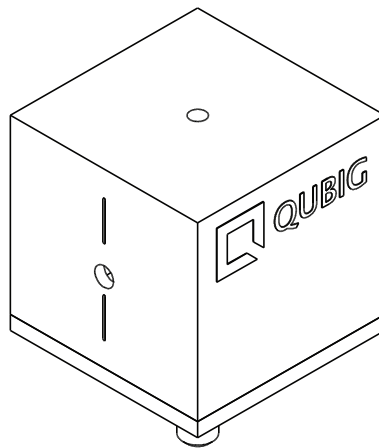


Test Data Sheet

EO-T38M3-NIR

S/N:

Resonant electro-optic phase modulator with - tunable resonance frequency



RF properties	Value	Unit
Resonance frequency: f_0 ¹⁾	29.7 - 46.0	MHz
Preset frequency: f_{set} ¹⁾	38.0	MHz
Bandwidth: $\Delta\nu$	342	kHz
Quality factor: Q	111	
Required RF power for 1rad @ 850nm ²⁾	19.9	dBm
max. RF power: RF_{max} ³⁾	1	W

Optical properties		
EO crystal	MLN	
Aperture	3x3	mm ²
Wavefront distortion (633nm)	$< \lambda/4$	nm
recommended max. optical intensity (850nm)	< 20	W/mm ²
AR coating ($R_{avg} < 0.5\%$)	500 - 1100	nm

¹⁾ at 24.3°C ²⁾ with 50Ω termination ³⁾ no damage with $RF_{in} < 2W$

Measured modulation

Fig. 1: Oscilloscope trace

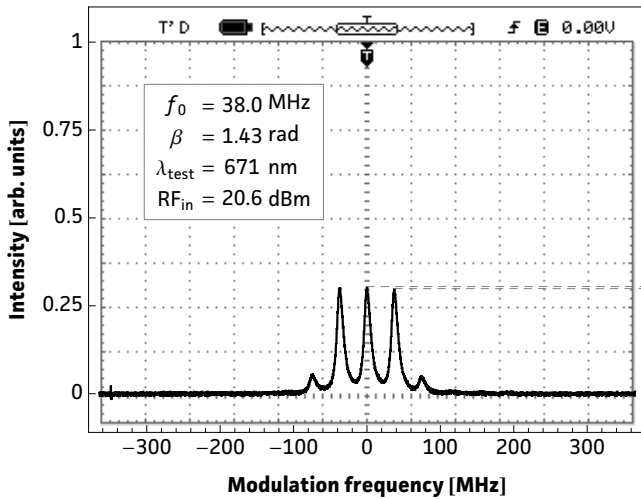


Fig. 2: Carrier/sideband ratio

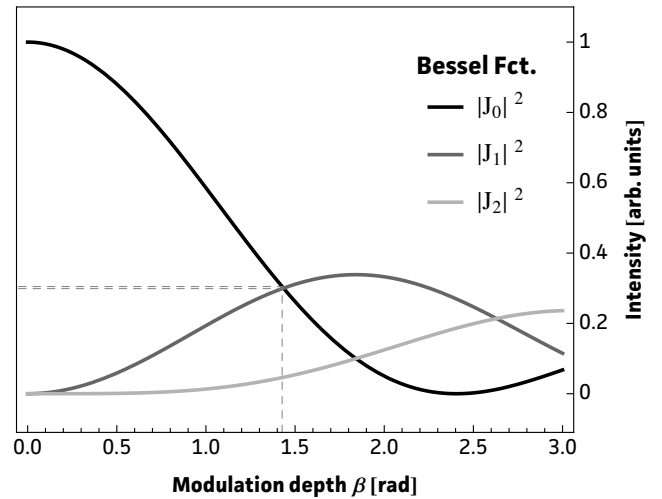


Table 1: Expected modulation

$\beta = 1 \text{ rad}$	unit	λ_1	λ_2
λ	nm	671	850
P	dBm	17.5	19.9
P	mW	56	97
U	V_p	2.4	3.1
U_π	V_p	7.5	9.8
β / U	rad / V	0.42	0.32

