



# EFFICIENT WIDE BAND VHF ANTENNA PERFORMANCE ADVANTAGE

Key Words: LMR, P25, Public Safety, VHF, Wide Band, Impedance Matching, Interoperability

VHF radio technologies continue to evolve while enhancing traditional system performance through various means of digital, software defined radio implementations, presenting themselves in various formats within DMR, Public Safety P25 platforms and other Land Mobile Radio applications.

With these advancements, the demand for efficient VHF antenna performance continues to remain strong and has recently been fueled by FCC narrow-banding policies and increasing requirements for P25 interoperability. System operators are finding new challenges to maintain and extend their territorial coverages with reduced receiver sensitivity in conjunction with multi-banding initiatives to meet statewide interoperability standards. These challenges include increased bandwidth requirements for multi-region states implementing statewide communication coverage. The need for efficient wide band antennas is prevalent and will continue to develop, meeting the growing demands of their system specifications.

To address these challenges, E/M Wave, Inc. has recently introduced the EMFLX-M10008-WB antenna. The antenna is characterized by its iconic, low profile all black chrome finish, incorporating the industry’s most successful impact spring technology, **e/m-Flex™**. Aside from its low visibility and high strength polymer mechanical integrity, the EMFLX-M10008-WB is designed specifically for efficient RF performance, incorporating classical broad band impedance matching techniques, resulting in low loss, highly efficient quarter-wave antenna performance. The broad band impedance design utilizes high Q passive components, integrated within a high performance RF printed circuit board. These components augment an efficient wide band antenna, operating with traditional quarter-wave directivity and gain, while handling up to 150W of input power.

The design optimization specifically targets wide band VHF performance for the 144-174 MHz range. This selected range permits wide band operation exceeding traditional quarter-wave antennas by as much as 50%, performing with low VSWR and efficient gain for most applications in the LMR/Public Safety markets. The operating bandwidth is chosen to coincide with the largest segment of the Public Safety/LMR market, while maintaining efficient RF power transfer. The design includes optimizing VSWR for key frequency channels and band edges through the entire operating range. These characteristics are advantageous and critical to maintain system performance for efficient mobile radio transmission.

The EMFLX-M10008-WB is designed for ground plane dependent installations and does not require tuning during installation, saving time and expense. Applications include conductive vehicle surface mounts for P25 interoperability, system channel expansions and quite simply offers the advantage of a single antenna purchased to operate instantaneously within the 144-174 MHz range, without tuning. Finally, when considering and comparing stated RF specifications, one must clearly understand the importance of VSWR, specifically the VSWR measurement method employed to characterize the performance. The EMFLX-M10008-WB VSWR, displayed in Figure 1, is specified at the antenna input, and does not rely on lengthy cable, masking the actual input VSWR with added insertion loss to define the antenna’s VSWR specification. Appropriately specified, a high quality design includes optimized impedance matching, proper selection of materials and a radiating aperture size to provide an antenna system delivering maximum power transfer for the mobile radio. These characteristics are integral to the EMFLX-M10008-WB Wide Band Antenna.

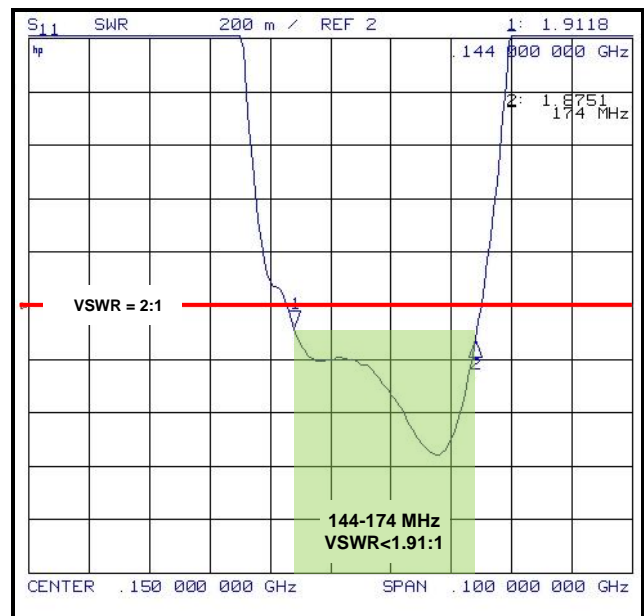


Figure 1. EMFLX-M10008-WB Antenna Input VSWR