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Calibration of wideband systems, need for a standard

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Although wide band sonar system are becoming more and more popular, there is no unified standard method for their calibration. Most of the wideband systems are calibrated at multiple frequencies using single frequency methods. Although such calibrations give correct figures, these figures do not correspond to the real use of the systems and do not display properly the problems encountered while using such systems such as signal deformation due to the directivity pattern. For instance, the zeroes of directivity patterns that correspond to destructive interference at one frequency are spatially smeared even for a band of 10% and appear as spectral variations. We will show two examples of such calibration with increasing difficulty. The first case considers a wideband sounder covering two octaves (20-80 kHz) and the second one a parametric array (primaries around 100 kHz and parametric generation from 10 to 20 kHz). In the second case, the difficulty is increased due to the factor of about ten between the primary and the secondary frequencies that are also associated to important level difference (about 40 dB). It requires a high linearity constraint of the whole calibration chain.