



**Name of the Technology: Improved Variable Frequency Ultrasonic Interferometer for Velocity and Attenuation Measurement in liquids.**

**Summary:** Ultrasonic interferometer is highly versatile device used for liquid characterization. Commercially available interferometers provide measurement of ultrasonic propagation velocity only. However, ultrasonic velocity and attenuation both are useful to study various other derived chemical and physical parameter. Recently CSIR- National Physical Laboratory, India has indigenously developed an improved version of interferometer. The system developed has facility to measure the propagation velocity by sweeping the frequency. The system provides special provision for propagation velocity measurement at harmonics. The technology is improved in many aspects in order to facilitate ultrasonic attenuation measurement which is currently not available in the commercial interferometers. The system has novelties and unique design for which a patent has been filed as a CSIR technology. It has software based frequency control capability. Sensitivity adjustment range for high attenuating to low attenuation liquids. The technology is ready for its commercialization with the help of interested industry.

**Product specifications:**

- It consists of DDS based variable frequency excitation system.
- Excitation frequency range 1 to 30 MHz and low excitation voltage
- Wide sensitivity control on the front panel, high gain adjustment,
- LCD for frequency display and analog meter for easy node and anti-node identification.
- Ultra fine frequency adjustment /control with 1Hz step (selectable steps in multiple of 10).

**Applications:**

Ultrasonic dispersion study, adiabatic compressibility and thermo-acoustic parameters of liquids; Pharmaceutical industries; Test liquid quality for food and ingredients in food industry; Research in colleges, universities of physics and chemistry faculty; Study of chemical and physical parameter like solvation number, Wada constant, intermolecular free path length etc; Used in industry to detect the purity and uniformity of liquids; Study of nano-fluids.





### Advantages over existing ultrasonic interferometer:

Attenuation measurement facility added which is not present in the commercially available instrument; Generation of RF signal based on Direct Digital Synthesis (DDS) technology; Compatible with existing commercial liquid cells; Measurement of parameters at harmonic frequencies; Low cost solid-state electronic circuit design for the excitation and detection of ultrasound; Provision to count number of maxima and minima; Low excitation voltage produces negligible heat in the liquid sample.

**Related Patent:** Patent Filed **No. 201711036499**; **Country:** INDIA; **Publication** Date: Yet Not Published; **Grant Date:** Under Process; **Year of Introduction:** 2017

**Broad Area/Category:** Electronics & Instrumentation

| Idea | Concept Definition | Proof of Concept | Prototype | Lab Validation | Technology Development | Technology Demonstration | Technology Integrated | Market Launch |
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### User Industries:

- 1) The educational institutions and research laboratories of relevant field.
- 2) Chemical Industry for the study of suitable chemicals
- 3) Pharmaceutical for the detection of mixing proportionality.
- 4) Adulteration detection related organizations