

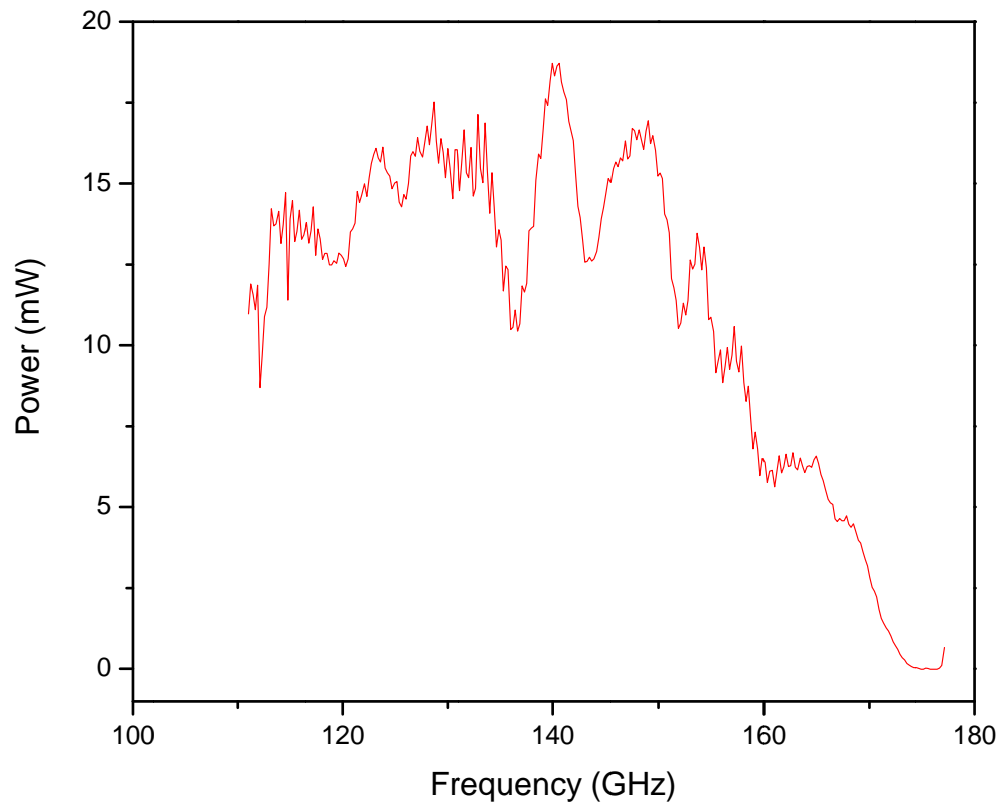
QS2-500 Quasi-Optical Source

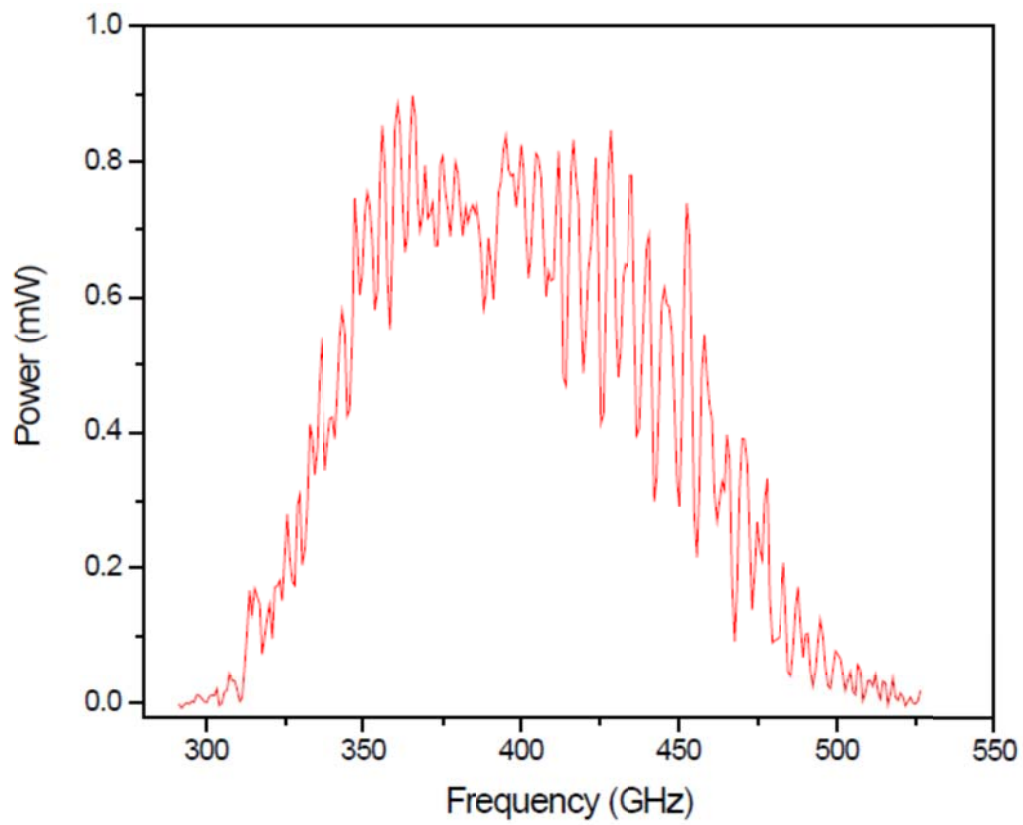
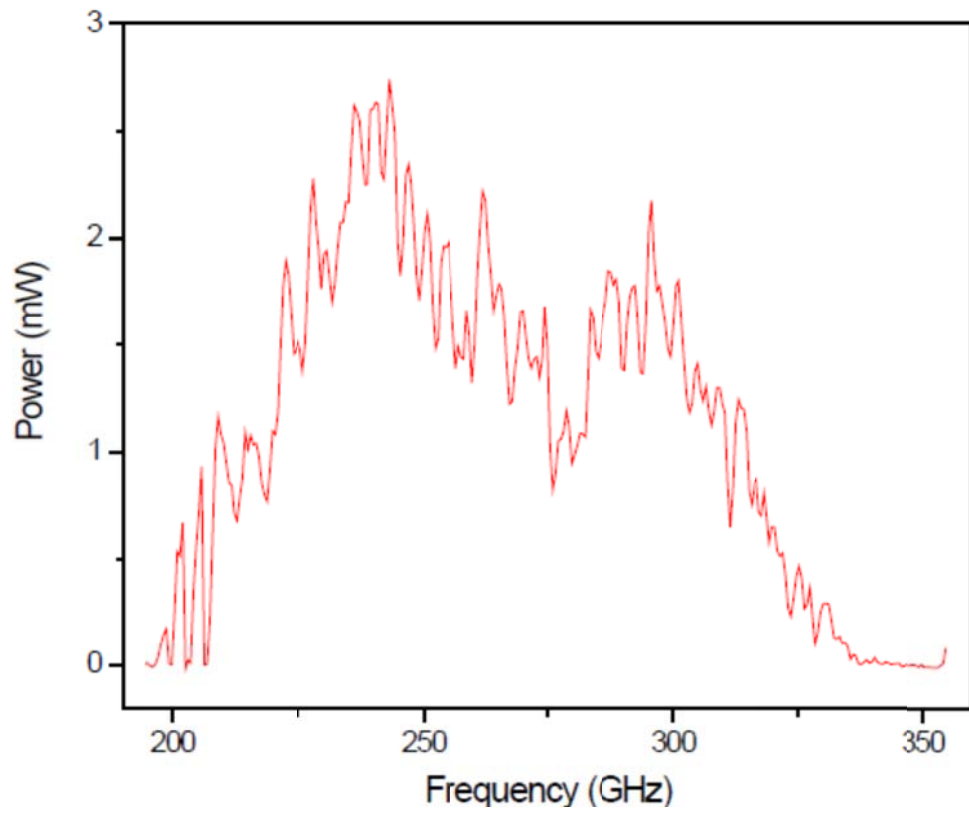


Frequency Range (GHz)	Power Range (mW)
111-177	1-18
200-350	0.1-2.5
300-500	0.1-0.9

1. Cathode voltage, V	1500
2. Cathode current, mA	17
3. Heater current, A	2.04
4. Grid Voltage, V	200
5. Output frequency, GHz	145.1

The QS2-500 is a quasi-optical source composed of a QS2-180 (OV-86) backward wave oscillator (BWO) and a Schottky diode frequency doubler and tripler. It is tunable across the 111-177 GHz, 200-350 GHz, and 300-500 GHz frequency ranges.





