

Title Analysis of frequency sensitivity of the unified grain moisture algorithm
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Abstract

The purposes of this research were: 1) to reconfirm the use of 149 MHz as the appropriate measurement frequency for the Unified Grain Moisture Algorithm, 2) to assess what moisture measurement errors might result from a manufacturer choosing a frequency other than 149 MHz, and 3) to estimate the frequency accuracy and stability needed for moisture meters to be compatible with the Unified Grain Moisture Algorithm. Dielectric data for over 6,000 grain samples were used to simulate the effects of different measurement frequencies. Programs were written to re-optimize all parameters so that the relative performance at different measurement frequencies could be thoroughly evaluated. The results reconfirmed the original choice of approximately 149 MHz as a desirable measurement frequency. With limited re-optimization efforts, other measurement frequencies within several megahertz of 149 MHz could be used with little or no performance penalty. Measurement frequency error (ambiguity) caused much larger moisture measurement errors than intentional changes with appropriate parameter adjustments. The frequency accuracy and stability for instruments based on the Unified Grain Moisture Algorithm should be better than +/- 0.1 MHz to have negligible effects on moisture measurement accuracy.