QUBIG

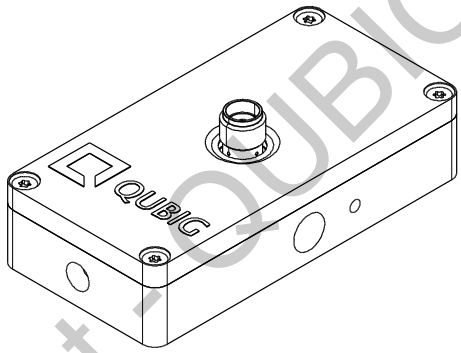
Empowering Laser Technologies

Test Data Sheet

PM10 - NIR

S/N:

Resonant electro-optic phase modulator



RF properties	Value	Unit
Resonance frequency: f_0 [1]	9740 - 9885	MHz
Preset frequency: f_{set} [1]	9775	MHz
Bandwidth: $\Delta\nu$	64.6	MHz
Quality factor Q	151	
Required RF power for 1 rad @ 1064 nm	39.2	dBm
max. RF power: RF_{max} [2]	5	W

Optical properties		
EO crystal	KTP	
Aperture	⌀ 2	mm
Wavefront distortion (@ 633 nm)	λ/8	
recommended max. optical intensity (@ 1064nm)	20	W/mm²
AR coating (R_{avg} < 1%)	780 - 1560	nm

[1] at 27.7 °C [2] no damage with RF_{in} < 10W, but use of a proper heatsink is strongly recommended at high powers

Measured phase modulation

Fig. 1: Oscilloscope trace

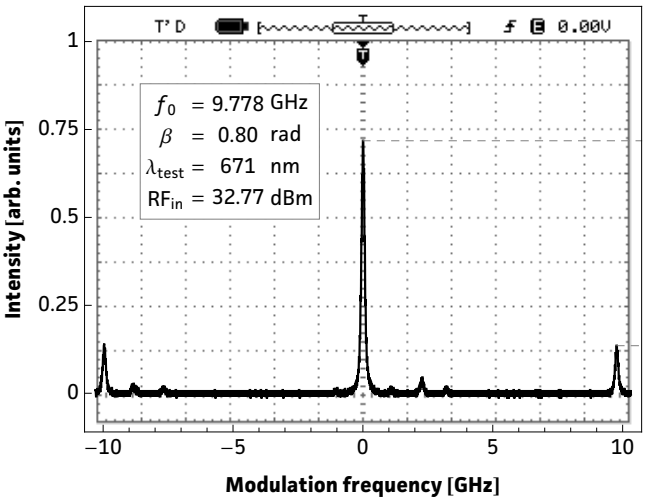


Fig. 2: Carrier/sideband ratio

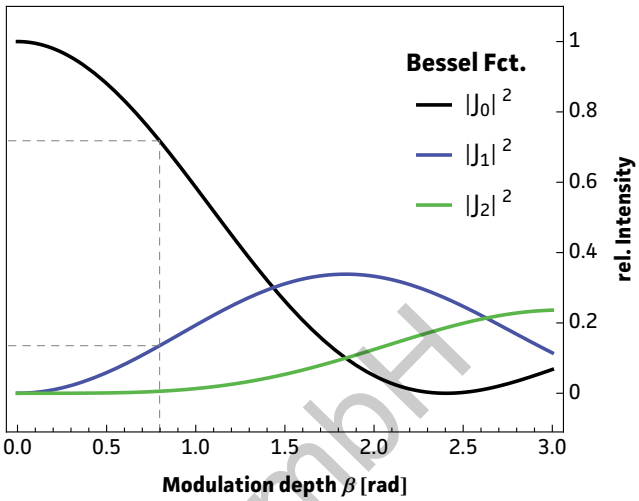


Table 1: Expected modulation

$\beta = 1$ rad	unit	λ_1	λ_2
λ	nm	**671**	**1064**
P	dBm	34.7	39.2
P	W	2.98	8.23
U	V_p	17.2	28.7
U_π	V_p	54.2	90.1
β / U	rad / V	0.06	0.03

