The scattering matrix which relates travelling waves amplitudes as state variables has been shown to be more attractive than transfer or mobility matrices since it reflects the fundamental duct nature: it gives a more complete description of the transmission, reflection and conversion properties of the duct. In the University of Technology of Compiègne, an experimental procedure was developed to measure this matrix: a p-p probe mounted on a set up designed during DUCAT project is used to measure pressures at two cross sections on the both side of the test lined duct, then by using a modal decomposition and separation techniques, the scattering matrix is deduced.

In this paper, a method to measure the multimodal scattering matrix based on the use of a p-v probe getting simultaneously the acoustic pressure and velocity at one section on the both side of the test duct is developed. A comparison of some acoustics values (scattering matrix coefficients, acoustic powers...) of a hard wall duct straight duct obtained by each technique with the theory is presented to evaluate its advantages and limitations.