# PRODUCT / PROCESS CHANGE INFORMATION

| 1. PCI basic data | | |
|---|---|---|
| 1.1 Company |  | STMicroelectronics International N.V |
| 1.2 PCI No. | | AMS/21/12940 |
| 1.3 Title of PCI | | Change of EWS test platform from C372 to DOT 100 on the selected products. |
| 1.4 Product Category | | See Products List |
| 1.5 Issue date | | 2021-07-27 |

| 2. PCI Team | |
|---|---|
| 2.1 Contact supplier | |
| 2.1.1 Name | ROBERTSON HEATHER |
| 2.1.2 Phone | +1 8475853058 |
| 2.1.3 Email | heather.robertson@st.com |
| 2.2 Change responsibility | |
| 2.2.1 Product Manager | Andrea Mario ONETTI |
| 2.1.2 Marketing Manager | Simone FERRI |
| 2.1.3 Quality Manager | Michele CALDERONI |

| 3. Change | | |
|---|---|---|
| 3.1 Category | 3.2 Type of change | 3.3 Manufacturing Location |
| Equipment (EWS-FT) | Tester or prober duplication : qualification of a new equipment, which type (brand, and/or model, and/or options) already exists and is used on same application | CATANIA |

| 4. Description of change | | |
|---|---|---|
| | Old | New |
| 4.1 Description | EWS test platform: SPEA C372. | EWS test platform: SPEA DOT 100. |
| 4.2 Anticipated Impact on form,fit, function, quality, reliability or processability? | NO IMPACT | |

| 5. Reason / motivation for change | |
|---|---|
| 5.1 Motivation | C372 are old models as EWS Test Platform and are no more properly supported by suppliers. |
| 5.2 Customer Benefit | SERVICE CONTINUITY |

| 6. Marking of parts / traceability of change | |
|---|---|
| 6.1 Description | by dedicated FG code |

| 7. Timing / schedule | |
|---|---|
| 7.1 Date of qualification results | 2021-06-25 |
| 7.2 Intended start of delivery | 2021-10-11 |
| 7.3 Qualification sample available? | Upon Request |

| 8. Qualification / Validation | | | |
|---|---|---|---|
| 8.1 Description | 12940 G101463 Wfs 25 Porting summary report.pdf | | |
| 8.2 Qualification report and qualification results | Available (see attachment) | Issue Date | 2021-07-27 |

| 9. Attachments (additional documentations) |
|---|

12940 Public product.pdf
12940 G101463 Wfs  25 Porting summary report.pdf

| 10. Affected parts | | |
|---|---|---|
| 10. 1 Current | | 10.2 New (if applicable) |
| 10.1.1 Customer Part No | 10.1.2 Supplier Part No | 10.1.2 Supplier Part No |
| | ASM330LHHTR | |

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# ASM330LHHTR / KIT330LHHTR

## TPGM ASIC EWS Porting from C372 to DOT

### EWS Porting summary report

Author: Marco Morezzi / Francesco Cicchitano

Approver: Alfio Dimartino

Catania, 25/06/2021

Revision 1.0

# Overview

SPEA C372 are old testers.

They are in production since 1998. SPEA cannot fully guarantee adequate support in case of tester problems.

Due to equipment obsolescence, we will move ASM330LHHTR / KIT330LHHTR ASIC from EWS test platform SPEA C372 to SPEA DOT 100.

SPEA DOT 100 is already used for consumer version of this product since many years

**The following slides are showing that electrical results using the two tester models are equivalent**

# Change Traceability

- Traceability:
  - Same Commercial Product (CP) / Ordering Code will be used
  - New Finished Goods (FG) will be applied on the material produced with the new flow
  - Production transfer planned by week 40 (beginning of october 2021)

| | CURRENT | NEW |
|---|---|---|
| **ST Commercial Product** | ASM330LHHTR | ASM330LHHTR |
| **ST Marking** | No change | No change |
| **ST Finished Good (T&R)** | ASM330LHHTR-M5F/ | ASM330LHHTR-MB5/ |
| **ST Commercial Product** | KIT330LHHTR | KIT330LHHTR |
| **ST Marking** | No change | No change |
| **ST Finished Good (TRAY)** | KIT330LHHTR-M4F/ | KIT330LHHTR-MB5/ |

