PRODUCT / PROCESS CHANGE INFORMATION

1. PCI basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCI No.	CRP/22/13425
1.3 Title of PCI	UTAC Singapore - Qualification of Auto Packing Machine and Moisture Barrier Bag (MBB) new dimension for STM Tray Devices
1.4 Product Category	Refer to impacted product list
1.5 Issue date	2022-07-26

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 Process Owner	Chiara ZACCHERINI
2.1.2 Corporate Quality Manager	Gerard PETIT

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	Any indirect material modifications for shipping products in dimensions, material, composition, orientation	UTAC Singapore

4. Description of change		
	Old	New
4.1 Description	All Test FG Tray Packing out in OSAT/UTAC Singapore for all ST products (Auto/Non-Auto) is packed via manual packing using 240mm MBB Bag	All Test FG Tray Packing out in OSAT/UTAC Singapore for all ST products (Auto/Non-Auto) is packed via automated packing using 260mm MBB Bag
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	- Form: No change on product - Fit: No change on product - Function: No change on product - Reliability, or Processability: NA (Not applicable).	

5. Reason / motivation for change	
5.1 Motivation	The main benefits are: Increased in productivity and improvement in quality with the automated packing solution in OSAT/UTAC Singapore. MBB dimensional change is a consequence of automated packing process change. Proposed change process has been implemented in production for OSAT/UTAC Singapore.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	Date-code - Internal Traceability

7. Timing / schedule	
7.1 Date of qualification results	2022-07-04
7.2 Intended start of delivery	2022-12-05
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	13425 PCI - UTAC Singapore - Qualification of Auto Packing Machine for STM Tray Devices_W29.2.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2022-07-26

9. Attachments (additional documentations)
13425 Public product.pdf 13425 PCI - UTAC Singapore - Qualification of Auto Packing Machine for STM Tray Devices_W29.2.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
	SPEAR600-2	

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PRODUCT / PROCESS CHANGE INFORMATION

PCI - UTAC Singapore - Qualification of Auto Packing Machine and Moisture Barrier Bag (MBB) new dimension for STM Tray Devices

What is the change?

Current Condition:

All Test FG Tray Packing out in OSAT/UTAC Singapore for all ST products (Auto/Non-Auto) is packed via **manual packing** using **240mm** MBB Bag

Proposed Condition:

All Test FG Tray Packing out in OSAT/UTAC Singapore for all ST products (Auto/Non-Auto) is packed via **automated packing** using **260mm** MBB Bag

Why?

The main benefits are:

Increased in productivity and improvement in quality with the automated packing solution in OSAT/UTAC Singapore.
MBB dimensional change is a consequence of automated packing process change.
Proposed change process has been implemented in production for OSAT/UTAC Singapore.

When will this change occur?

The change will be implemented starting December'2022 with progressive deployment during 6 months.
For very low volume products the transition period could be longer.

How will the change be qualified?

Perform visual mechanical buyoff post cycling of BGA and QFP packages in bundled trays. (Refer to Qualification Plan).

What is the impact of the change?

- **Form:** No change on product
- **Fit:** No change on product
- **Function:** No change on product
- **Reliability, or Processability:** NA (Not applicable).

APPENDICES:

APPENDIX 1 Risk Assessment

APPENDIX 2 Qualification Plan

APPENDIX 3 Qualification Results

APPENDIX 4 Visual illustration of automated packing system layout and process

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APPENDIX 1: RISK ASSESSMENT

Change Risk Assessment				
Category	**S/N**	**Risk description**	**Risk Level (H/M/L)**	**Risk Mitigation Plan description**
Spare parts	1	Will spare parts/ tools be relocated?	L	Spare parts will be identified & purchased with plan
Changes to method/process and changes to sequence in between process steps.	2	Using different processes or methods or change in process sequence.	L	Improvement on the method to pack bundles which will have an increased output
Changes to FMEA, Control Plan, recipes etc.	3	Using different FMEA, Control Plan, recipes.	L	Update exisiting FMEA & Control Plan FMEA : USG-PFMEA-EOL-Packing Control Plan : Generic Quality Control Plan for EOL OCAP : eOCAP-EOL-LPK-XX
Changes to layout of the line.	4	Drastic layout change may cause disruption to the feel and running of the line.	L	Change in layout not affecting other machine or cause disturbance to operators. Machine is located in a separate area from LPK
Preventive Maintenance	5	Is preventive maintenance established?	L	Establish machine PM checklist with vendor advice
Changes to process	6	Changes in MBB Width due to machine capability that will affect sealing quality?	L	There is no change in the Material Specs of MBB thus it will not affect sealing quality
	7	Label was printed but did not paste on the MBB / Inner box?	L	For MBB, operator is performing the folding and is able to see the label if not pasted. For Inner Box, vision system will check and ensure that the label is pasted.
	8	Wrong lot is packed?	L	There is a stack label scanner and will not allow if stack label info is mismatch with the lot being processed.
	9	Color changes of Humidity Indicator Card	L	Vision system to check that the HIC have not changed its color to exposed condition.
	10	Damage due to over gripping of robot gripper	L	Gripper have sensors to prevent too much gripping force

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APPENDIX 2: QUALIFICATION PLAN

1. Obtain qualification units from both BGA and QFP Devices which are visual mechanically good units to form 3 bundles per package.

