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PCN12992 ST MUAR – Qualification of ARTEAC Flow for Selected STM8A Products

Qualification Plan

05-Oct-2021

MCD Operations & Quality

Introduction

Description of Changes / Context

- Scope: selected automotive commercial products STM8A (see the full list of impacted products in PCN document)
- The proposed change is linked to production steps of final test (FT) and quality acceptance test (QA test - sometimes also called quality control or QC test) within the test and finishing flow.
- As of today, automotive products are, after assembly, subjected first to FT tests and after that to QC test
 - Most of the sales types have one FT at HOT and one FT at COLD. Some sales types have FT at AMBIENT as an additional final test step.
 - Quality acceptance test QC is performed once, typically at the end of test flow.
- The basic idea of the change is to replace QC test by so called ARTEAC test (Automated Real Time Electrical and Audit Control) keeping the same test coverage and same lot quality acceptance criteria.
- ARTEAC flow contains at least the same test instances as the existing QC flow (same or larger test coverage compared to QC).
- ARTEAC execution: During the lot final test there is a real time sampling (regular intervals following an algorithm) and the selected units – after passing the FT test - will be subjected to ARTEAC flow, without any disconnection.
- Advantage is that the ARTEAC sampled unit should not be twice contacted (ARTEAC flow executed immediately after the unit passed FT flow) and no loading of QC test is required after FT test, thus reducing quality risk induced by QC handling.
- There is no loss of test coverage or other product quality concern because ARTEAC is simultaneously done at the very last FT step within the test flow.



ARTEAC Flow – Initial Verifications

- Initial verifications check correct behaviour of ARTEAC test solution prior full qualification
- The ARTEAC test solution in ST_MUAR is already used in mass production of non-automotive STM8 and other ST automotive products
- The verifications are to be done using a limited number of the impacted automotive finished goods (based on dice 79A and 79B) and using the T2000 test programs of interest (ST79A_T2KFT, ST79B_T2KFT)

Verification	Criteria	Comment
Verification of test Automation vs. ARTEAC	Correct generation of XML file including ARTEAC status, Quantity In, ARTEAC sampling size	Check of ARTEAC test solution
Site test result verification tester vs. handler	Matching of test result – site to site – between tester and handler, including ARTEAC FAIL/PASS units	
Verification of binning and sorting of ARTEAC units	Correct binning and physical sorting of ARTEAC_GOOD and ARTEAC_FAIL units to intended tray	ARTEAC_GOOD units should fall into bin HB1, ARTEAC_FAIL units should fall into bin HB2

ARTEAC Flow Qualification

- At least 500 FT rejects per test temperature will be collected and prepared for this trial.
- The units are tested first with QC and after that with ARTEAC flow.
- Criteria: All QC fails must be detected as ARTEAC fails too.

Test Program Quality Validation with FT_HOT Rejects

Order / Test Stage	Criteria
1. QC Test Program	All QC fails must be detected as ARTEAC fails
2. ARTEAC Flow	

Test Program Quality Validation with FT_COLD Rejects

Order / Test Stage	Criteria
1. QC Test Program	All QC fails must be detected as ARTEAC fails
2. ARTEAC Flow	

Test Program Quality Validation with FT_AMBIENT Rejects

Order / Test Stage	Criteria
1. QC Test Program	All QC fails must be detected as ARTEAC fails
2. ARTEAC Flow	

ARTEAC Flow Qualification Using Production Lot

- One production lot of at least 2000 units are used for this trial.
- The selected sales type should have 3 FT stages (HOT, COLD, AMBIENT) in its test and finishing flow.
- The BIN1 units that passed FT or FT+ARTEAC flow should also come out as BIN1 on the next corresponding 100% QC step (normal QC production test program). It is valid for all 3 possible FT temperatures: HOT, COLD, AMBIENT.
- Remark: In production ARTEAC is simultaneously done only at the very last FT step within the test flow.

Order / Test Stage	Criteria	Comment
1. FT_HOT + ARTEAC	No ARTEAC fail	
2. 100% QC_HOT	No fail	All BIN1 (PASS) units from previous step 1 used
3. Bake 48 h		Standard production step
4. FT_COLD + ARTEAC	No ARTEAC fail	
5. 100% QC_COLD	No fail	All BIN1 (PASS) units from previous step 4 used
6. FT_AMB + ARTEAC	No ARTEAC fail	
7. 100% QC_AMB	No fail	All BIN1 (PASS) units from previous step 6 used

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