# 5M1E analysis

| Change | 4M | Control | Remarks |
|---|---|---|---|
| Testing transfer from ST CST to ST MLT | Machine | Tester : C372 from SPEA | Tester DOT100 from SPEA |
| | Man | Same EWS plant (Catania EWS) | No change |
| | Material | Same diffusion material | No change |
| | Measurement | Testing program is transferred from C372 to DOT 100 | No change in testing results |
| | Method | Testing flow is unchanged:<br><br>EWS (amb ) EWS 2 (cold) | No change |
| | Environment | Catania plant is fully qualified for automotive production | No change |

# Qualification plan : correlation wafer

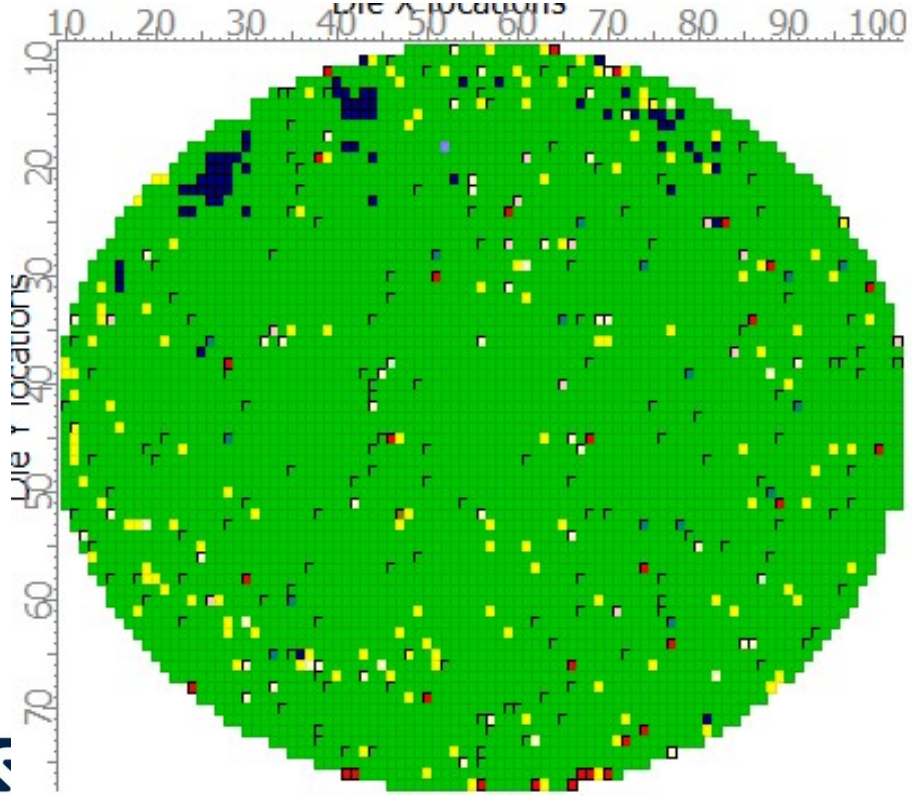
Lot: G101463;
Wf laser marking : 25;
Gross: 5124;
Flow: EWS1 (T amb), EWS2 (T cold  -40°C);
VddMin= 1.71 V, VddCal= 2.5V, VddMax= 3.6 V;
Testing: Wf 25 tested before on DOT  and then on C372
Purpose: to compare the EWS results.

