The Moxon-Yagi Dual-Band VHF/UHF Antenna for Superior Satellite Link Performance

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Elevate your satellite connections with the Moxon-Yagi Dual-Band VHF/UHF Antenna. This innovative design optimizes signal reception for seamless communication.

In amateur radio satellite communication, the use of **directional antennas** is essential. Operating on both the VHF and UHF bands with a single antenna can present a significant challenge. This article introduces a **dual-band antenna design that covers both VHF and UHF bands** by combining two distinct antenna types: the **Moxon antenna for VHF frequencies** and the **Yagi antenna for UHF frequencies**. One of the notable advantages of this design is its utilization of **a single feeding point**.

The **Moxon antenna**, also known as the Moxon rectangle, is a simple yet mechanically robust antenna configuration composed of two elements: a driven element and a parasitic element. It is named after the renowned radio amateur Les Moxon, with the call sign G6XN. Essentially, the Moxon antenna resembles a Yagi-Uda antenna with **two folded dipole elements**, one serving as the driven element and the other as the reflector element. **A tunable gap exists between these two folded dipoles**, allowing for adjustments to minimize the Voltage Standing Wave Ratio (VSWR) at VHF frequencies. Consequently, it is a mechanically tunable antenna that eliminates the need for an impedance matching network. In our dual-band design, as illustrated below, the Moxon segment of the antenna serves as the excitation point.

The accompanying figure also depicts the **Yagi-Uda portion of the dual-band antenna**. This section follows the conventional Yagi array configuration, consisting of a reflector element, a driven element, and three directors. However, the driven element in this context is not directly excited; it is powered indirectly through **electromagnetic induction** from the driven element of the Moxon array. The gap separating the Moxon and Yagi sections of the combined antenna can be mechanically adjusted to minimize the VSWR at UHF frequencies.

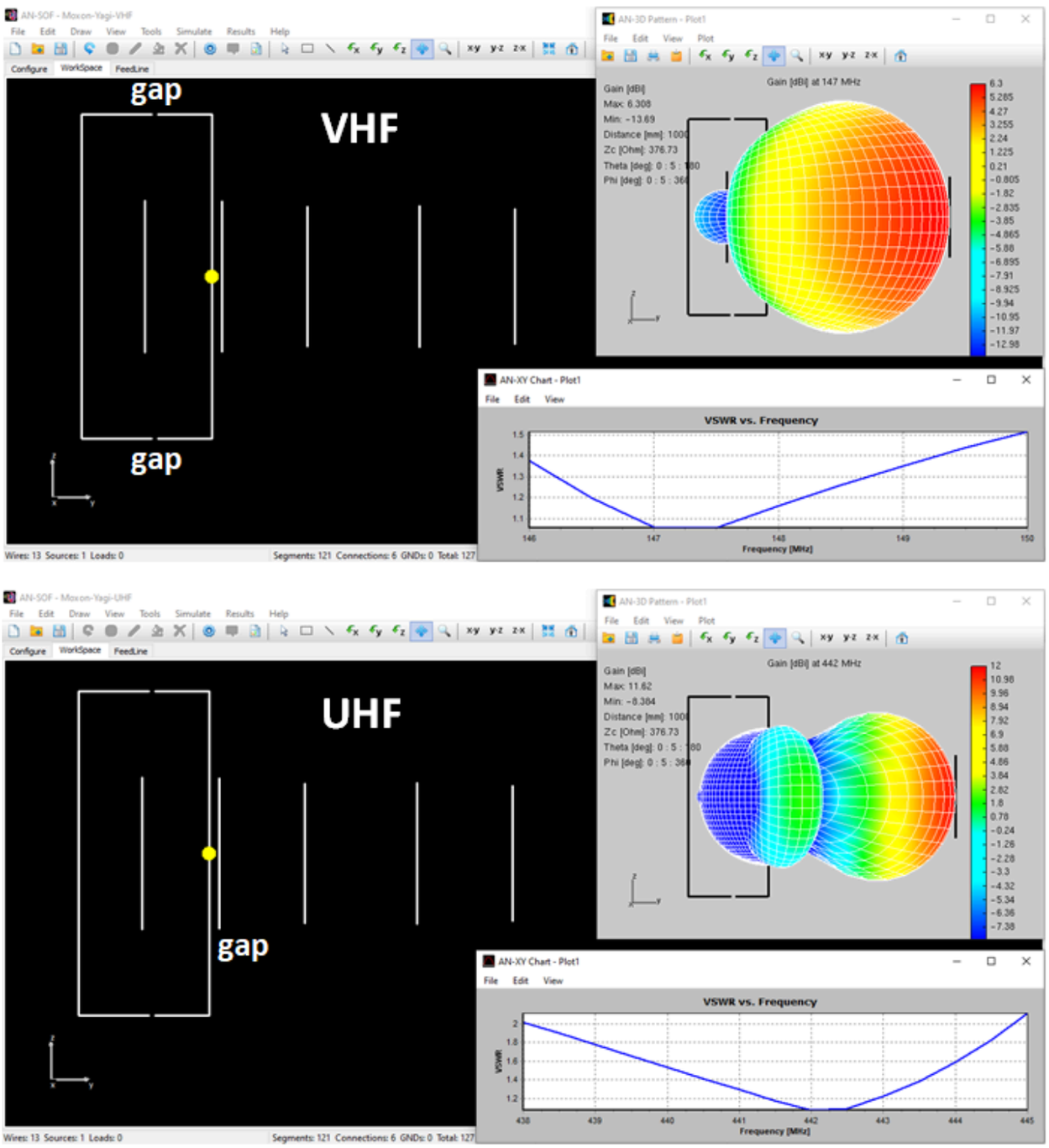
In the analyzed frequency ranges, this VHF/UHF dual-band antenna exhibits **self-resonance with an input impedance close to 50 Ohms,** eliminating the need for a matching network. To optimize performance in each band, **fine-tune the gaps** as indicated in the figure below.

Additionally, the figure provides VSWR curves as a function of frequency. In the upper section, it shows the antenna resonating at 147 MHz, while in the lower section, it

resonates at 442 MHz. The figure also presents radiation patterns for both frequency bands, with gains of 6.3 dBi at VHF and 12 dBi at UHF.

Detailed AN-SOF models, along with antenna dimensions and calculations, are available for download through the buttons located below the figure.

We hope the available models serve as a valuable resource for ham radio enthusiasts interested in constructing this antenna to explore satellite link communication in real-world settings.



Moxon-Yagi Dual Band VHF/UHF Satellite Antenna. Upper part displays the VHF band results with antenna structure, VSWR, and radiation pattern. Lower part showcases UHF band results.

Download Model with VHF Results

Download Model with UHF Results

See Also:

- **Enhancing VHF Performance: The Dual Reflector Moxon Antenna for 145 MHz**

About the Author

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ANTENNA SIMULATION ENGINEER & PHYSICS PH.D. With over 25 years of experience in Computational Electromagnetics, I'm a dedicated researcher specializing in antenna modeling and design. As the founder of Golden Engineering LLC, I develop intuitive yet powerful simulation tools to help RF engineers optimize designs, educators demonstrate concepts, and hobbyists bring antenna projects to life.

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