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Original Paper

Minimizing the Effects of Reflections by Using a Virtual Pulse Method, for Free-Field Reciprocity Calibration

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Abstract
The National Metrology Institute of Japan has developed a free-field reciprocity calibration system for type WS3 microphones as acoustic standards in the airborne ultrasonic range between 20 and 100 kHz, because numerous instruments radiate airborne ultrasound. Precise calibration of these microphones requires minimizing the influence of sound reflected from the objects such as absorbing wedges and supporting rods within the acoustic chamber. To minimize this influence, we applied the virtual pulse method, which is a signal processing technique used in the audible frequency to airborne ultrasonic range. Experimental and analytical results validated this method. Use of this method in the calibration of type WS3 microphones will decrease the calibration uncertainty in the free-field sensitivity level.

Keywords
Sound reflection – Free-field calibration – Airborne ultrasound – Virtual pulse method – Type WS3 microphone