# EWS1

# 25 – EWS1 - Wafer map

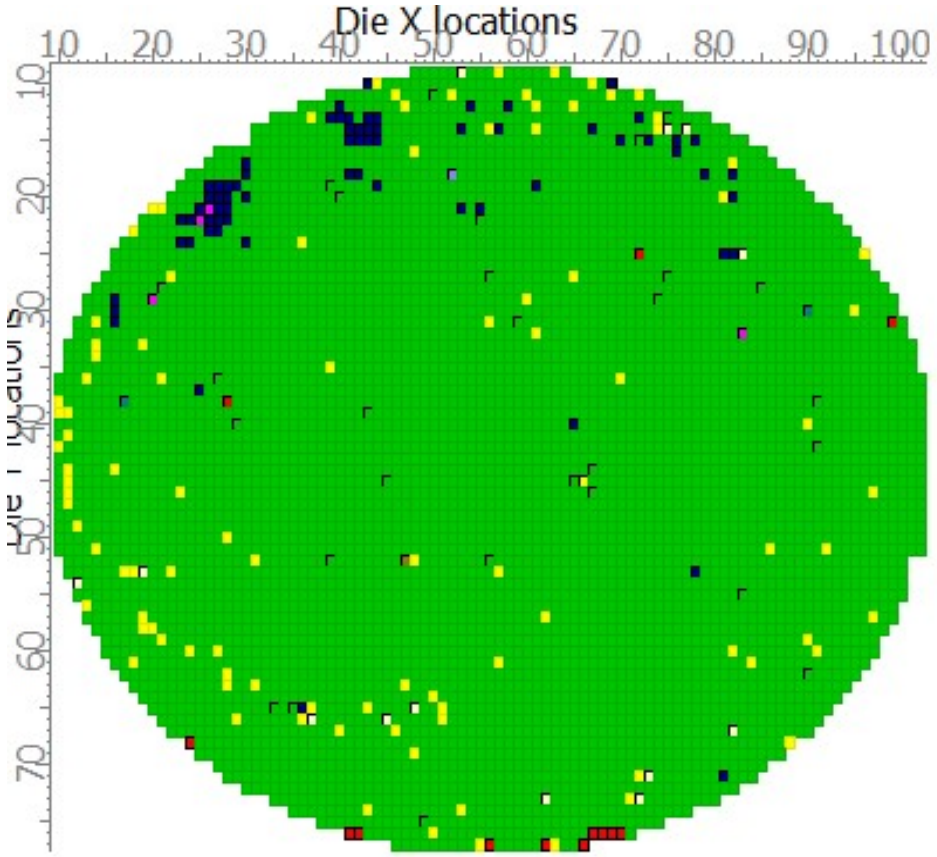
## Group name: C372

| Top 10 Software Binning | 1 Pass | 4 Leakages | 15 FIFO | 18 Supply Current | 3 Ram_Rom | 11 LDO | 12 Otp | 16 EWS_test_GYRO | 17 EWS_test_ACC |
|---|---|---|---|---|---|---|---|---|---|
| Color | | | | | | | | | |
| Pass/Fail | P | F | F | F | F | F | F | F | F |
| Percentage | 93.8% | 2.7% | 1.3% | 0.7% | 0.6% | 0.3% | 0.3% | 0.2% | 0.1% |
| Total count | 4805 | 136 | 69 | 36 | 31 | 16 | 13 | 9 | 4 |




## Group name: DOT

| Top 10 Software Binning | 1 Pass | 4 Leakages | 15 FIFO | 3 Ram_Rom | 17 EWS_test_ACC | 5 Open | 18 Supply Current | 11 LDO | 31 STMC_Ram_Test |
|---|---|---|---|---|---|---|---|---|---|
| Color | | | | | | | | | |
| Pass/Fail | P | F | F | F | F | F | F | F | F |
| Percentage | 96.0% | 2.0% | 1.3% | 0.3% | 0.1% | 0.1% | 0.1% | 0.0% | 0.0% |
| Total count | 4920 | 101 | 69 | 13 | 4 | 4 | 4 | 2 | 2 |

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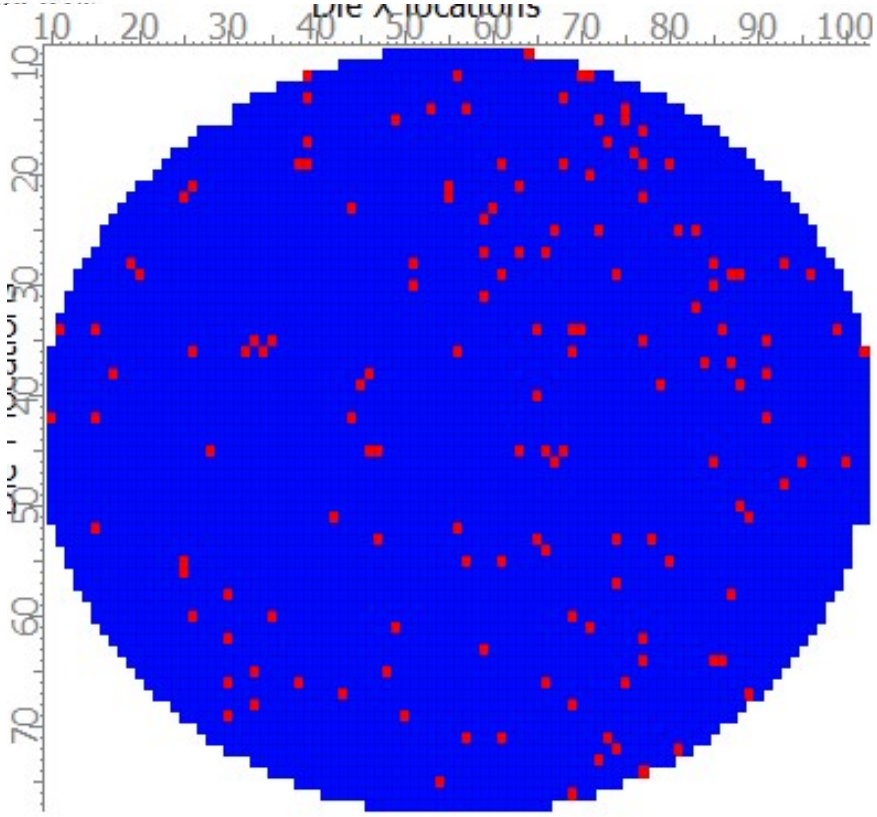
# 25 – EWS1 - Wafer map

