

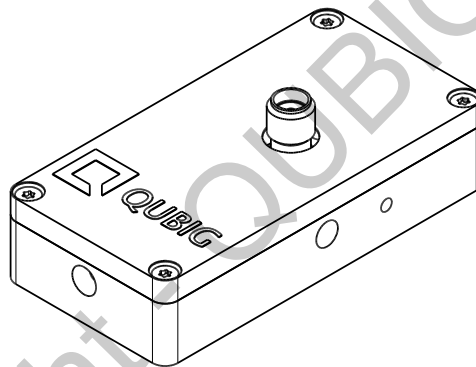
Test Data Sheet

PM-Rb87_6.6M2

(old: EO-Rb87-6.6G)

S/N:

Resonant electro-optic phase modulator
with
- tunable resonance frequency



RF properties	Value	Unit
Resonance frequency: f_0 ¹⁾	6532 - 6628	MHz
Preset frequency: f_{set} ¹⁾	6580	MHz
Bandwidth: $\Delta\nu$	27.9	MHz
Quality factor Q	236	
Required RF power for 1 rad @ 780 nm	31.9	dBm
max. RF power: RF_{max} ²⁾	3	W

Optical properties		
EO crystal	MLN	
Aperture	∅ 2	mm
Wavefront distortion (@ 633 nm)	$\lambda/4$	nm
recommended max. optical intensity (@ 780 nm)	5	W/mm ²
AR coating ($R_{avg} < 1\%$)	630 - 1100	nm

¹⁾ at 26.2 °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

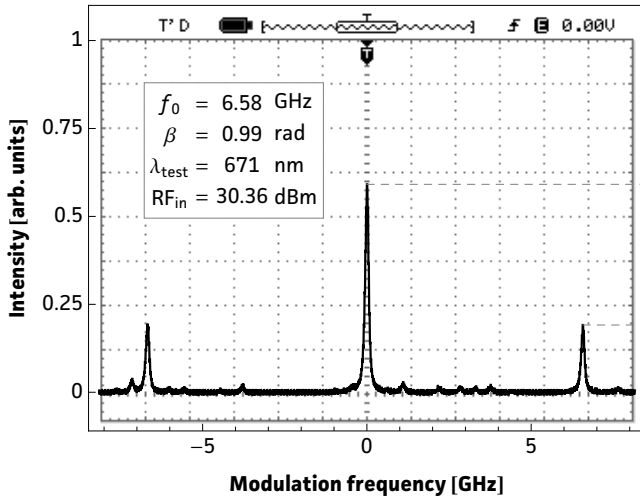


Fig. 2: Carrier/sideband ratio

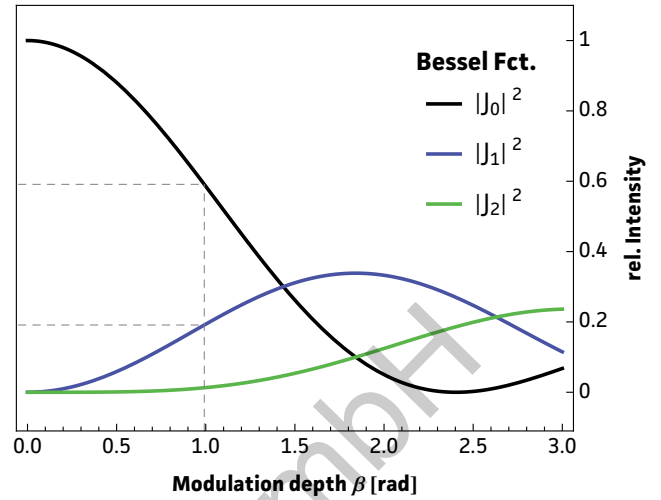


Table 1: Expected modulation

$\beta = 1 \text{ rad}$	unit	λ_1	λ_2
λ	nm	671	780
P	dBm	30.4	31.9
P	W	1.1	1.56
U	V_p	10.5	12.5
U_π	V_p	33.	39.2
β / U	rad / V	0.1	0.08