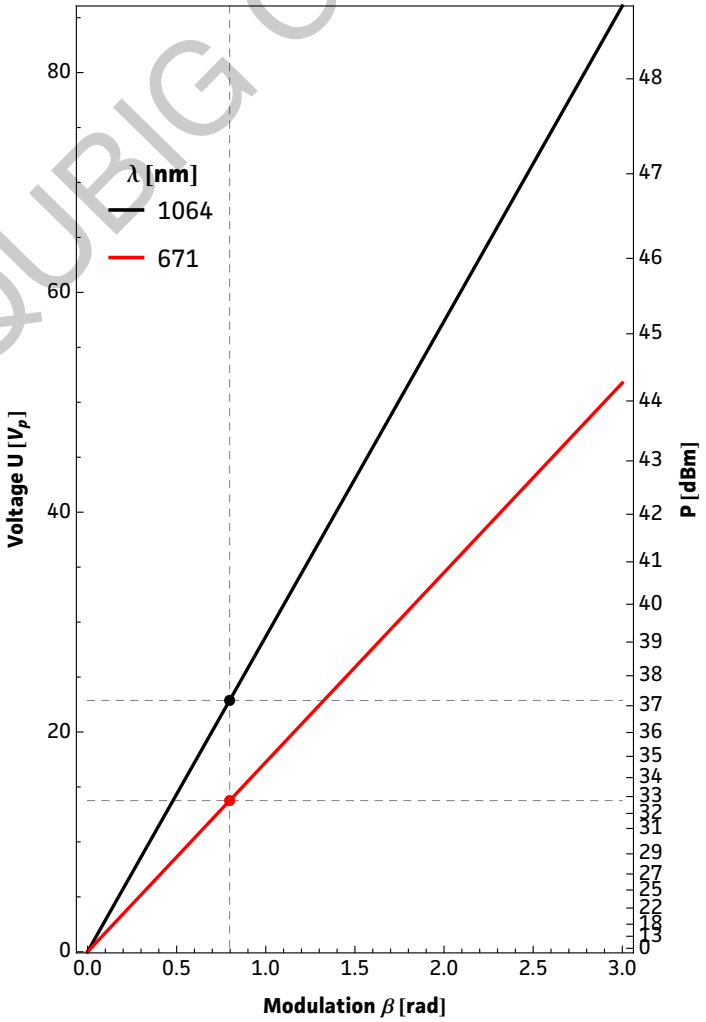


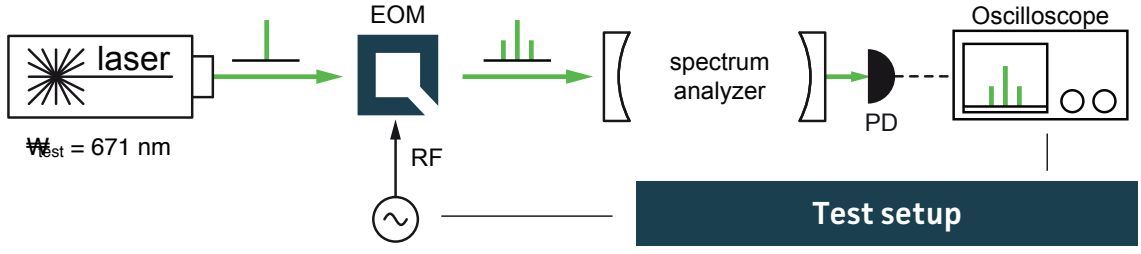
Fig. 3: RF–signal amplitude vs. modulation depth

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.

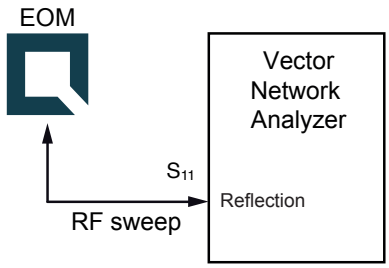
Fig. 3: Dependency between RF amplitude and modulation depth for different wavelengths. Points on the curve allow to retrieve either the required RF amplitude for a specific/desired ß or the max. achievable modulation depth for a given/available RF power.