## Delta yield summary table

| - | C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 |
|---|---|---|
| Total dies | 5124 | 5124 |
| Total PASS | 4805 | 4920 |
| Yield | 93.77% | 96.02% |
| Mismatch (all): 145 | 2.83% | 2.83% |
| Mismatch (P->F): 8 | 0.16% | 0.16% |
| Mismatch (F->P): 123 | 2.40% | 2.40% |

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# – EWS1 - Pass C372… Fail DOT100

**Delta yield binning pareto: Pass to Fail**

| C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 | Frequency (#) |
|---|---|---|
| 1 | 4 | 1 |
| 1 | 11 | 1 |
| 1 | 18 | 1 |
| 1 | 3 | 1 |
| 1 | 5 | 2 |
| 1 | 15 | 2 |
| Total | - | 8 |

**C372, fail DOT,** 8 dice:

**1- 2** fail Sw Bin 15 (Hw Bin 15) → FIFO
**2-** 2 fail Sw Bin 5 (Hw Bin 5) → Open
**3-** 1 fail Sw Bin 3 (Hw Bin 10) → Ram_Rom
**4-** 1 fail Sw Bin 18 (Hw Bin 19) → Supply current
**5-** 1 fail Sw Bin 11 (Hw Bin 7) → LDO
**6-** 1 fail Sw Bin 4 (Hw Bin 11) → Leakage (with PD pre-calibration)

# WF 25 – EWS1 - Pass DOT100… Fail C372

**Delta yield binning pareto: Fail to Pass**

| C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 | Frequency (#) |
|---|---|---|
| 13 | 1 | 2 |
| 15 | 1 | 6 |
| 16 | 1 | 7 |
| 12 | 1 | 10 |
| 11 | 1 | 14 |
| 3 | 1 | 18 |
| 18 | 1 | 32 |
| 4 | 1 | 34 |
| Total | - | 123 |

