

**EUROMET PROJECT  
PROGRESS/FINAL REPORT\*)**

1. Ref. No.: 736	2. Subject Field: Acoustics																																													
3. Type of collaboration: Cooperation																																														
4A. Partners: UME, PTB (institutions)		4B. CEC funded? No																																												
5. Participating countries: Turkey, Germany																																														
6. Title: Bilateral comparison of ultrasonic power standards																																														
<p>7. Progress:</p> <p>The bilateral comparison of ultrasonic power standards was carried out between UME and PTB. LiNbO<sub>3</sub> crystal based transducers, which were fabricated at UME, were used as transfer standards. Radiation conductance (<math>G</math>) values of two ultrasonic transducers were determined for 4 frequency-power combinations. Results declared by the partners are following:</p> <p style="text-align: center;">Table of results</p> <table border="1" style="margin: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">No</th><th rowspan="2">Transducer</th><th rowspan="2">Frequency, MHz</th><th rowspan="2">Power, W</th><th colspan="2">UME</th><th colspan="2">PTB</th></tr> <tr> <th><math>G</math>, mS</th><th><math>u_i \cdot 10^{-2}</math></th><th><math>G</math>, mS</th><th><math>u_i \cdot 10^{-2}</math></th></tr> </thead> <tbody> <tr> <td>1</td><td>UME-LNB1M</td><td>0.9322</td><td>0.1</td><td>0.905</td><td>5.0</td><td>0.905</td><td>3.0</td></tr> <tr> <td>2</td><td>UME-LNB1M</td><td>0.9322</td><td>1.0</td><td>0.879</td><td>4.6</td><td>0.905</td><td>3.0</td></tr> <tr> <td>3</td><td>UME-LNB1M</td><td>3.1423</td><td>0.1</td><td>1.119</td><td>5.0</td><td>1.166</td><td>2.9</td></tr> <tr> <td>4</td><td>UME-LNB5M</td><td>4.6720</td><td>0.1</td><td>23.24</td><td>6.0</td><td>25.59</td><td>3.2</td></tr> </tbody> </table> <p>Uncertainties, <math>u_i</math>, shown in table of results are expanded uncertainties at confidence level of 95%.</p> <p>Based on these results, reference value of comparison, the degrees of equivalence of each laboratory with respect to the reference value and degrees of equivalence between two institutes were calculated for 3 combinations. Result of comparison shows that, UME's newly established standard is in reasonably good agreement with PTB's standard.</p> <p>Difference at the order of 10% in radiation conductance values of UME-LNB5M transducer (frequency 4.6720 MHz, power level 0.1 W) was achieved in 4th combination. This difference is originating from the possible systematic error in effective voltage measurements performed by UME. Obtained results are planned to use as an evidence for supporting of UME's CMC entries to be submitted for review.</p> <p><b>Detailed technical information related to the comparison is available in internal UME technical report 2003-ASL-001. Report can be obtained upon request from project coordinator.</b></p>			No	Transducer	Frequency, MHz	Power, W	UME		PTB		$G$ , mS	$u_i \cdot 10^{-2}$	$G$ , mS	$u_i \cdot 10^{-2}$	1	UME-LNB1M	0.9322	0.1	0.905	5.0	0.905	3.0	2	UME-LNB1M	0.9322	1.0	0.879	4.6	0.905	3.0	3	UME-LNB1M	3.1423	0.1	1.119	5.0	1.166	2.9	4	UME-LNB5M	4.6720	0.1	23.24	6.0	25.59	3.2
No	Transducer	Frequency, MHz					Power, W	UME		PTB																																				
			$G$ , mS	$u_i \cdot 10^{-2}$	$G$ , mS	$u_i \cdot 10^{-2}$																																								
1	UME-LNB1M	0.9322	0.1	0.905	5.0	0.905	3.0																																							
2	UME-LNB1M	0.9322	1.0	0.879	4.6	0.905	3.0																																							
3	UME-LNB1M	3.1423	0.1	1.119	5.0	1.166	2.9																																							
4	UME-LNB5M	4.6720	0.1	23.24	6.0	25.59	3.2																																							
<p>8. Coordinator's name: Baki Karaböce</p> <p>Address: TÜBİTAK UME Anibal Cad. MAM Kampüsü Beşevler, 41470, Gebze Kocaeli TURKEY</p> <p>Telephone: +90 262 679 50 00      Telefax: +90 262 679 50 01 E-mail: baki.karaboce@ume.tubitak.gov.tr</p>																																														
9. Completion date : 12.12.2003	10. Coordinator's signature:	11. Date: 05.01.2004																																												

*Notes for completion of the form overleaf*

\*) Delete as appropriate