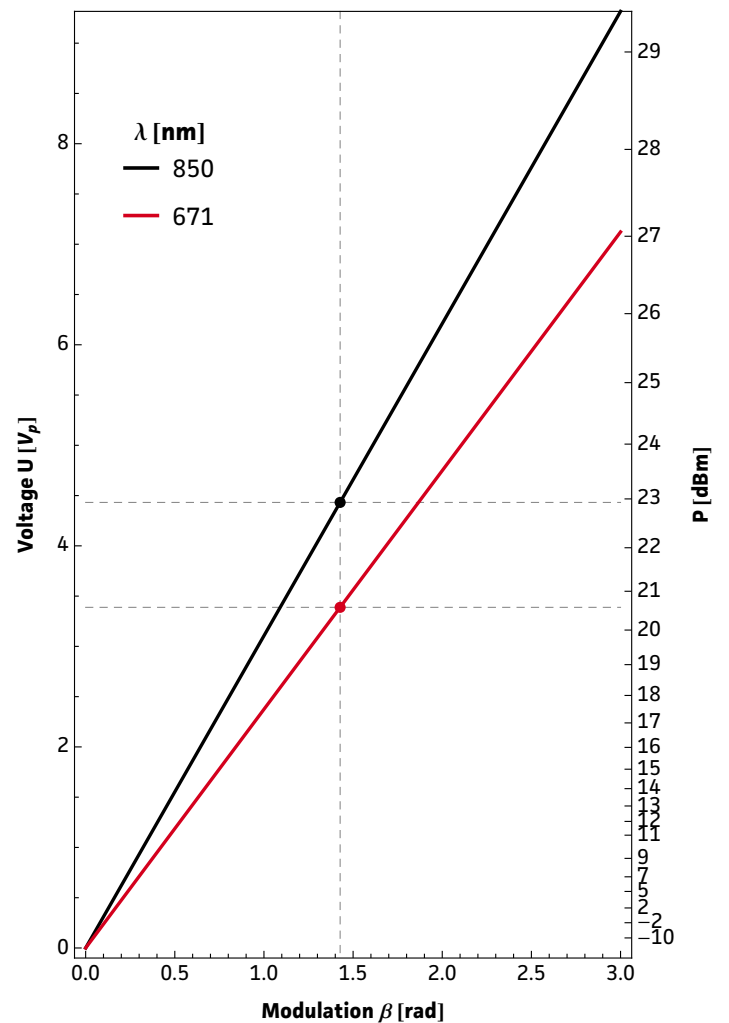


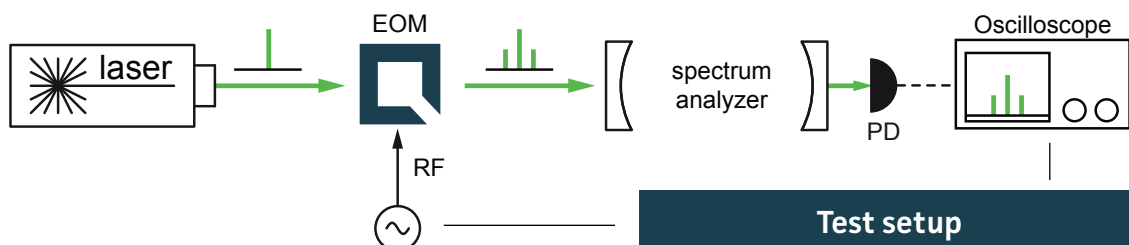
Fig.1: Recorded oscilloscope trace retrieved from a test setup as illustrated below.

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 .

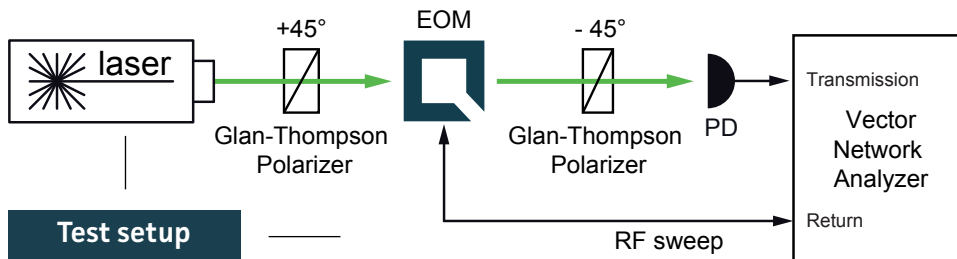
Fig.3: Dependency between RF amplitude and modulation depth for different wavelengths. Points on the curve allow to retrieve either the required RF amplitude for a specific/desired β or the max. achievable modulation depth for a given/available RF power.

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.