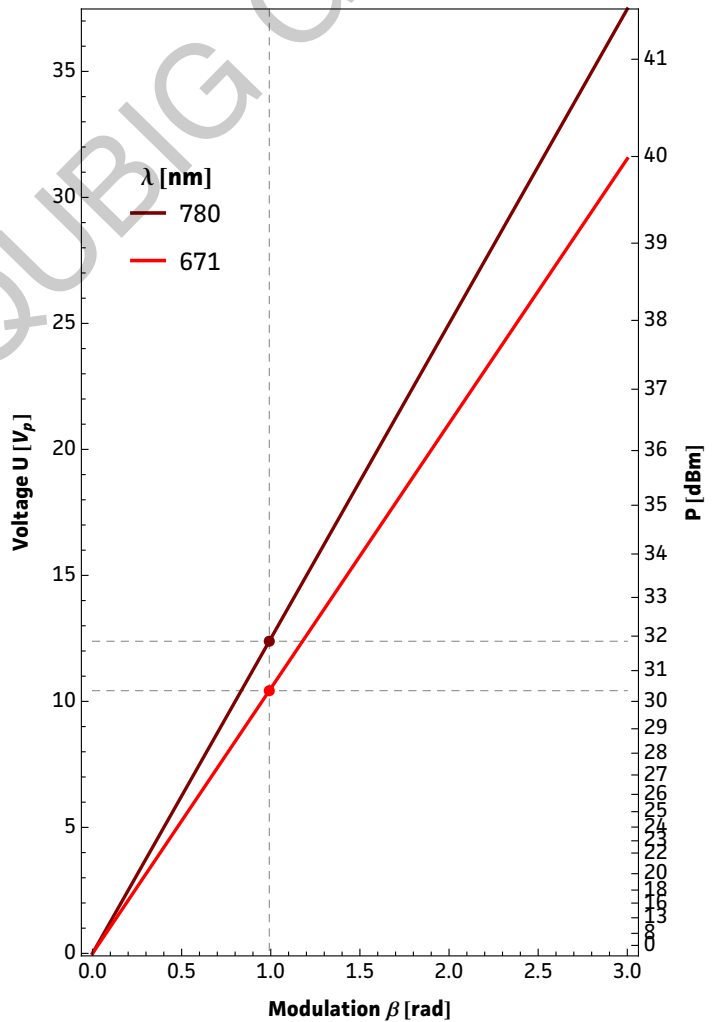


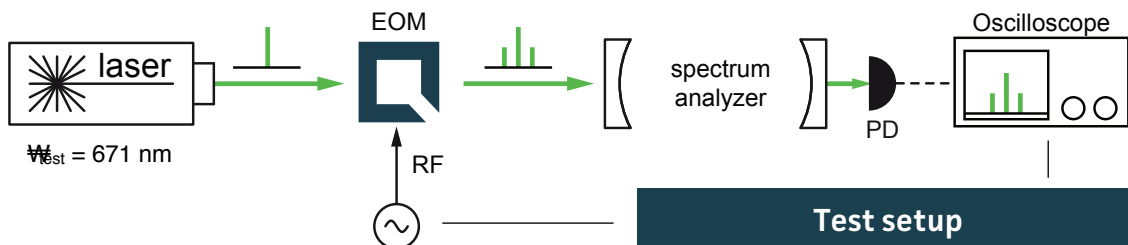
Fig. 1: Recorded oscilloscope trace retrieved from a test setup as illustrated below.

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 .

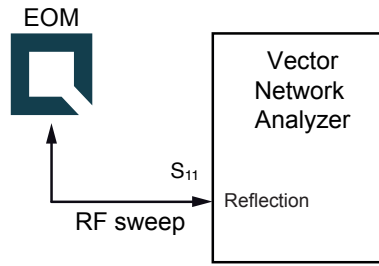
Fig. 3: Dependency between RF amplitude and modulation depth for different wavelengths. Points on the curve allow to retrieve either the required RF amplitude for a specific/desired β or the max. achievable modulation depth for a given/available RF power.

