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**High Performance Ultrasound Arrays Assessment Through In Vitro Imaging Performance**

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Probes are well-known to be a capital element for ultrasound image quality. During design, many parameters can be tuned on the acoustic stack to optimise the electrical, electro-acoustical and acoustical performance measurements. But the effects on image quality of these performances are not so well identified. To overcome such a limitation, we developed a quantitative method for image quality assessment. A set of algorithms was developed to assess in vitro images. The goal of this investigation is to link the electro-acoustical, acoustical performances and transducer parameters to the imaging performance.

Ultrasound test objects were used to quantify the ultrasound images. The acquisition was carried out on a commercial scanner and imaging parameters were set constant in order to benchmark the probes in the same environment. From B-mode images, key parameters such as axial & lateral resolutions, contrast, statistic or metric parameters and signal to noise ratio are established.

Data from transducers, exhibiting different trade-offs on their performances (Bandwidth, Bandwidth shape, Center frequency, Elementary directivity) were characterized. Using the algorithms developed, all identified image properties were analysed with regard to these performances. The impact of each electro-acoustical parameter on image quality have been identified and discussed.