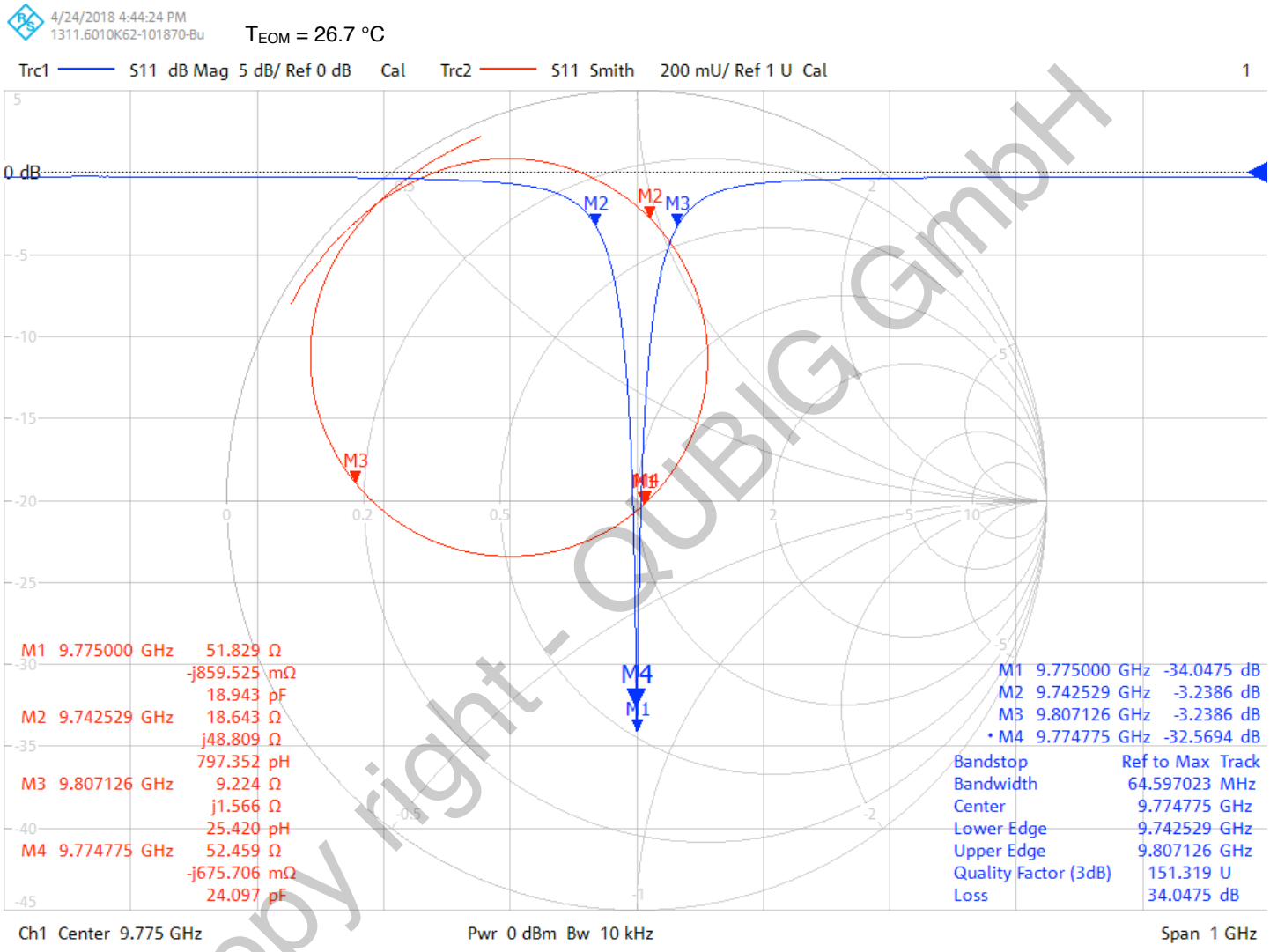
Table 1: Expected RF-amplitude/-power values and conversion factors for the required wavelength at the reference modulation depth of 1 rad. **Note:** Experimentally recorded modulation depth displayed in Fig. 1 might vary from the respective values (ß=1rad) provided in the table.