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



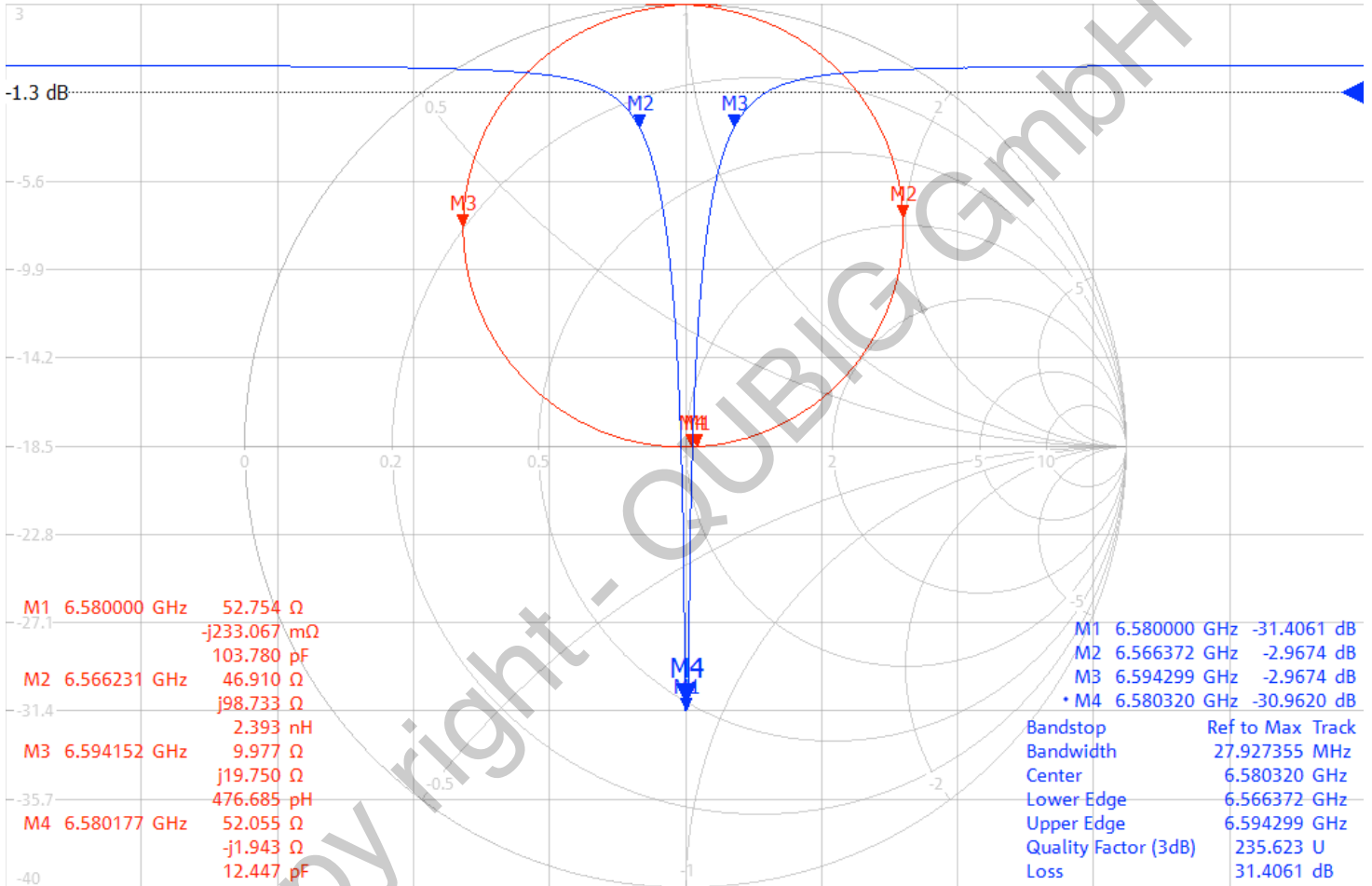
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$T_{EOM} = 26.2\text{ }^{\circ}\text{C}$

