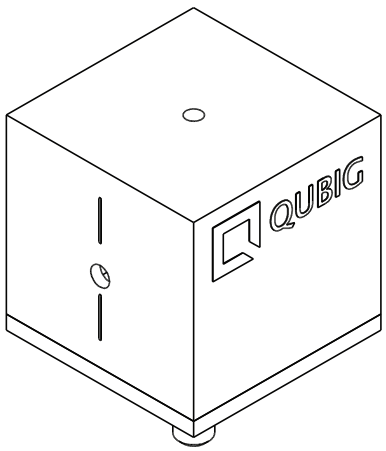
QUBIG

Empowering Laser Technologies

Test Data Sheet

EO-1100M3-NIR
S/N:

Resonant electro-optic phase modulator
with
- **thermal crystal mount**



RF properties	Value	Unit
Resonance frequency: f_0 [1)]	1.09	GHz
Preset frequency: f_{set} [1)]	1.09	GHz
Bandwidth: Δν	2.8	MHz
Quality factor: Q	389	
Required RF power for 1rad @ 1064nm [2)]	27.1	dBm
max. RF power: RF_{max} [3)]	4	W

Optical properties		
EO crystal	LN	
Aperture	3x3	mm^2
Wavefront distortion (633nm)	λ/6	nm
recommended max. optical intensity (1064nm)	~ 4	W/mm^2
AR coating (R<0.5%)	630 - 1070	nm

[1)] at 24.3°C [2)] with 50Ω termination [3)] no damage with RF_{in} < 10W

Measured modulation

Fig. 1: Oscilloscope trace

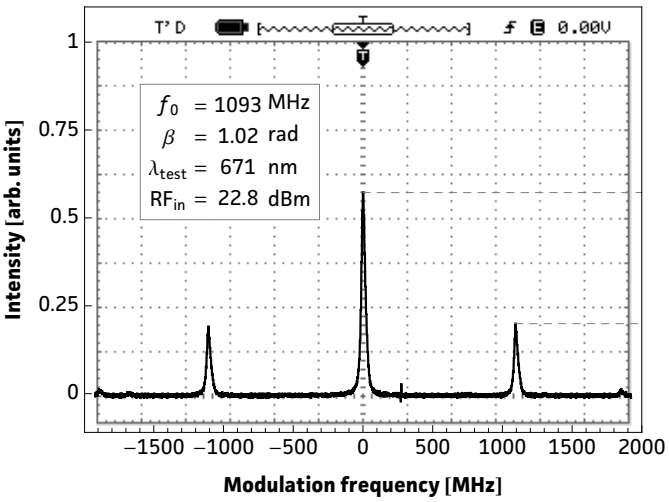


Fig. 2: Carrier/sideband ratio

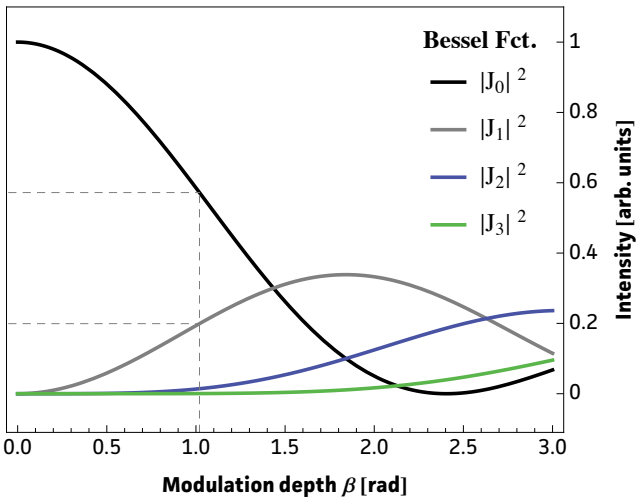


Table 1: Expected modulation

$\beta = 1$ rad	unit	λ_1	λ_2
λ	nm	**671**	**1064**
P	dBm	22.6	27.1
P	mW	183	513
U	V_p	4.3	7.2
U_π	V_p	13.4	22.5
β / U	rad / V	0.23	0.14

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 ß.

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 ß 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.