Test setup

Resonance characteristics

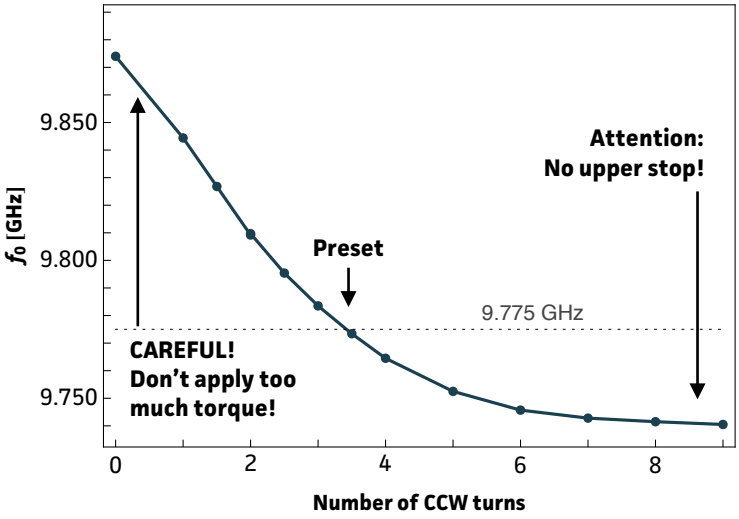




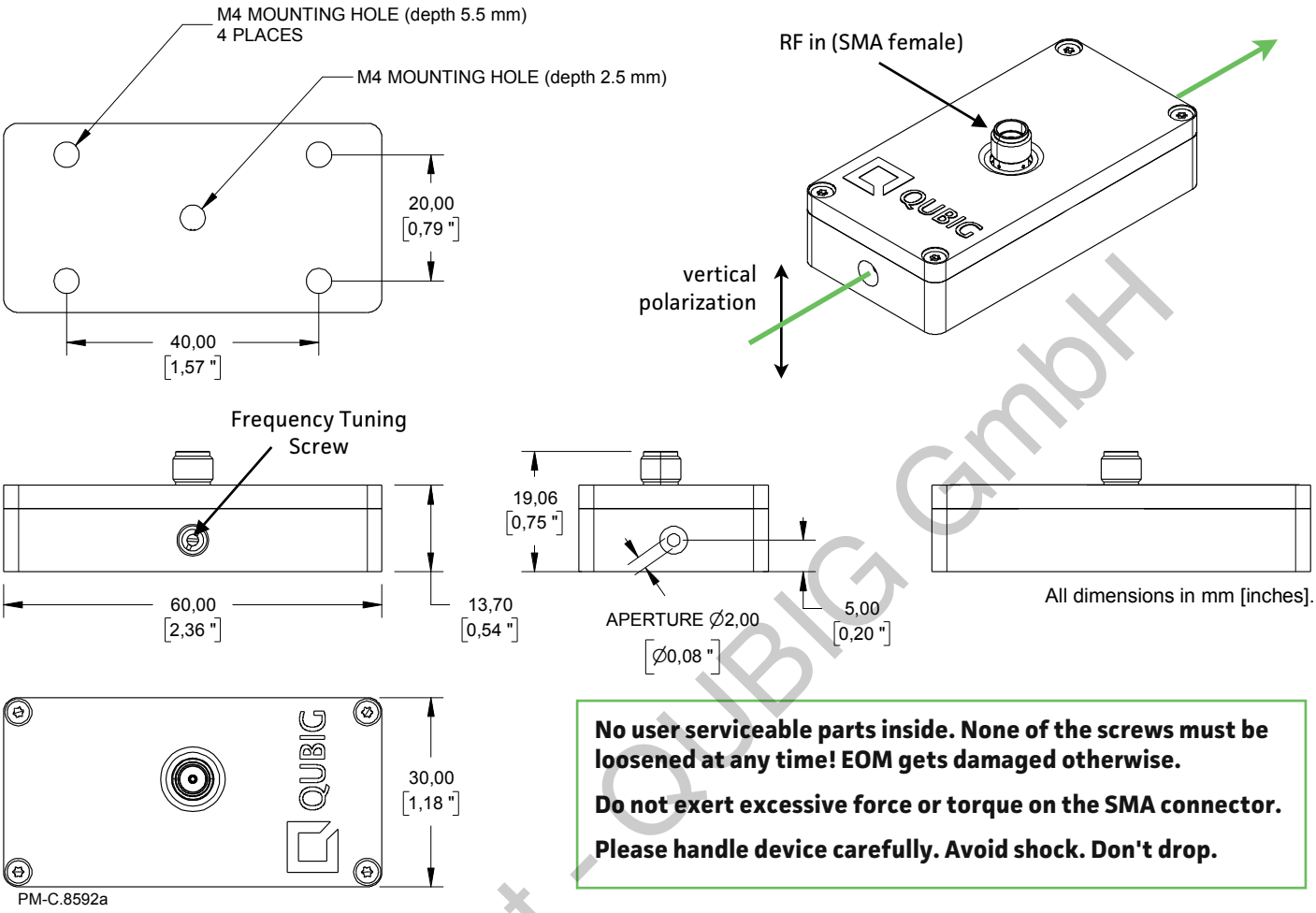
Frequency tuning performance @ T=23.8°C

MAX resonance frequency	$f_{0,max}$	9885	MHz
MIN resonance frequency	$f_{0,min}$	9740	MHz
number of turns	N_{max}	9	
tuning range		145	MHz
temperature dependence	df_0/dT	-3.4	MHz/°C

- only use supplied tuning tool
- actuate tuner carefully / do not apply too much torque, especially close to $f_{0,max}$
- there might be no hard upper or lower stops (!)



Package drawing



No user serviceable parts inside. None of the screws must be loosened at any time! EOM gets damaged otherwise.

Do not exert excessive force or torque on the SMA connector.

Please handle device carefully. Avoid shock. Don't drop.

Tested by:

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