Trc1 — S11 dB Mag 4.3 dB/ Ref -1.3 dB Cal int

Trc2 — S11 Smith 200 mU/ Ref 1 U Cal int

1



Ch1 Center 6.58 GHz

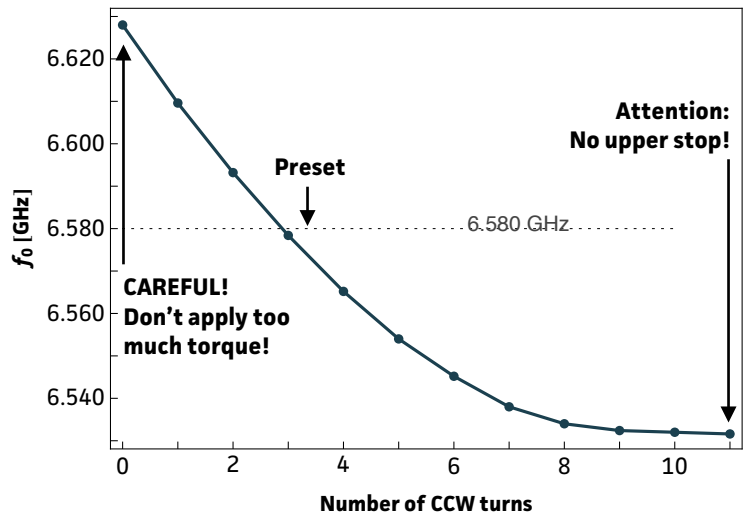
Pwr -10 dBm Bw 10 kHz

Span 400 MHz

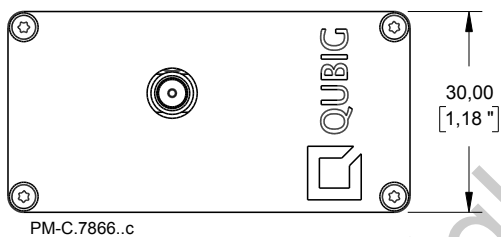
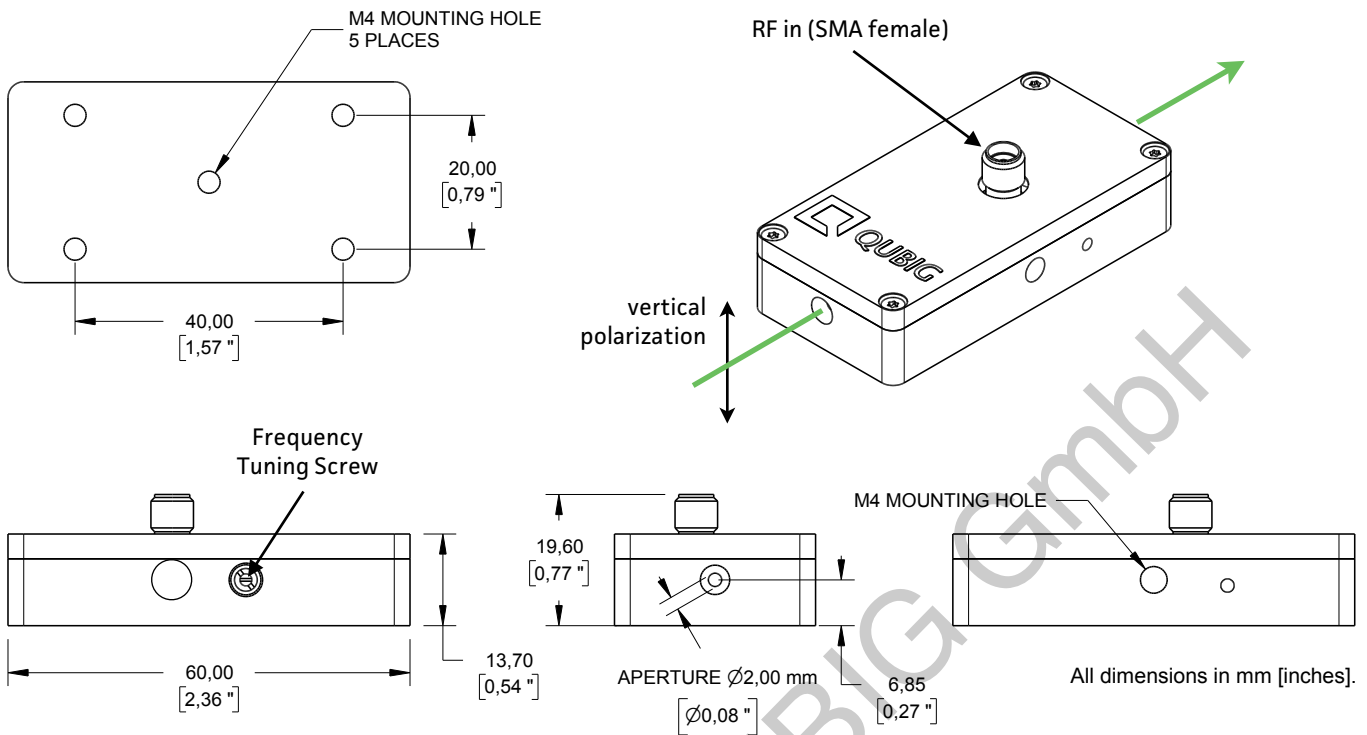
Frequency tuning performance @ $T=26.2^{\circ}\text{C}$

MAX resonance frequency	$f_{0,max}$	6628	MHz
MIN resonance frequency	$f_{0,min}$	6532	MHz
number of turns	N_{max}	10	
tuning range		104	MHz
temperature dependence	df_0/dT	-2.6	MHz/ $^{\circ}\text{C}$

- only use supplied tuning tool
- actuate tuner carefully / do not apply too much torque especially around $f_{0,max}$
- 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.

Note that the faces of the crystal have a 2° wedge in order to prevent back reflections. A small horizontal beam displacement is therefore expected.

Tested by:

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