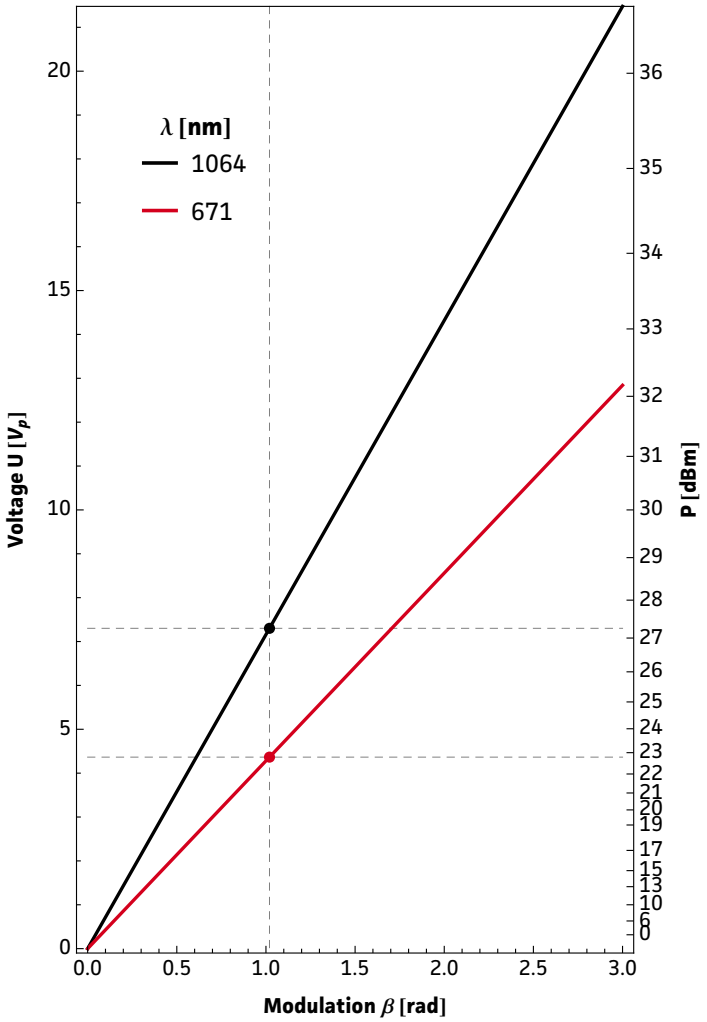
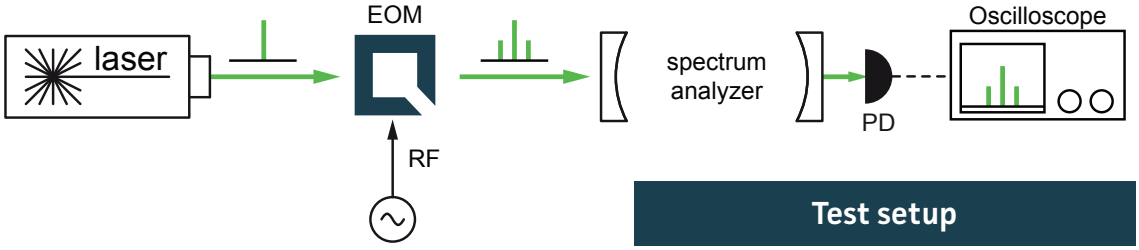
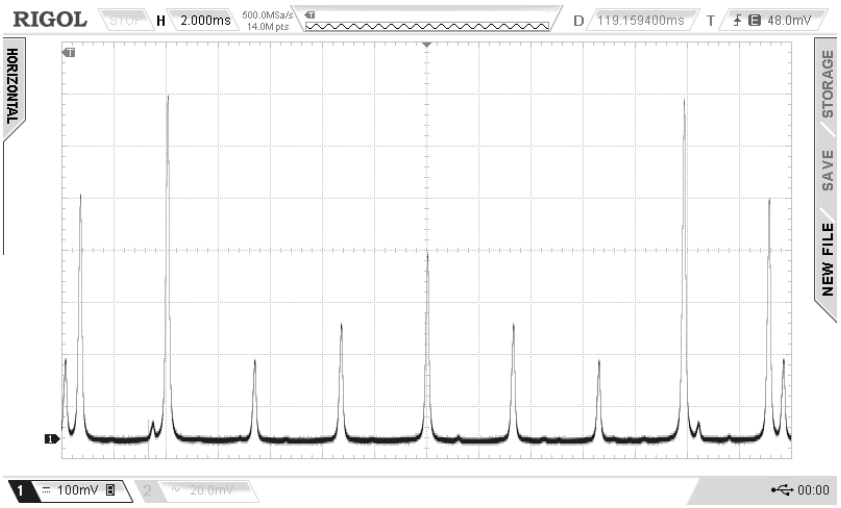


