Title: Scanning Acoustic Microscopy: Test flow and procedures for the assessment of delamination flaws and historical results review.

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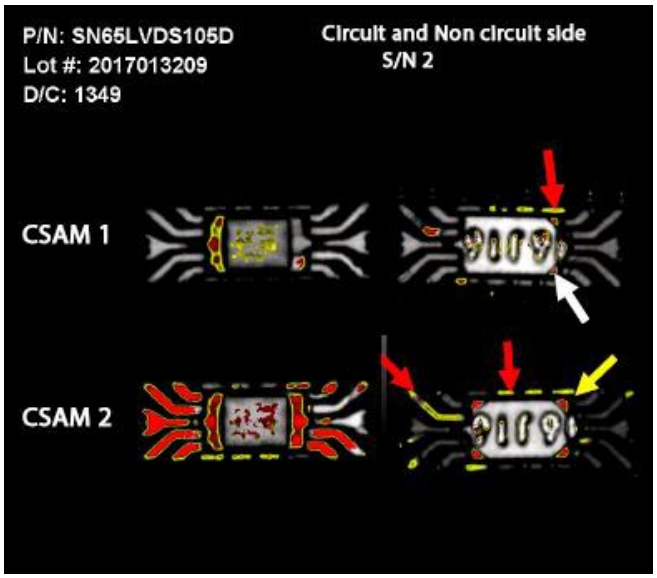
Nowadays scanning acoustic microscopy (SAM) is extensively used in the non-destructive inspection of microelectronic devices and is present in different space verification programs; particularly for plastic-encapsulated electronic components. This is so due to the ability to image the internal morphology, location, size and distribution of hidden features including different types of flaws. Therefore, it has high prospects to be one of the key inspection tools for reliability assessment and screening of novel 3D assemblies including buried technologies, as well as new lead-free soldering solutions.

Both industrial and space standards such as IPC/JEDEC J-STD-020E and ESCC 25200 state rejection criteria for SAM inspection, or the bases to perform additional verification tests. The strict rejection of any delamination flaw detected by SAM would lead to unnecessary high rejection ratios due the high sensitivity of the technique to horizontal features. Hence, these specifications put the focus on the potential effect of the delamination over the system functionality, which is a sometimes-subjective concept subjected to interpretation. In addition, ESCC specification also indicates that SAM inspection must be combined with stress tests, but it does not specify the type and intensity of the treatment. Thus, additional studies are required to state more clear procedures and rejection criteria in order to address the already present COTS revolution.

In this context, the present communion aims to shed light on this subject and to share with audience the detailed **verification procedures and rejection criteria proposed by ALTER TECHNOLOGY**. In agreement with both ESCC and IPC/JEDEC specifications this approach combines **accurate SAM inspections** and well-defined **thermomechanical stress tests (including thermal cycling**). Furthermore, the proposed methodology also makes use of **high magnification electron microscopy** and **functional** and **mechanical tests** to verify the actual conditions and reliability of those specimens displaying internal flaws. The approach is supported by the large experience on EEE inspection involving 6 different acoustic microscopes for more than 30 years. Thus, we will also present and analyse an historical review of our SAM results compiled on different types of plastic-encapsulated systems from different manufactures.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