

## Accepted Manuscript

The influence of viscous and conducting liquid on the characteristics of the slot acoustic wave

I.A. Borodina, B.D. Zaitsev, A.A. Teplykh

PII: S0041-624X(17)30454-7  
DOI: <http://dx.doi.org/10.1016/j.ultras.2017.07.011>  
Reference: ULTRAS 5584

To appear in: *Ultrasonics*

Received Date: 19 May 2017  
Revised Date: 13 July 2017  
Accepted Date: 17 July 2017

Please cite this article as: I.A. Borodina, B.D. Zaitsev, A.A. Teplykh, The influence of viscous and conducting liquid on the characteristics of the slot acoustic wave, *Ultrasonics* (2017), doi: <http://dx.doi.org/10.1016/j.ultras.2017.07.011>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



The influence of viscous and conducting liquid on the characteristics of the slot acoustic wave

I. A. Borodina<sup>1</sup>, B.D. Zaitsev<sup>1</sup>, A.A. Teplykh<sup>1</sup>

<sup>1</sup>Kotel'nikov Institute of Radio Engineering and Electronics of RAS, Saratov Branch, Saratov,

410019, Russia

e-mail: [borodinaia@yandex.ru](mailto:borodinaia@yandex.ru)

**Abstract:** The influence of the liquid with the different values of conductivity, permittivity, and viscosity on the characteristics of the slot mode in the structure consisting of delay line with propagating shear – horizontal acoustic wave of zero order ( $SH_0$ ) and upper piezoelectric plate separated by the air gap was experimentally investigated. The delay line made of the Y-X lithium niobate plate 0.2 mm thick contained two interdigital transducers for the excitation and reception of acoustic wave in the frequency range of 2.6 – 3.8 MHz. The upper plate represented the 0.5 mm thick plate of Z-X lithium niobate. The excitation of the slot mode led to the appearance of the sharp resonant peaks on the frequency dependencies of insertion loss and phase of the output signal. It has been found that the depth and frequency of these peaks depend on the parameters of liquid contacting with the upper plate. The possibility of the use of the slot mode in the pointed structure for the identification of liquids with the different values of the conductivity, viscosity, and permittivity was shown. The qualitative explanations of the obtained experimental results are presented.

**Keywords:** Slot mode, piezoelectric plate, shear – horizontal acoustic wave of zero order, resonant peaks on the frequency dependency of insertion loss, viscosity, conductivity, and permittivity of liquid.

**Contact author:** Irina A. Borodina, Zelyonaya str., 38, Kotel'nikov Institute of Radio

Engineering and Electronics of RAS, Saratov Branch, Saratov, 410019, Russia

Fax: +7-8452-27-24-01

Download English Version:

<https://daneshyari.com/en/article/5485256>

Download Persian Version:

<https://daneshyari.com/article/5485256>

[Daneshyari.com](https://daneshyari.com)