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# D2.5: Final Single Element Transducer for RSOM with Low Noise Amplification

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| PU | Public | x |
| PP | Restricted to other programme participants (including the Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

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## Table of Content

## 1) Purpose of this document

This document reports the development, manufacturing and evaluation of the final single element ultrasound transducer for Raster Scan Optoacoustic Mesoscopy (RSOM) including low noise preamplification.

## 2) Requirements

The requirements for the acoustic characteristics of the transducer were defined by iThera in terms of central frequency, relative bandwidth, and focal length. The transducer must also include low-noise preamplification.

## 3) Description of the transducer


**Figure 1: The manufactured detector in its latter version.**

The transducer was chosen among a series of transducers which were developed within the project with various design options, on the basis of their acoustic characteristics. The selected design was achieved based on exchanges between SONAXIS, TUM and iThera and various concurrent designs. It is made of:

- An active element made of a LiNbO3 crystal and an acoustic lens with large numerical aperture.
- A connector for coaxial electrical connection.
- A +30dB preamplifier. The input and output are connected, respectively, to the active element and to the SMA connector.
- A casing containing all the elements. The design was optimized to fit in the imaging system.

## 4) Performance of the transducer

The performance of the transducer was evaluated by SONAXIS, TUM and iThera. Figure 2 shows a reconstructed image from in-vivo measurement of human skin.

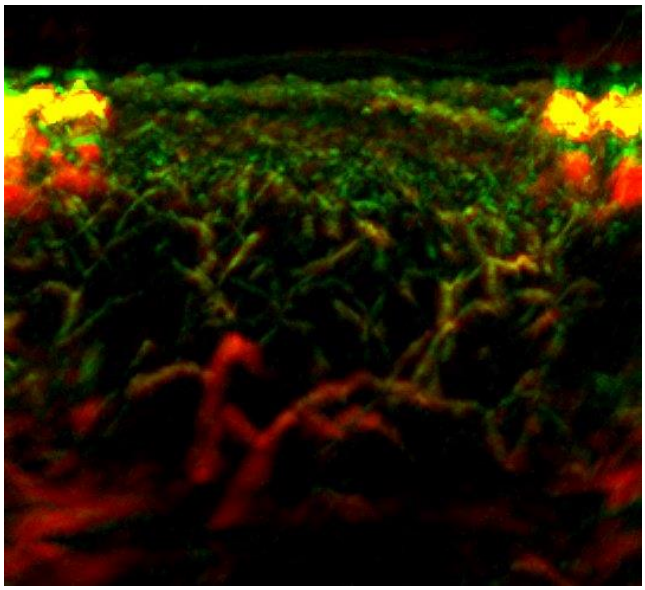

**Figure 2: In vivo imaging of human skin, reconstructed image.**

## 5) Conclusion

A high frequency, high numerical aperture probe using LiNbO3 and focusing with an acoustic lens was developed and manufactured by SONAXIS. The probe was characterized by SONAXIS, TUM and iThera. It satisfies all the requirements.

The deliverable is complete.