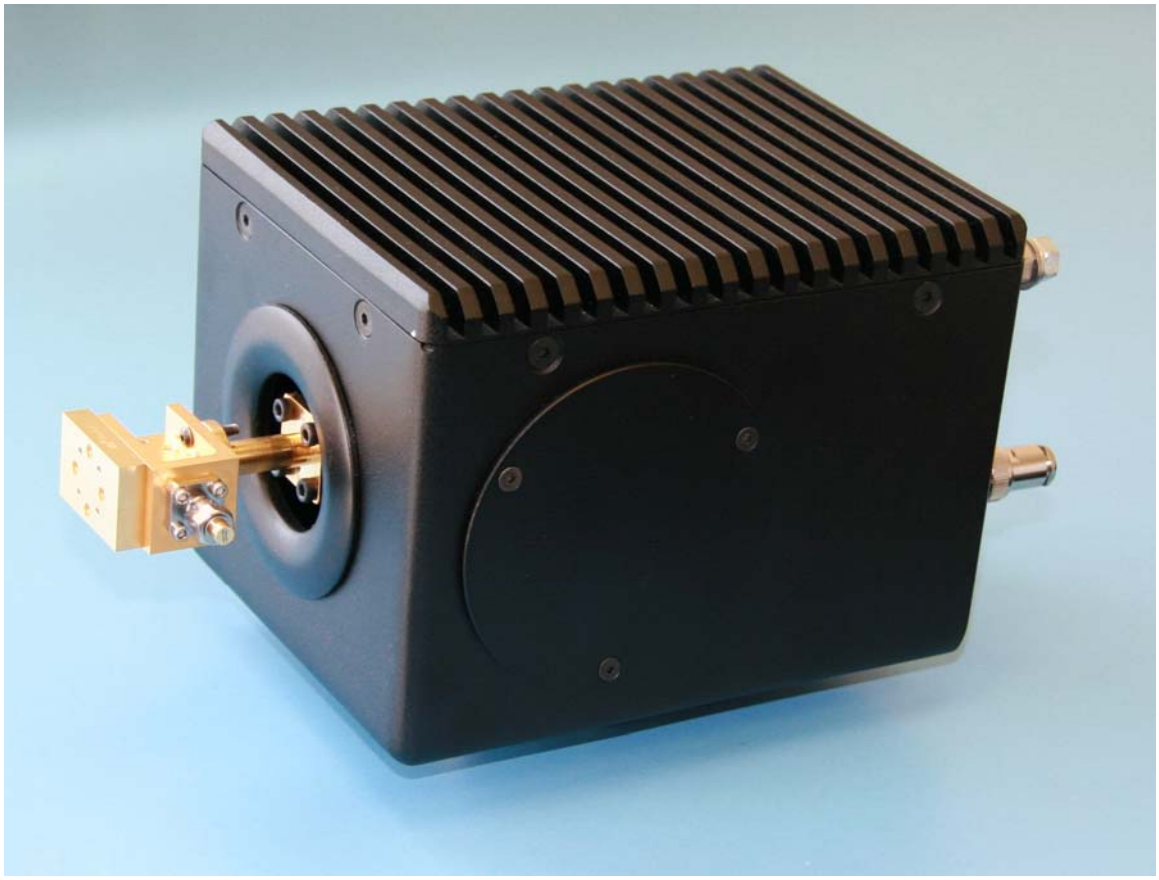
QS2-1000 Quasi-Optical Source



Frequency Range (GHz)	Power Range (mW)
100-180	10-100
200-350	1-10
300-500	.5-2
600-1000	.02-.1

The QS2-1000 is a compact quasi-optical source. It is air cooled. It operates across the ranges 100-180, 200-350, 300-500, and 600-1000 GHz. The unit is rapidly configurable for any of those ranges and comes equipped with the components to operate in all of those specified ranges.[1] This makes it an excellent choice for a broad range of research and industrial applications.

The QS2-1000 quasi-optical source is a hybrid spectral source composed of a QS2-180 100-180 GHz backward wave oscillator (BWO) and a set of Schottky diode multipliers. The set consists of a base doubler, a secondary tripler, and a base tripler.

The QS2-180 BWO is pre-packed in a magnet and never needs adjustment in the magnet. In the baseline configuration, a typical BWO source produces a peak of 40 to 60 mW continuous wave monochromatic power in the TE_{01} mode with a bandwidth of 1 MHz. This is shown in Figure 1. The lifetime of the QS2-180 is 10 to 15 years.