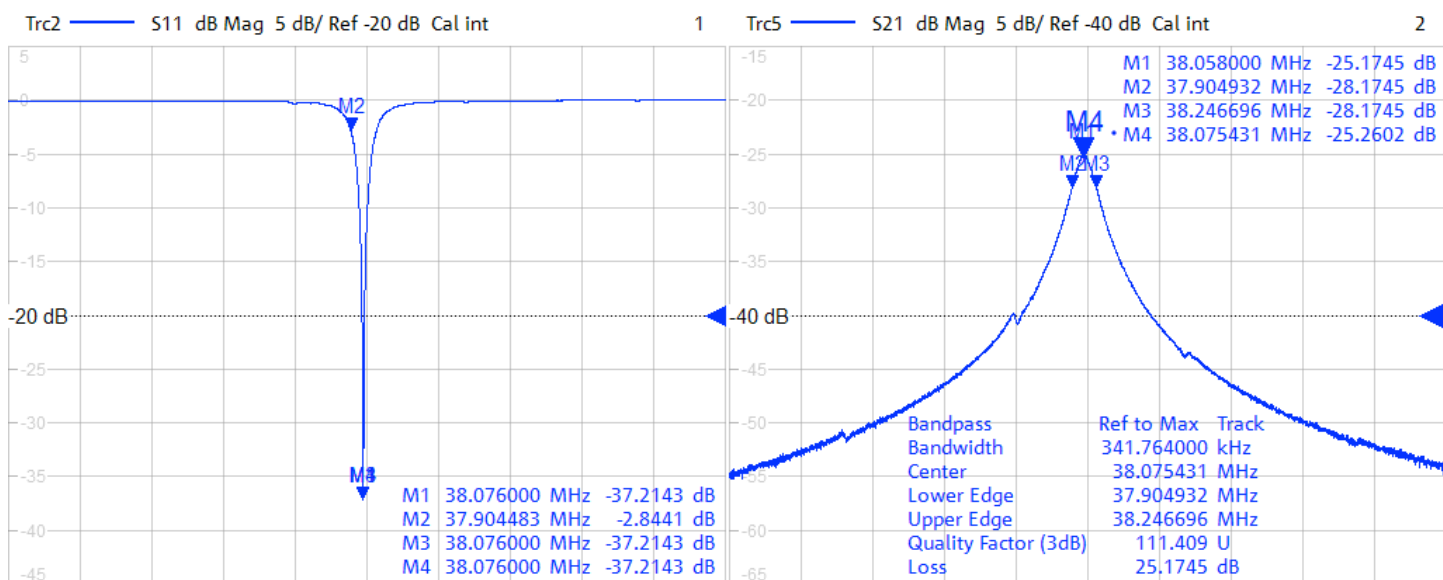
Fig. 3: RF-signal amplitude vs. modulation depth



