

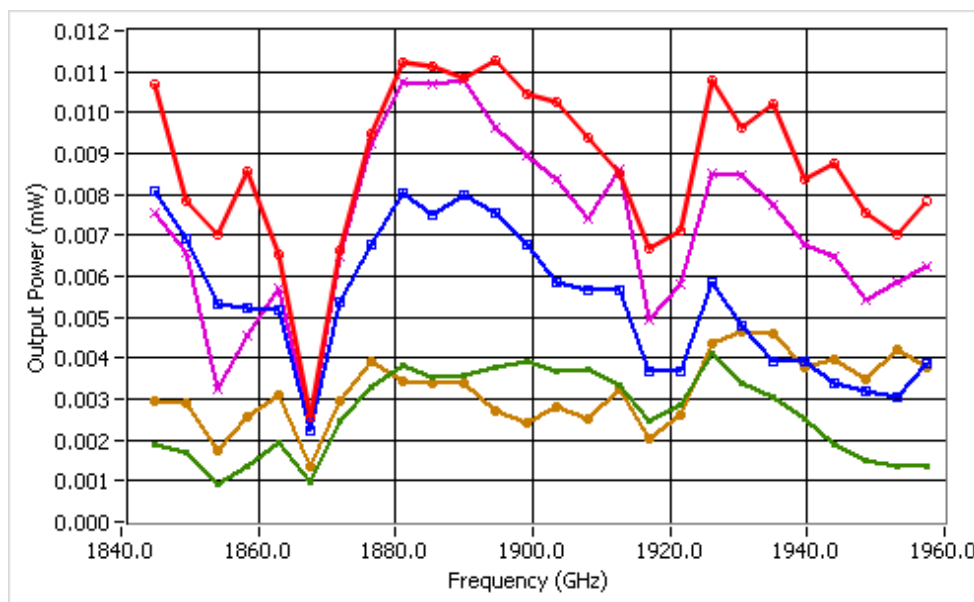
# Development and Characterization of a 1.9THz LO Source

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## Abstract

Over the last several years VDI has been developing THz sources based on microwave frequency amplifiers and a cascaded series of frequency multipliers. Much of this effort has been focused on the 1.9THz frequency range, which is of significant astronomical importance and will soon be accessible from the Sofia airborne observatory. This development is now nearing completion with the successful development of sources with power levels well above ten microwatts. This effort has required the development of improved millimeter-wave varactor multipliers with better thermal grounding for greater power handling, the optimization of the THz multipliers for operation at low power levels and the development of improved assembly and testing techniques. This paper will discuss the many challenges of achieving useful sources at such high frequency, as well as review the results that have been achieved. For example, the figure below shows the measured performance of several frequency triplers to the desired frequency band. The results show significant variation from build-to-build, but very impressive power levels for the best builds.



*Fig. 1. The measured output power of a series of WR0.51x3 triplers to ~1.9THz at room temperature. Each of these triplers was pumped by the same lower frequency driver. Although the power level achieved for the best builds is very useful for atmospheric purposes, the variation from build to build is indicative of the challenges of developing such high frequency sources.*