PRODUCT / PROCESS CHANGE INFORMATION

1. PCI basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCI No.	MDG/24/14492
1.3 Title of PCI	AMKOR ATT (Taiwan) for listed products in WLCSP Packages - Polyimide (PI) passivation layer change from version LTC9320-E07S to LTC9320-E19
1.4 Product Category	GPM - STM32WB : STM32WB55xx - STM32U : STM32U535x & STM32U545x. CS /EEPROM : - M35Pxx-CXCST/EF - M95Pxx-IXCST/EF in WLCSP package
1.5 Issue date	2024-04-05

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	Ricardo Antonio DE SA EARP,Marie-France FLORENTIN
2.1.2 Marketing Manager	Veronique BARLATIER,Sylvain FIDELIS
2.1.3 Quality Manager	Pascal NARCHE,Mickael DENAIS-ALLICHON

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Bumps	AMKOR ATT (Taiwan)

4. Description of change		
	Old	New
4.1 Description	Current Condition: LTC 9320 E07S Polymer supplier: Asian source Both of Exposure machines type Aligner and Stepper can use for PI1 and PI2 layers	New Condition: LTC 9320 E19 Polymer supplier: European source Dedicate Exposure machines type: Stepper is for PI1 and Aligner is for PI2.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no impact	

5. Reason / motivation for change	
5.1 Motivation	Fujifilm announced that passivation layer LTC-9320 E07S will be discontinued and ATT proposed using the latest version LTC-9320 E19 instead. The present volatile market situation impacts the chemical raw material availability. The high market demands create raw material shortages and force raw material suppliers to optimize their product portofolio. The present resin supplier of Fuji-LTC9320-E07S passivation layer decided to stop the production of the raw material with immediate effect under these market circumstances. This specific resin is only used in the production of LTC 9320-E07S. Consequently, LTC9320-E07S has become obsolete, the current stock is limited and will be replaced by a new LTC9320-E09 starting march 2024.
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Traceability ensured by ST internal tool and date code on the package marking.

7. Timing / schedule	
7.1 Date of qualification results	2024-03-26

7.2 Intended start of delivery	2024-04-30
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14492 MDG RER2114 V1 - PCI14492 - ATT WLCSP LTC9320 E19 - reliability evaluation report.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	**Issue Date**	2024-04-05

9. Attachments (additional documentations)
14492 Public product.pdf 14492 MDG RER2114 V1 - PCI14492 - ATT WLCSP LTC9320 E19 - reliability evaluation 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**
	M95P16-IXCST/EF	
	M95P32-IXCST/EF	
	STM32WB55VGY6TR	
	STM32WB5MMGH6TR	

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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 : AMKOR ATT (Taiwan) for listed products in WLCSP Packages - Polyimide (PI) passivation layer change from version LTC9320-E07S to LTC9320-E19

PCI Reference : MDG/24/14492

Subject : Public Products List

Dear Customer,

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

STM32WB55VGY6TR	STM32WB5MMGH6	STM32WB55VGY7TR
STM32WB55VYY6TR	STM32U535NCY6QTR	STM32WB55VEY6TR
STM32U535NEY6QTR	STM32WB55VEY7TR	STM32U545JEY6QTR
STM32WB55VCY6TR	M95P32-IXCST/EF	STM32WB55VCY7TR
STM32WB5MMGH6TR	STM32U535JEY6QTR	M95P16-IXCST/EF
STM32U545NEY6QTR		

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Reliability Evaluation Report

(RER2114 / PCI14492)

WLCSP assembly process change

Passivation material change from LTC9320 E07s to E19 in ATT

Release	Date	Author	Function
1.0	March 22th 2024	Michel DERIE Berengere ROUTIER-SCAPPUCCI	CS BE Q&R GPM BE Q&R

DOCUMENT ACTORS:

Name	Function	Location	Date
Pascal NARCHE	GPM Subgroup Quality Manager	ROUSSET	March 22nd 2024
Mickael DENAIS-ALLICHON	CS Division Quality Manager	ROUSSET	March 26th 2024

This report is a summary of the reliability trials performed in good faith by STMicroelectronics. This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics General Terms and Conditions of Sale.

QUALIFICATION OVERVIEW

- **OBJECTIVE**

The aim of this reliability is to qualify in Amkor ATT Taiwan assembly site for WLCSP process the change of Polyimide (PI) passivation layer raw material version moving from LTC9320 E07s to E19 due to Fujifilm supplier termination of E07s version.

PCI14492 Changes are described here below:

Reason of Change	Fujifilm announced that LTC-9320 E07S will be discontinued in May 2024 and ATT proposed using the latest version E19 instead.
Current Condition	Current Condition: LTC 9320 E07S Polymer supplier: Asian source Both of Exposure machines type Aligner and Stepper can use for PI1 and PI2 layers
New Condition	New Condition: LTC 9320 E19 Polymer supplier: European source Dedicated Exposure machines type: Stepper is for PI1 and Aligner is for PI2.