**, 123 dicPass DOT, fail C372e:**

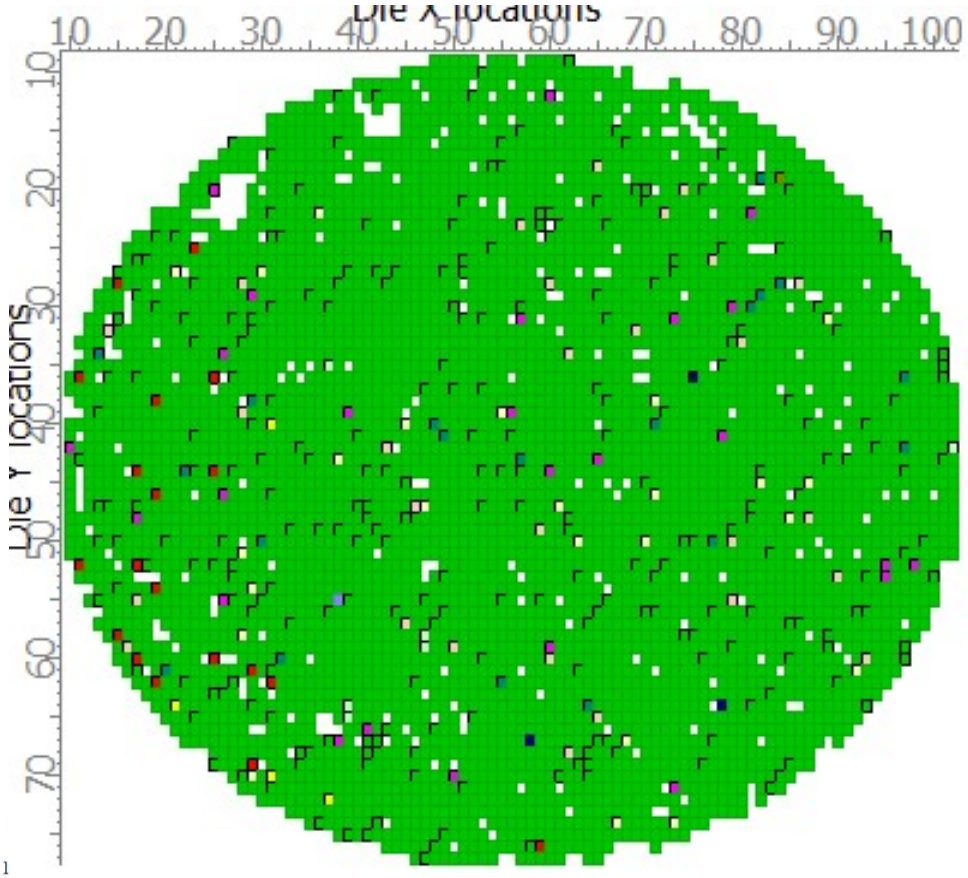
**1- 34** fail Sw Bin 4 (Hw Bin 11) → Leakage (with PD pre-calibration) → **No reprobe of fail dice**
**2-** 32 fail Sw Bin 18 (Hw Bin 19) → Supply Current
**3-** 18 fail Sw Bin 3 (Hw Bin 10) → Ram_Rom
**4-** 14 fail Sw Bin 11 (Hw Bin 7) → LDO
**5-** 10 fail Sw Bin 12 (Hw Bin 14) → OTP
**6-** 7 fail Sw Bin 16 (Hw Bin 17) → EWS test Gyro
**7-** 6 fail Sw Bin 15 (Hw Bin 15) → Fifo
**8-** 2 fail Sw Bin 13 (Hw Bin 9) → Temperature

