



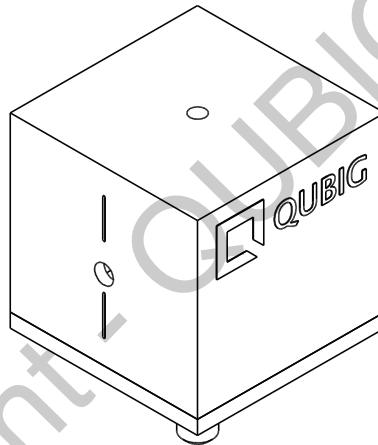
Test Data Sheet

PM-K40_1.3M3

(old: EO-K40M3-NIR)

S/N:

Resonant electro-optic phase modulator
with
- tunable resonance frequency
- thermal crystal mount



RF properties	Value	Unit
Resonance frequency: f_0 ¹⁾	1152 - 1361	MHz
Preset frequency: f_{set} ¹⁾	1285	MHz
Bandwidth: $\Delta\nu$	2.6	MHz
Quality factor: Q	494	
Required RF power for 1rad @ 767nm ²⁾	28.2	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 (767nm)	<5	W/mm ²
AR coating ($R_{avg}<1\%$)	630 - 1100	nm

¹⁾ at 24°C ²⁾ with 50Ω termination ³⁾ no damage with $RF_{in} < 3W$

Measured modulation

Fig. 1: Oscilloscope trace

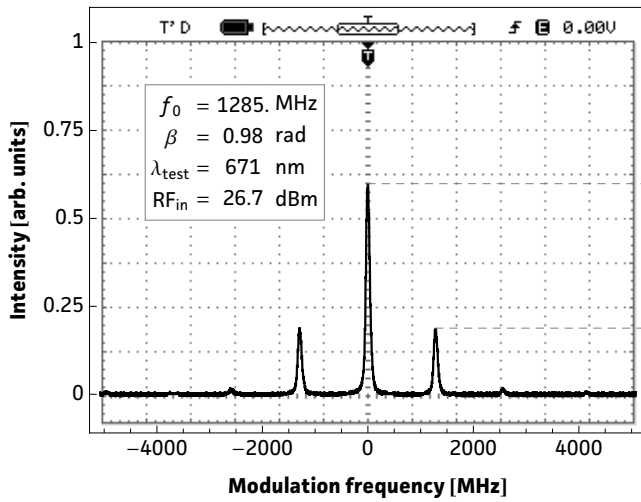


Fig. 2: Carrier/sideband ratio

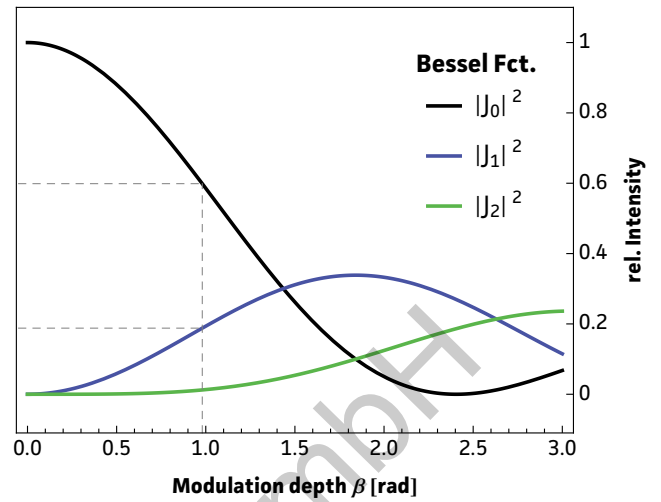


Table 1: Expected modulation

$\beta = 1 \text{ rad}$	unit	λ_1	λ_2
λ	nm	671	767
P	dBm	26.9	28.2
P	mW	487	663
U	V_p	7.	8.1
U_π	V_p	21.9	25.6
β / U	rad / V	0.14	0.12

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.