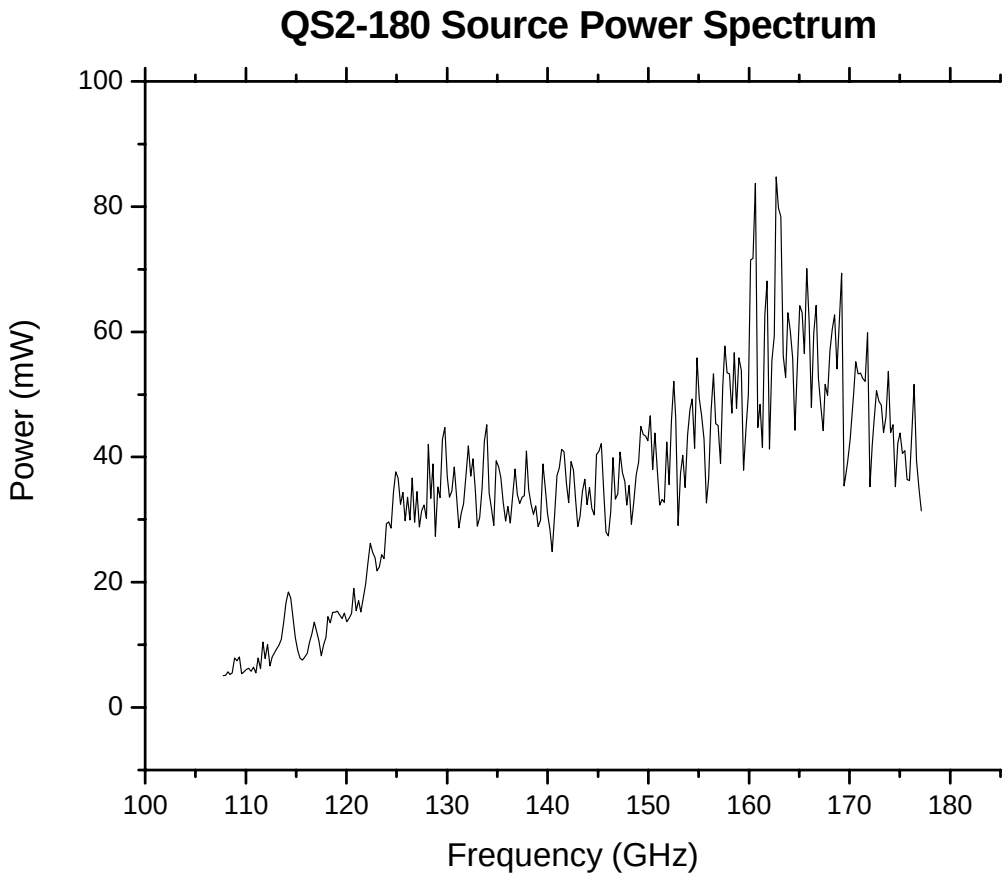


Figure 1: typical power spectrum from a QS2 BWO source used in the QS2-1000 quasi-optical sources.

The Schottky diodes attach easily to the wave guide adapter for quick range changes. With the frequency doubler the power spectrum has a broad usable range with power at or close to 4 mW across a large part of the spectrum. With a multiplier attached the spectrum is frequency multiplied from the base BWO spectrum and as one would expect so is the bandwidth. The frequency doubled configuration has a bandwidth of 2 MHz. The spectrum in the doubled configuration is shown below in Figure 2.