2. Label and load the bundles as per the following for both BGA and QFP devices:
    - First bundle ➔ “1X Cycling”, Complete the machine packing as normal for 1 time
    - Second bundle ➔ “5X Cycling”, Let the machine perform Cycling to the bundle for 5 times
    - Third bundle ➔ “10X Cycling”, Let the machine perform Cycling to the bundle for 10 times

3. Verify for any damage on the packing material (Inner Box and MBB) for each bundle.

4. Perform lead\ball scan inspections using VM machines on the QFP/BGA units for each bundle.

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APPENDIX 3: QUALIFICATION RESULTS

SN	Pkg / Condition	QUANTITY			Material Verification		Remarks
		Inspected	Pass	Reject	MBB	Inner Box	
	BGA						
1	Normal	504	504	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass
2	5X Rework	504	504	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass
3	10X Rework	504	504	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass
	QFP						
4	Normal	360	360	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass
5	5X Rework	360	360	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass
6	10X Rework	360	360	0	No puncture or visible damage	No dent caused by gripping or hitting	Pass

Conclusion

Qualification results are positive and automated packing process with 260mm MBB is qualified for mass production

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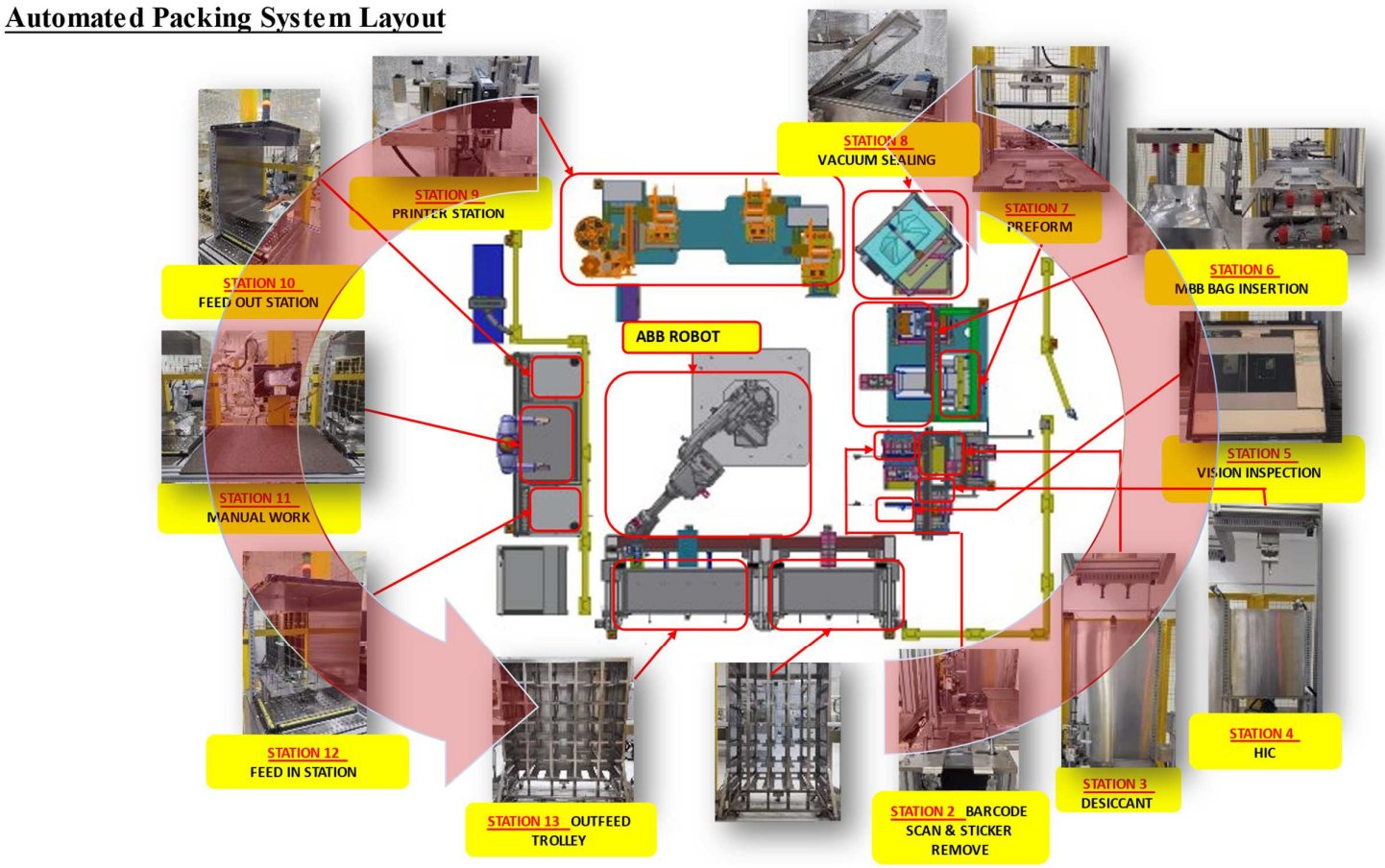
APPENDIX 4: VISUAL ILLUSTRATION OF AUTOMATED PACKING SYSTEM LAYOUT AND PROCESS



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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 : UTAC Singapore - Qualification of Auto Packing Machine and Moisture Barrier Bag (MBB) new dimension for STM Tray Devices

PCI Reference : CRP/22/13425

Subject : Public Products List

Dear Customer,

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

SPEAR320S-2	STCOM05	STCOMET05
STCOM10	STCOMET10	ST8500
SPEAR600-2	SPEAR310-2	

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