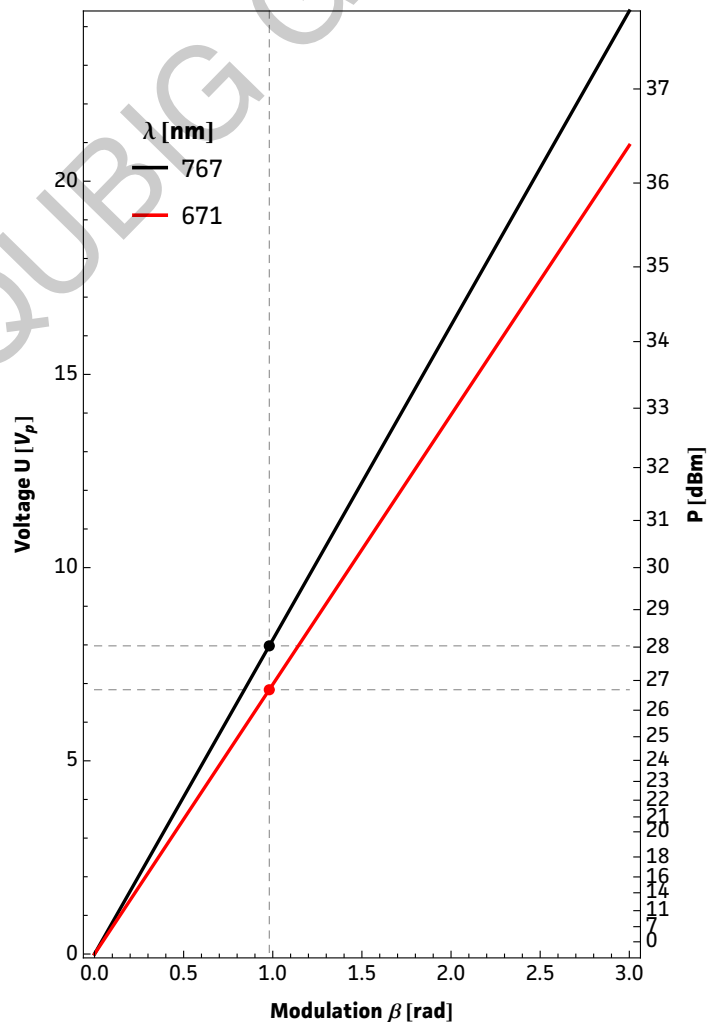
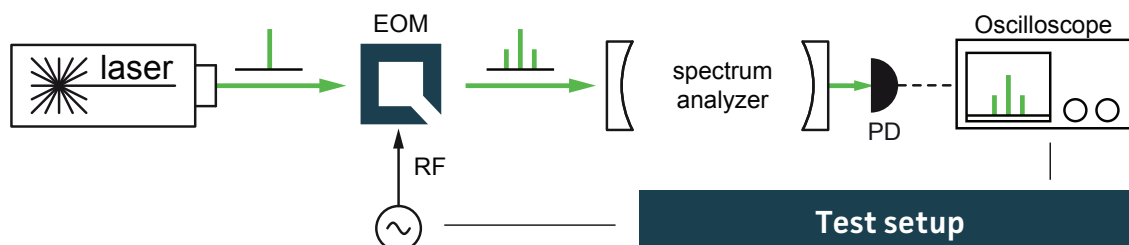
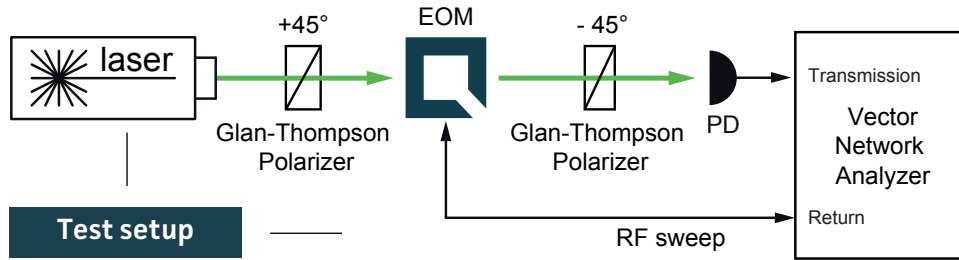


