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Our ref. ESA-TECMSP-LE-004699

Noordwijk, 17/03/2017

VISA: T Ghidini (TEC-MSP)

Subject: Qualification Status of PCB manufacturer TESAT

Dear Mr Fuggmann,

TESAT submitted to ESA a sample for qualification renewal in Nov 2016 for rigid epoxy PCB technology with SnPb finish and Molybdenum inserts. The evaluation of this sample in accordance with ECSS-Q-ST-70-10C has shown acceptable results as reported in ESA-TECQTM-LAB-RP-3641. ESA conducted a general audit in Mar 2017 with specific attention to the cleanliness improvements at the lay-up process. The acceptable outcome is reported in ESA-TECMSP-MIN-004700.

TESAT performed a delta qualification of rigid PCB technology with ENIPIG finish and Invar layers and the acceptable results are reported in 63.0125.200.73QPR_NiPdAu_line_3. TESAT provided a sample for ESA evaluation in Aug 2016, which also include microvias on signal layers. The evaluation of this sample in accordance with ECSS-Q-ST-70-10C has shown acceptable results as reported in ESA-TECQTM-LAB-RP-2722. TESAT issued a separate PID for this technology, which has been approved by ESA. An audit of the ENIPIG process was conducted for Metop-SG project together with the customer chain. The audit closure is reported in MOS-GEN-TE-MOM-0019-B.

The bare PCB qualification, in particular for the ENIPIG PCB with Invar, does not include assembly verification on this specific surface finish and PCB technology.

TESAT is considered qualified by ESA in accordance with ECSS-Q-ST-70-10C for the manufacture of rigid sequential epoxy PCBs in accordance with the following PIDs:

> 63.1500.570.21PID_PbSn PCB issue F **until 1 April 2019**, which includes SnPb finish, Molybdenum inserts and microvias

> 63.1500.570.41PID_NiPdAu PCB issue F **until 1 April 2018**, which includes ENIPIG finish, Invar layers and microvias

Best regards,

Stan Heltzel
Materials & Processes Section