Fig. 3: RF–signal amplitude vs. modulation depth

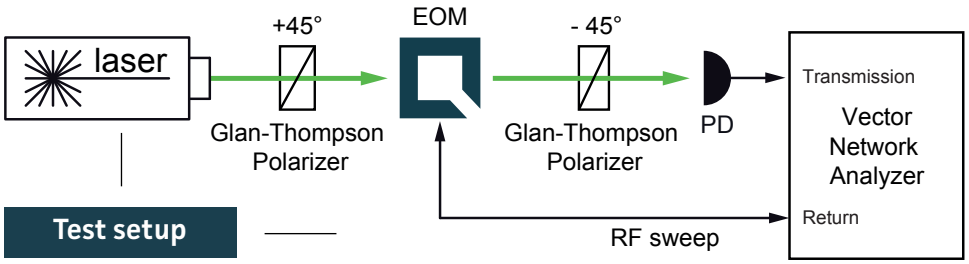


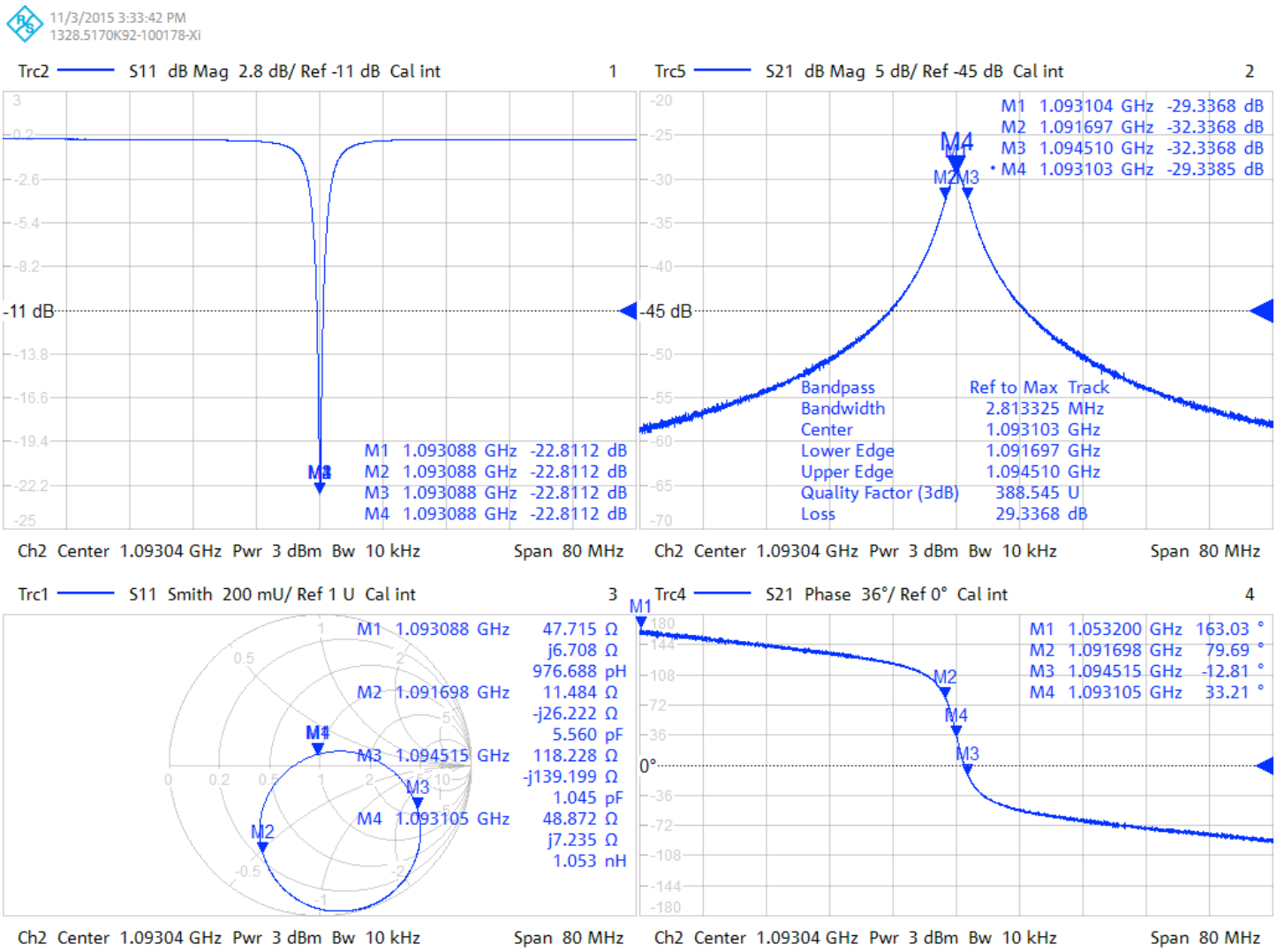
Test setup



- **Left:** oscilloscope trace illustrating the modulation performance of the EOM with: P_{RF} = 36.2 dBm (= -5dBm on EDU display), f_0 = 1.09 GHz, λ = 671 nm
- achieved modulation depth: β_{671nm} = ~4.6 rad
- corresponding modulation depth at 1064nm: β_{1064nm} = ~2.6 rad

Resonance characteristics

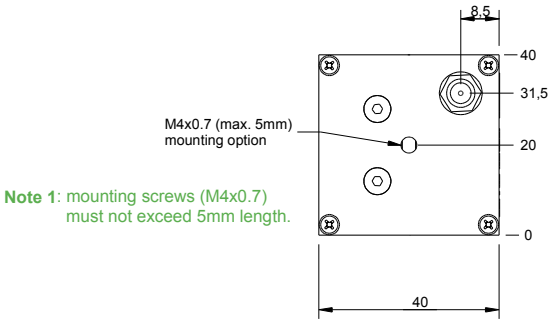


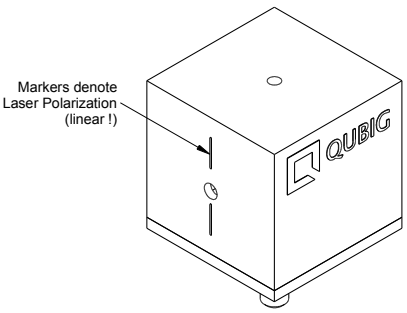


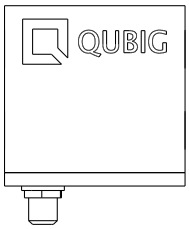
Handling instructions

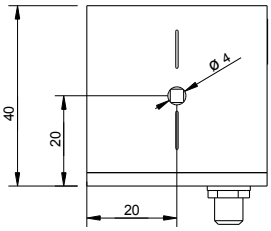
- Input laser polarization must be aligned with respect to the white markers on the housing