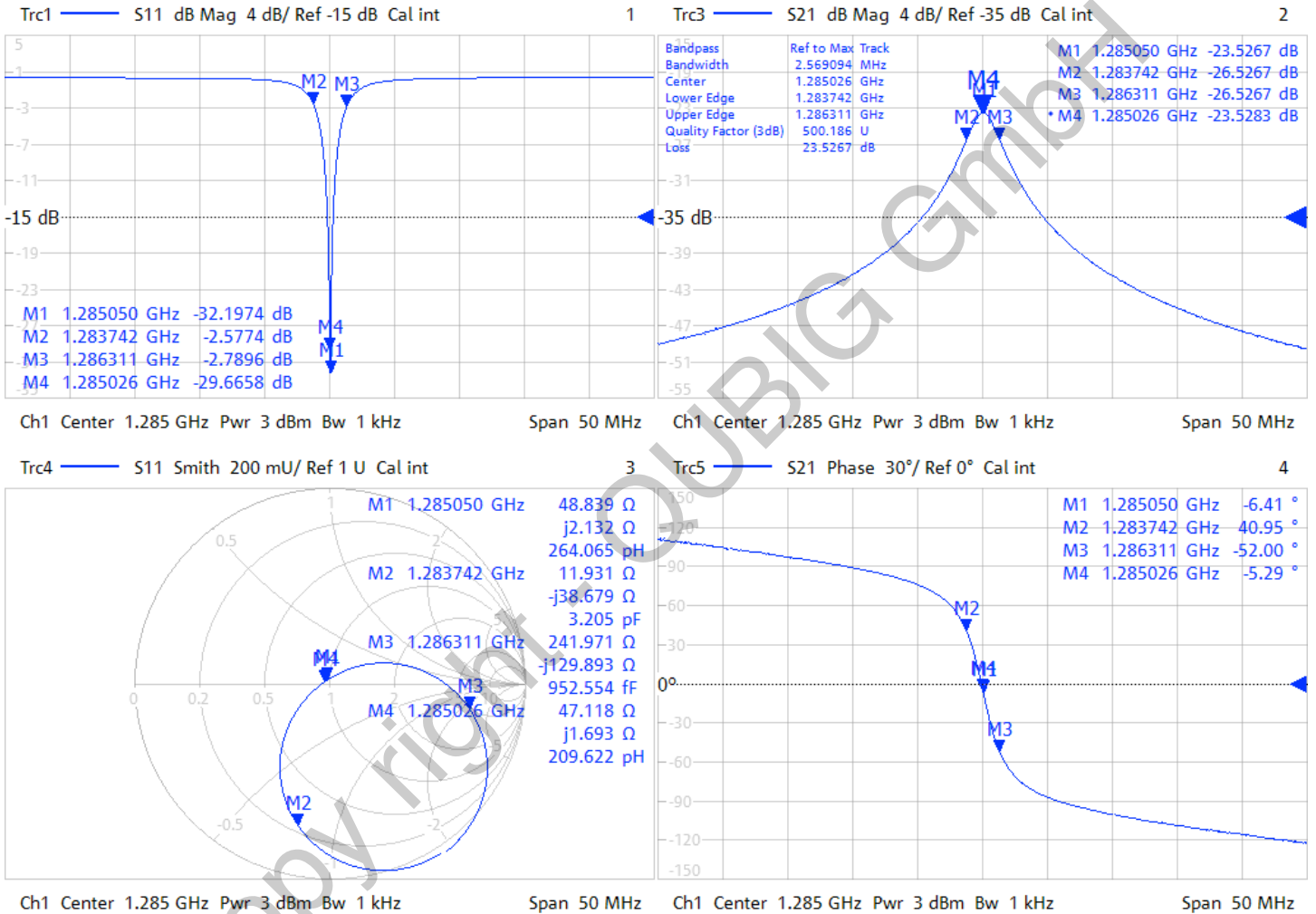
Fig. 3: RF-signal amplitude vs. modulation depth



Resonance characteristics

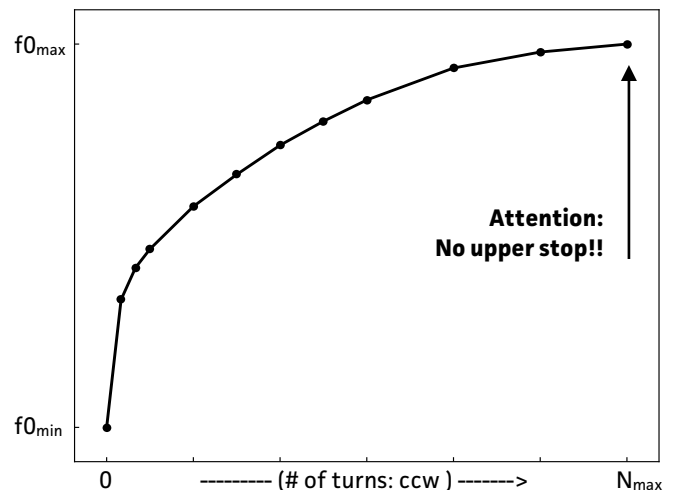


10/25/2018 3:26:58 PM
1328.5170K92-100178-XI



Tuning performance

MAX resonance frequency	f_0 max	1361	GHz
MIN resonance frequency	f_0 min	1152	MHz
number of turns	N_{max}	5	
counter clock-wise turns ↻		higher f_0 ↑	
clock-wise turns ↻		lower f_0 ↓	