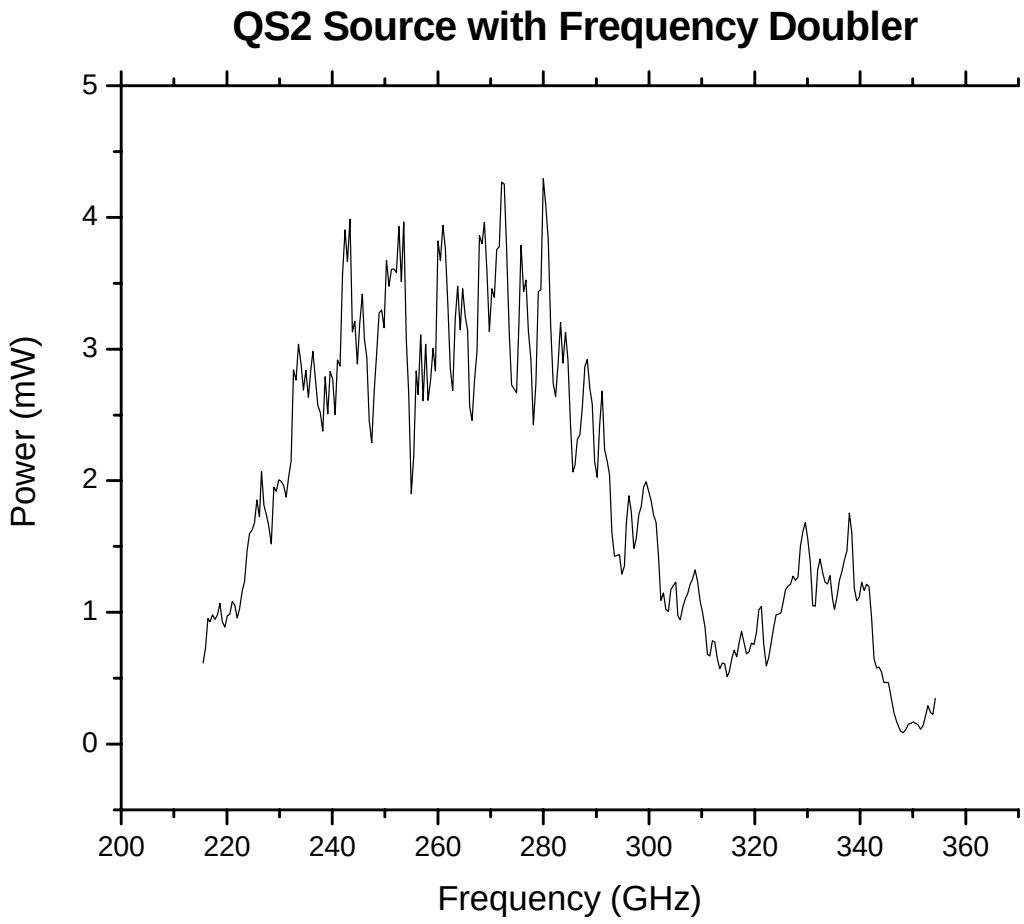


Figure 2: The doubled spectral power output for the QS2 with a frequency doubler. The power is above 3 mW for most of the range from 230 to 290 GHz.

By adding the secondary tripler one reaches 6 times multiplication. The spectrum for this is seen in Figure 3. The bandwidth in this case is 6 MHz.