- Please handle device carefully. Avoid shock. Don't drop.
- After turn on the resonance frequency might drift slightly with applied rf power. Please compensate by tuning the rf drive frequency until steady-state (~min).
- Slight angle adjustment can reduce unwanted residual amplitude modulation (RAM)
- For lowest RAM ideally use temperature-control (dT< 0.01C)

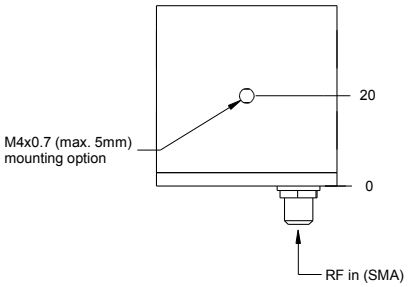
Package drawing



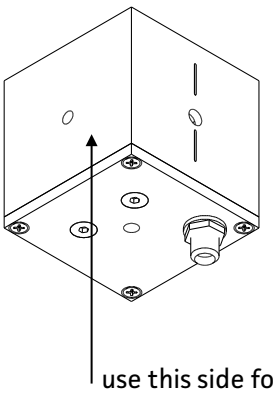


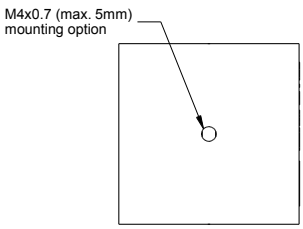


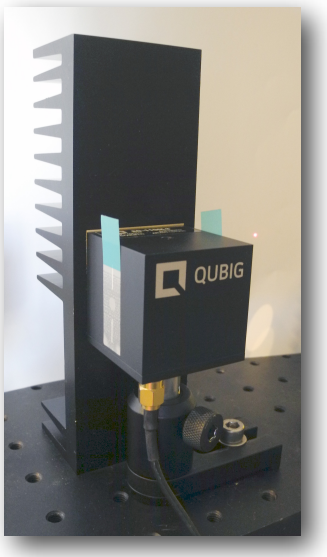




Note 2: crystal aperture is 3x3mm.







Tested by:

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