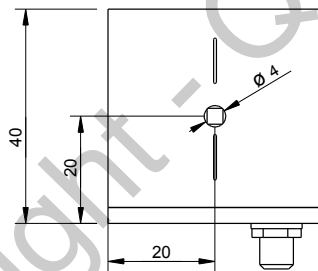
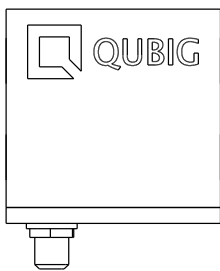
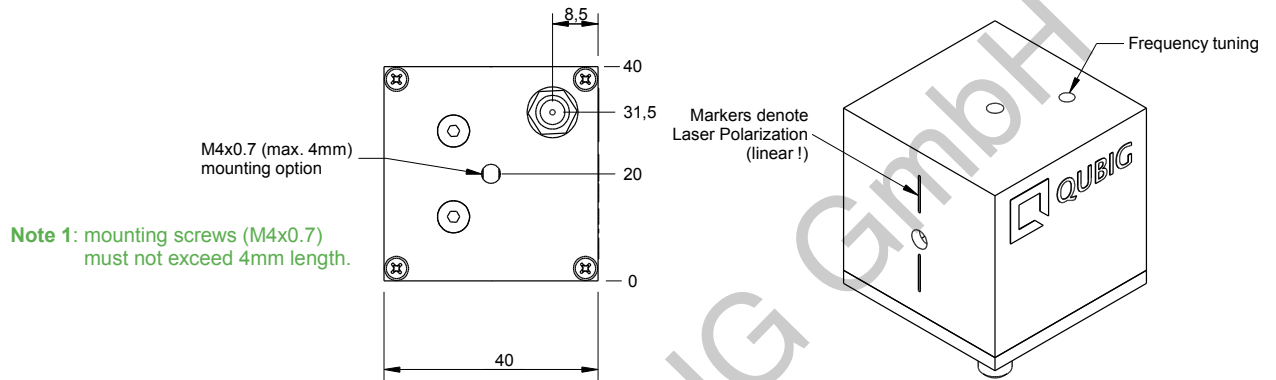


- actuate tuner carefully with supplied tuning tool
- tuner might not be perfectly perpendicular
- there might be no hard upper or lower stops (!)

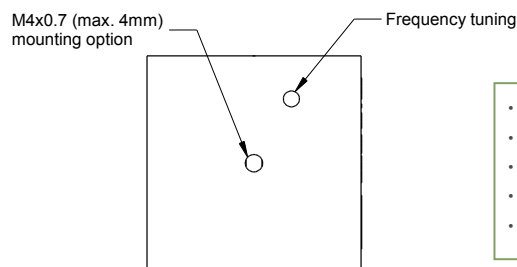
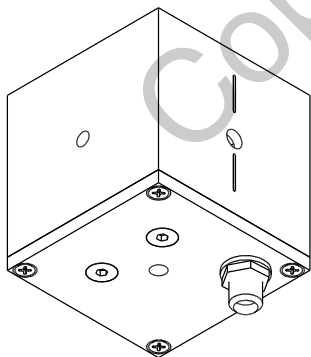
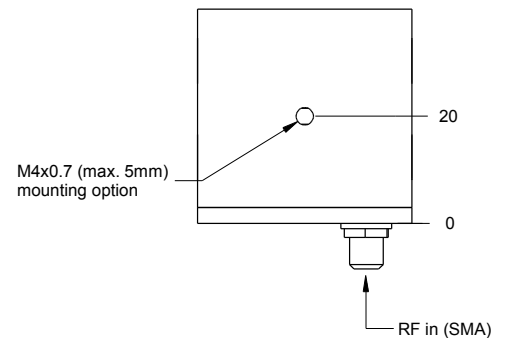
Handling instructions

- 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).

Package drawing



Note 2: crystal aperture is 3x3mm.



Attention!!

- use only supplied tuning tool
- actuate tuner carefully
- do not apply too much pressure or torque
- keep tuning tool coaxial
- tuner might not be perfectly orthogonal to box

Tested by:

Tel: +49 89 2302 9101
 Fax: +49 89 2302 9102
 eMail: mail@qubig.com
 web: www.qubig.com

Qubig GmbH
 Balanstr. 57
 81451 Munich
 Germany