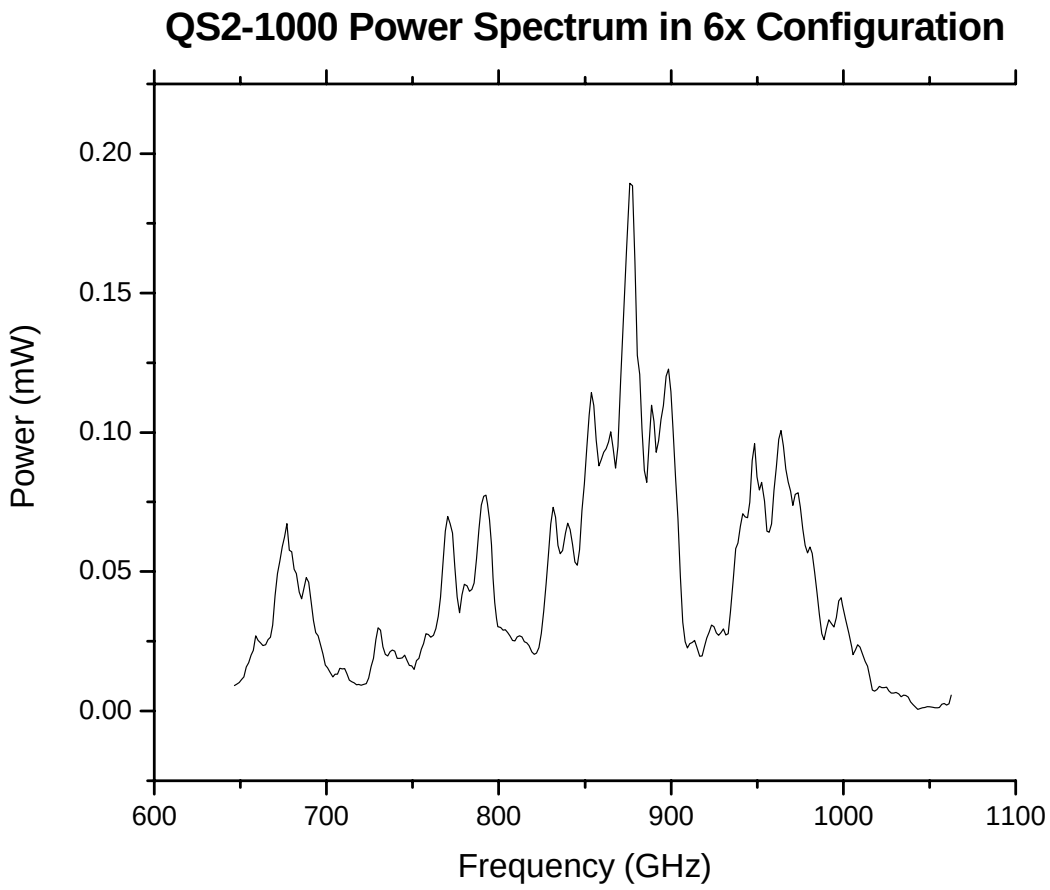


Figure 3: power spectrum with both the base doubler and the secondary tripler attached.

Or one can use the base tripler where the spectral range is 300 to 500 GHz. The base tripler output typically peaks at 1 mW. This is shown in Figure 4.

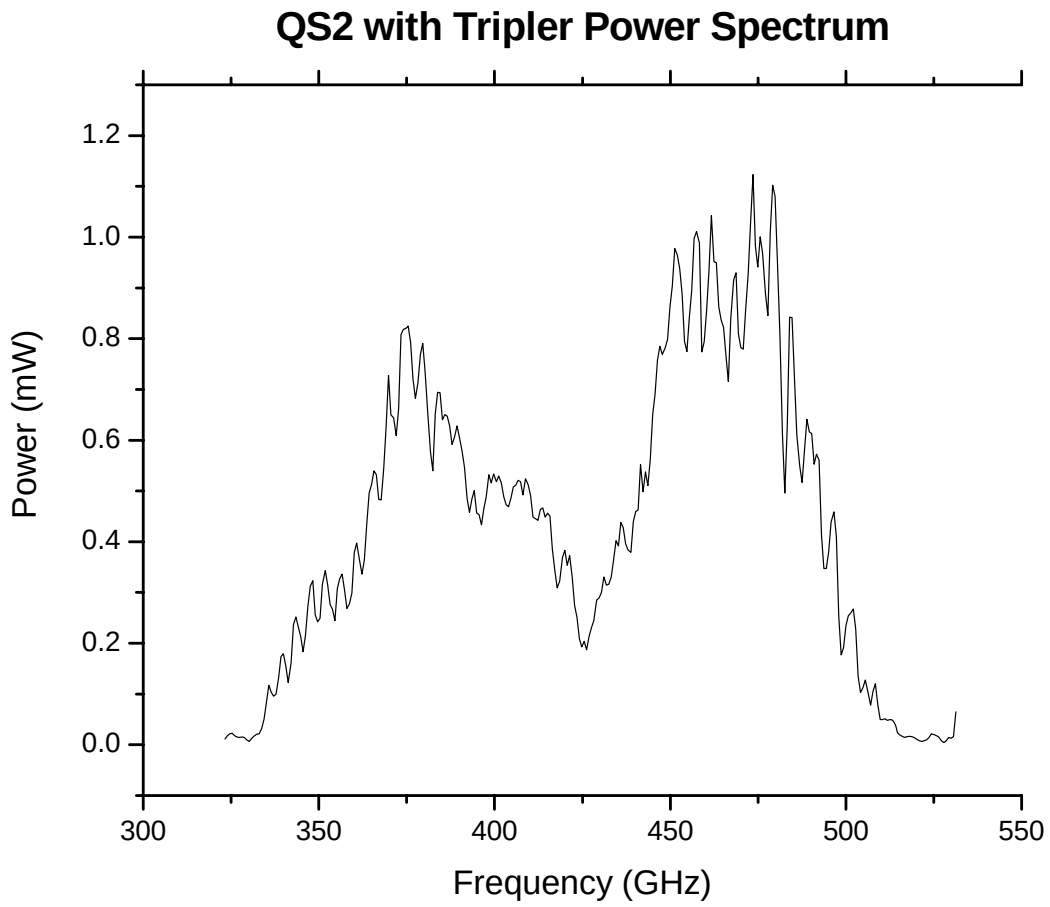


Figure 4: In tripled configuration there is broad power above 400 μW across the majority of the spectral band.

For those applications that don't require as much power at high frequency as a QS1 based system the QS2-1000 is an attractive economical alternative. With the permanent pre-packing in the magnet eliminating alignment time, the lack of need for water cooling, the broad available set of ranges, and the ease of conversion from one range to another; the QS2-1000 is an excellent choice for many research and industrial applications.

[1] Requires VR-3M or VR-6MU power supply for operation (not included).