ALL THESE DIE WERE RETESTED ON C372 AND WERE NOT CONFIRMED FAILURES

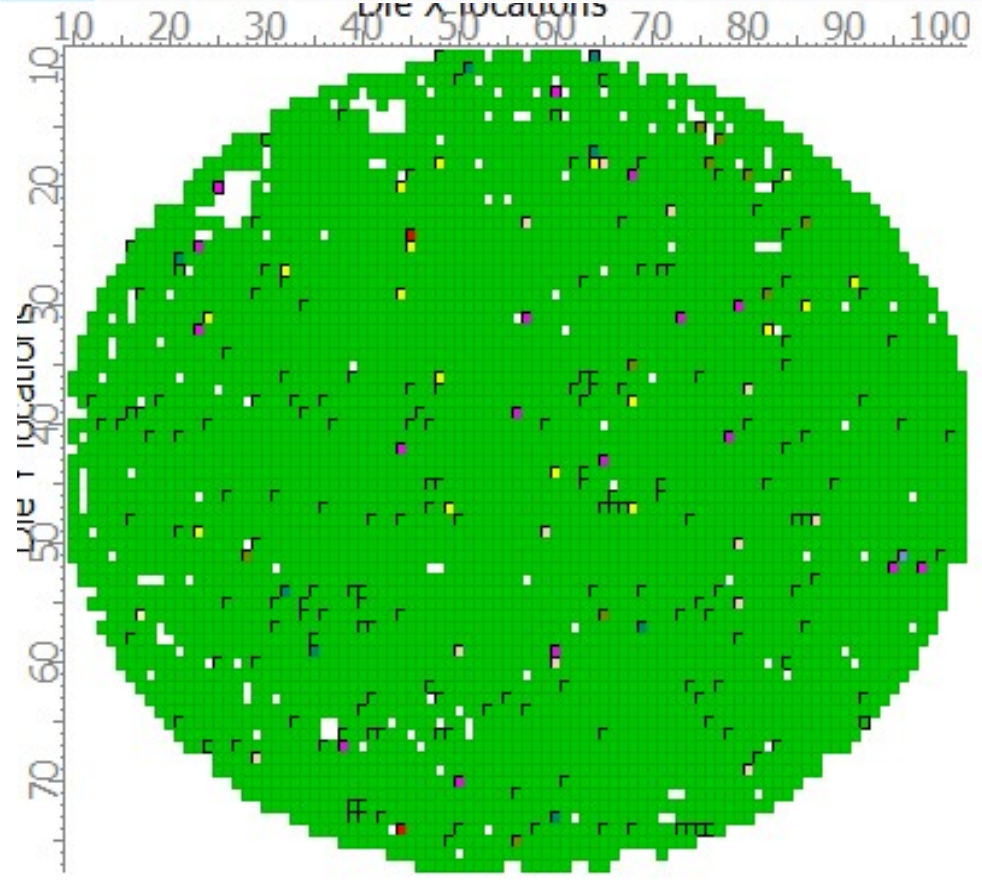
# EWS2

# WF 25 – EWS2 - Wafer map

| Top 10 Software Binning | 1 Pass | 12 Otp | 8 Scan Test | 18 Supply Current | 4 Leakages | 11 LDO | 14 Frequency_trim | 5 Open | 16 EWS_test_GYRO |
|---|---|---|---|---|---|---|---|---|---|
| Color | | | | | | | | | |
| Pass/Fail | P | F | F | F | F | F | F | F | F |
| Percentage | 97.3% | 0.6% | 0.5% | 0.5% | 0.4% | 0.4% | 0.1% | 0.1% | 0.1% |
| Total count | 4675 | 28 | 25 | 24 | 19 | 19 | 6 | 4 | 3 |



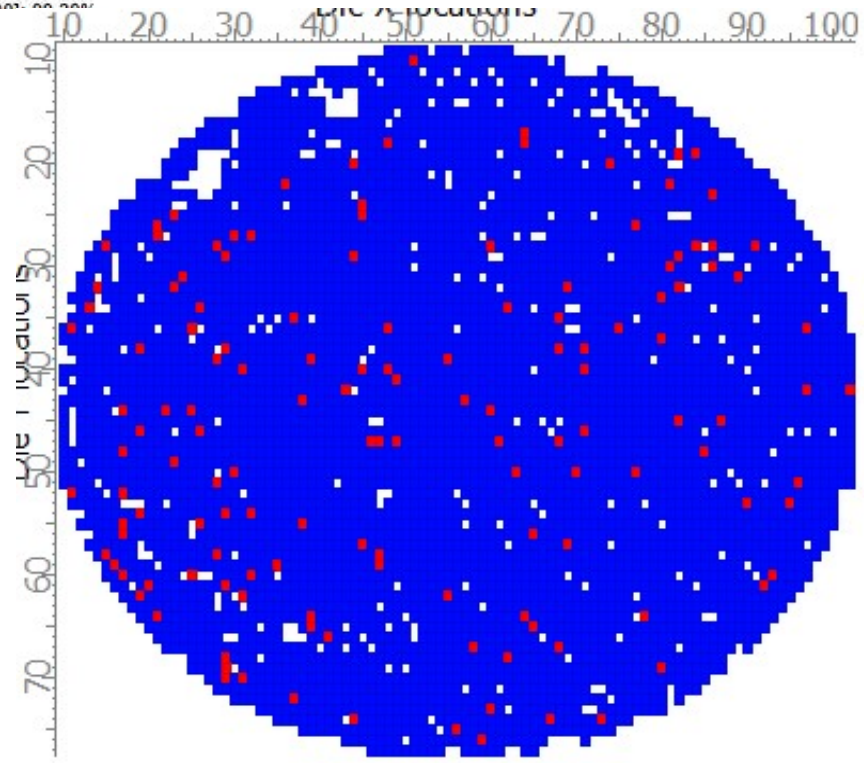

| Top 10 Software Binning | 1 Pass | 8 Scan Test | 5 Open | 12 Otp | 15 FIFO | 11 LDO | 4 Leakages | 18 Supply Current | 17 EWS_test_ACC |
|---|---|---|---|---|---|---|---|---|---|
| Color | | | | | | | | | |
| Pass/Fail | P | F | F | F | F | F | F | F | F |
| Percentage | 98.6% | 0.3% | 0.3% | 0.2% | 0.2% | 0.2% | 0.0% | 0.0% | 0.0% |
| Total count | 4852 | 17 | 16 | 12 | 10 | 8 | 2 | 1 | 1 |