The QS2-500 BWO comes pre-packaged in an air cooled magnetic system. Operation of QS2-500 also requires a high voltage power supply such as VR-3M. In the baseline configuration, QS2-500 produces up to 18 mW of continuous wave tunable monochromatic power with a bandwidth of 1 MHz. The system frequency can be doubled with up to 2.5 mW of power with a 2 MHz bandwidth and tripled with up to 0.9 mW with 3 MHz.

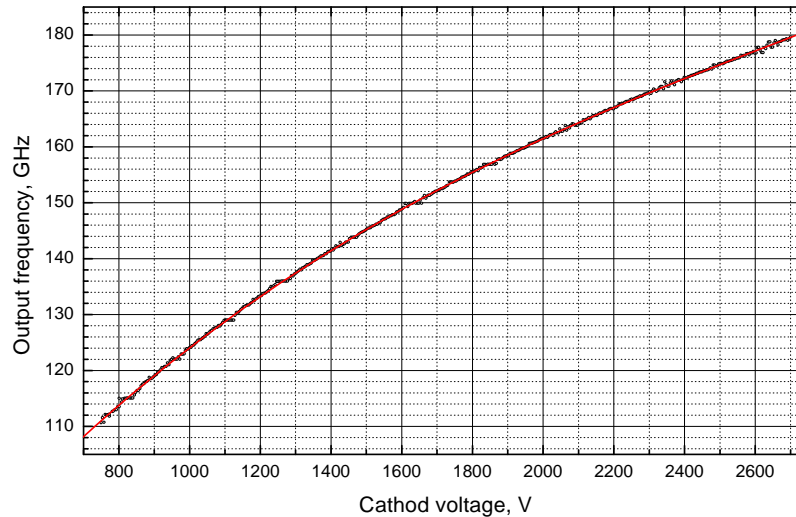
CALIBRATION POLYNOMINAL

$$U(f) = (U_0 + U_1f + U_2f^2 + U_3f^3)^2,$$

$$f(U) = f_0 + f_1\sqrt{U} + f_2U + f_3U^{3/2}, \quad U \text{ in Volts, } f \text{ in GHz}$$

U₀= -8,3014980480	f₀= 11,1708627400
U₁= 0,3851917728	f₁= 4,0161922990
U₂= -0,0010438450	f₂= -0,0125665622
U₃= 0,0000042859	f₃= -0,0000466561

CALIBRATION CURVE



TURN ON PROCEDURE:

a. Initial turn ON (required for tube installation and for a tube that was not used for more than 2 weeks)

1. Make sure that high voltage (coarse) and heater potentiometers on VR-3 are in zero position.
2. Turn on main power on VR-3 (green button). Wait for 3 min.
3. Switch on BWO switch on VR-3 power supply (This turns on high and grid voltages). Set cathode voltage to 1000V.
4. Increase the value of the heater current to 2.00 A, while monitoring the cathode current. Make sure the cathode current stays below 15 mA
5. Wait 1-2 minutes when cathode current will be stable.
6. By FINE adjustment of the heater current, set the cathode current at 15 mA. The cathode current will probably increase in the next 15 min so watch and repeat adjustment as necessary.
7. Change the cathode voltage to choose the output frequency required.
8. Check on the cathode current once in a while and make sure the cathode current does not exceed 17 mA at the test voltage!

b. Regular turn ON (recommended for a tube that was used in the last 2 weeks)

1. Make sure that high voltage in the zero position
2. Make sure that the heater potentiometer is fixed in a preset position defined for this specific tube. If the heater potentiometer position is not certain please use procedure (a) above.
3. Turn on main power on VR-3 (green button). Wait for 1 min.
4. Switch on BWO switch on VR-3 power supply (This turns on high and grid voltages). Set cathode voltage to 1000V, while monitoring the cathode current. Make sure the cathode current stays below 16 mA.
5. By FINE adjustment of the heater current, set the cathode current at 15 mA. The cathode current will probably increase in the next 15 min so watch and repeat adjustment as necessary.
6. Change the cathode voltage to choose the output frequency required.
7. Check on the cathode current once in a while and make sure the cathode current does not exceed 17 mA at the test voltage!

Turn OFF procedure:

1. Set the cathode voltage to zero.
2. Turn off the BWO switch
3. Turn off the main power (red button).

Warning: Please follow recommended Turn ON/OFF procedures to prevent damage of quasi-optical sources.