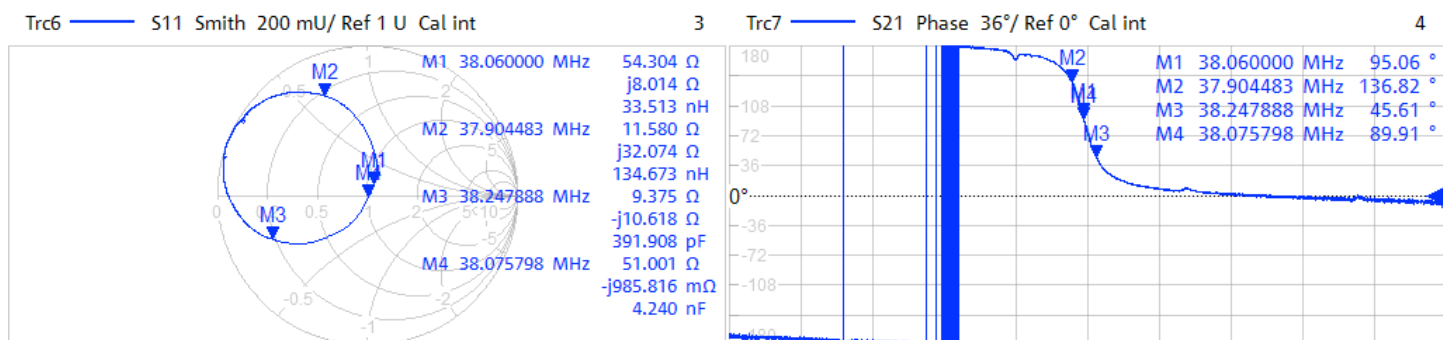
Resonance characteristics



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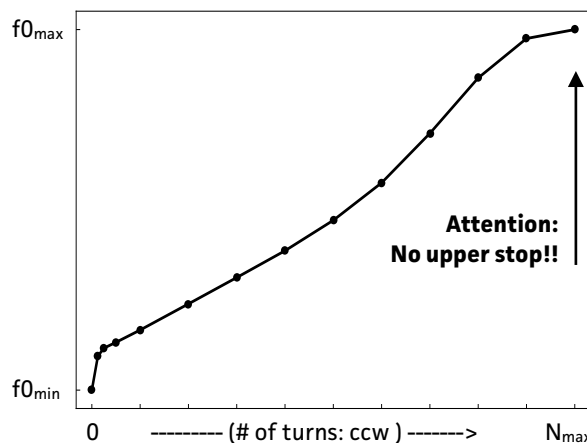
Ch2 Center 38.128 MHz Pwr 3 dBm Bw 10 kHz Span 10 MHz



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Tuning performance

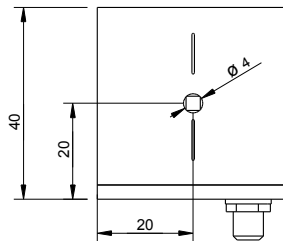
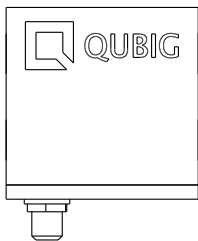
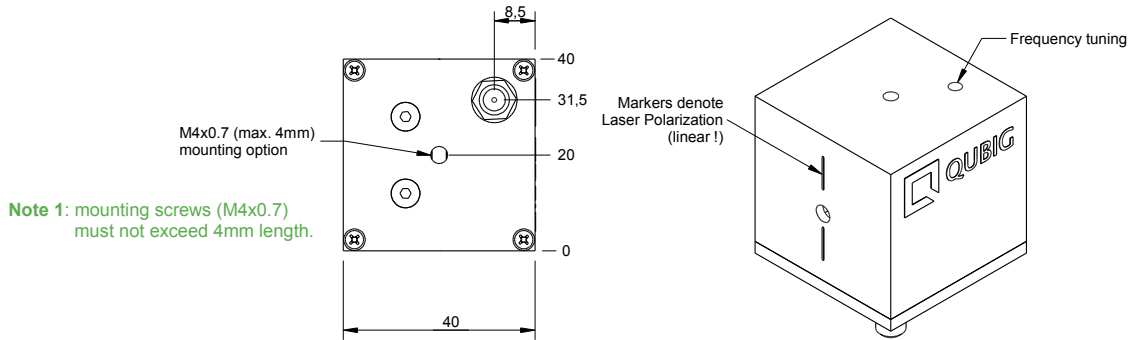
MAX resonance frequency	f_0 max	46.0	MHz
MIN resonance frequency	f_0 min	29.7	MHz
number of turns	N_{max}	19	
incr. frequency shift	Δf	~ 850	kHz / turn
counter clock-wise turns ↶	higher f_0 ↑		
clock-wise turns ↷	lower f_0 ↓		



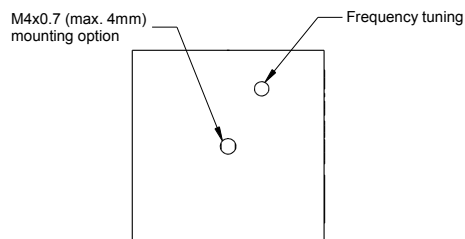
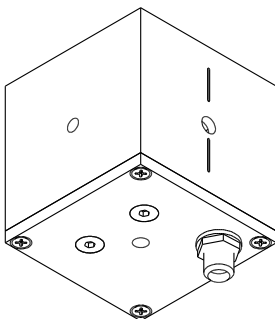
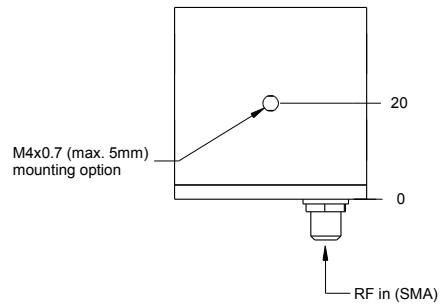
Handling instructions

- 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



Note 2: crystal aperture is 3x3mm.



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