# WF 25 – EWS2 - Summary mismatch

## Delta yield summary table

| - | C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 |
|---|---|---|
| Total dies | 4805 | 4920 |
| Total PASS | 4675 | 4852 |
| Yield | 97.29% | 98.62% |
| Mismatch (all): 140 | 2.91% | 2.85% |
| Mismatch (P->F): 34 | 0.71% | 0.69% |
| Mismatch (F->P): 101 | 2.10% | 2.05% |

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# WF 25 – EWS2 - Pass C372… Fail DOT100

**Delta yield binning pareto: Pass to Fail**

| C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 | Frequency (#) |
|---|---|---|
| 1 | 10 | 1 |
| 1 | 8 | 1 |
| 1 | 17 | 1 |
| 1 | 4 | 2 |
| 1 | 12 | 3 |
| 1 | 15 | 4 |
| 1 | 11 | 7 |
| 1 | 5 | 15 |
| Total | - | 34 |

**Pass C372, fail DOT,** 34 dice:

**1-** 15 fail Sw Bin 5 (Hw Bin 25) → Open
**2-** 7 fail Sw Bin 11 (Hw Bin 27) → LDO
**3-** 4 fail Sw Bin 15 (Hw Bin 35) → FIFO
**4-** 3 fail Sw Bin 12 (Hw Bin 34) → Otp
**5-** 2 fail Sw Bin 4 (Hw Bin 21) → Leakage (with PD pre-calibration)
**6-** 1 fail Sw Bin 17 (Hw Bin 24) → Ews test Acc
**7-** 1 fail Sw Bin 8 (Hw Bin 28) → Scan
**8-** 1 fail Sw Bin 10 (Hw Bin 31) → Current trim

## Delta yield binning pareto: Fail to Pass

| C372 - Wafer: G101463-25G5 | DOT - Wafer: G101463-25G5 | Frequency (#) |
|---|---|---|
| 10 | 1 | 1 |
| 16 | 1 | 3 |
| 5 | 1 | 4 |
| 14 | 1 | 6 |
| 8 | 1 | 9 |
| 4 | 1 | 18 |
| 11 | 1 | 18 |
| 12 | 1 | 19 |
| 18 | 1 | 23 |
| Total | - | 101 |

**DOT, fail C372,** 101 dice:

**1-** 23 fail Sw Bin 18 (Hw Bin 29) → Supply Current
**2-** 19 fail Sw Bin 12 (Hw Bin 34) → OTP
**3-** 18 fail Sw Bin 11 (Hw Bin 27) → LDO
**4-** 18 fail Sw Bin 4 (Hw Bin 21) → Leakage (with PD pre-calibration)
**5-** 9 fail Sw Bin 8 (Hw Bin 28) → Scan test
**6-** 6 fail Sw Bin 14 (Hw Bin 36) → frequency trim
**7-** 4 fail Sw Bin 5 (Hw Bin 25) → Open
**8-** 3 fail Sw Bin 16 (Hw Bin 23) → EWS test Gyro
**9-** 1 fail Sw Bin 10 (Hw Bin 31) → Current trim

ALL THESE DIE WERE RETESTED ON C372 AND WERE NOT CONFIRMED FAILURES

# WF 25 – Retest offline Pass DOT100… Fail C372

1. **C372 Wf 25 overall yield**: 91.24%;
2. **DOT Wf 25 overall yield**: 94.69%;

**Main causes of mismatches between C372 and DOT:**

1. Obsolescence of the C372 equipment (many retest on C372 are usually needed);
2. Obsolescence of the C372 setup
   a) Capacitors mounted between VDD and GND on C372 probecard are different from those mounted on the probecard of the DOT (100 nF // 10uF Vs 100nF). This causes differences in small current measurements and digital tests performed with pattern;
   b) Probecard of C372 with no impedance matching (creates an undesired effect of crosstalk issue).

All dies fail on C372 but pass on DOT have been retested with result **ALL PASS** confirming a poor performance of the equipment / setup C372.

# Conclusion

DOT 100 is fully qualified to test ASM330LHHTR / KIT330LHHTR ASIC at EWS step.

Mismatch on the results between C372 e DOT100 are due to poor performance of C372

# Thank you



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# Public Products List

Publict Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

***PCI Title :*** Change of EWS test platform from C372 to DOT 100 on the selected products.

***PCI Reference :*** AMS/21/12940

***Subject :*** Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

| | | |
|---|---|---|
| ASM330LHHTR | | |

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