Impacted product list as per PCI14492 are shown below:

- GPM products
  - STM32WB : STM32WB55xx
  - STM32U : STM32U535x & STM32U545x.
- CS /EEPROM products:
  - M35Pxx-CXCST/xx
  - M35Pxx-xxCST/EF

- **CONCLUSION**

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

Package oriented tests have not put in evidence any criticality. Physical analysis performed on samples submitted to tests has not put in evidence any issue. ESD CDM are in accordance with ST spec.

Based on the overall results obtained, the new version of LTC9320 E19 is qualified for listed products in PCI.

Refer to Section 3.0 for reliability test results.

TABLE OF CONTENT

1. QUALIFICATION STRATEGY

Reliability evaluation is based on the standard STMicroelectronics corporate procedures for quality and reliability, namely RELIABILITY TESTS AND CRITERIA FOR QUALIFICATION, and in compliance with the JESD47 international standard.

Overall results are listed in test results summary in section 3, including specifications references.

2. PRODUCT OR TEST VEHICLE CHARACTERISTICS

Test vehicles considered serve 2 ST organizations:

- CS (Connected Security) with products K4C
- GPM (General Purpose microcontrollers) with the product 495

	Test Vehicles	
	K4C	495
Material	LTC9320-E19	
PI1	10	10
RDL1 (Include seed layer)	6.3	6.3
PI2	10	10
PR Type	AZ4620	
UBM (include seed layer)	8.9	8.9
Solder Ball	SAC405 0.16mm	SAC405 0.23mm

Based on similarity it qualifies all products using 2 PI passivation layers and 2 Cu layers (RDL1 and UBM).

3. TEST RESULTS SUMMARY

3.1. ACCELERATED ENVIRONMENT STRESS TESTS

Test code	Stress method	Stress Conditions	Sampling size	S.S.	Total	Results/Lot Fail/S.S.	Comments:(N/A =Not Applicable)
PC	JSTD 020 JESD 22-A113	24h bake@125°C, MSL1 (168h/85°C/85%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	1 lot 495, 3 lots K4C	308 for 495 231 for K4C	1001	PASS	NA
HTSL	JESD22-A103	Ta= 150°C Duration= 1000hrs ☑ After PC for 495 ☐ After PC for 4KC	1 lot 495, 3 lots K4C	77	308	PASS	NA
TC	JESD22-A104	Ta= -65 to 150°C Cyc= 500 ☑ After PC	1 lot 495, 3 lots K4C	77	308	PASS	NA
bHAST	JESD22-A110	Ta= 85%HR/110°C/VDD max Duration= 264hrs ☑ After PC	3 lots K4C	77	231	PASS	
THB	JESD22-A101	Ta= 85%HR/85°C/VDD max Duration= 1000hrs ☑ After PC	1 lot 495	77	77	PASS	NA
UHAST	JESD22-A118	Ta= 130°C/85%RH Duration= 96hrs ☑ After PC	1 lot 495, 3 lots K4C	77	308	PASS	NA

ELECTRICAL VERIFICATION TESTS

Test code	Stress method	Stress Conditions	Lots Qty	S.S.	Total	Results/Lot Fail/S.S.	Comments:(N/A =Not Applicable)
ESD CDM	JEDEC JS-002	Voltage=500V	1 lot 495 1 lot K4C	3	6	PASS	NA

PACKAGE ASSEMBLY INTEGRITY TESTS

Test code	Stress method	Stress Conditions	Lots Qty	S.S.	Total	Results/Lot Fail/S.S.	Comments:(N/A =Not Applicable)
CA	Construction analysis	ST internal specifications	1 lot 495 3 lots 4KC	50	200	PASS	NA

Note: Test method revision reference is the one active at the date of reliability trial execution.

4. APPLICABLE AND REFERENCE DOCUMENTS

Reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP2.4.4	Record Management Procedure
SOP2.6.2	Internal Change Management
SOP2.6.7	Finished Good Maturity Management
SOP2.6.9	Package & Process Maturity Management in BE
SOP2.6.11	Program Management for Product Development
SOP2.6.17	Management of Manufacturing Transfers
SOP2.6.19	Front-End Technology Platform Development and Qualification
DMS 0061692	Reliability Tests and Criteria for Product Qualification
JEDEC JS-002	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JESD22-A103	High Temperature Storage Life
JESD22-A104	Temperature cycling
JESD22-A101	Temperature Humidity Bias
JESD22-A110	Biased Highly Accelerated temperature & humidity Stress Test
JESD22-A113	Preconditioning of non-hermetic surface mount devices prior to reliability testing
JESD22-A118	Unbiased Highly Accelerated temperature & humidity Stress Test
J-STD-020	Moisture/reflow sensitivity classification for non-hermetic solid state surface mount devices

5. GLOSSARY

ESD - CDM	Electrostatic Discharge - Charged device model
CA	Construction analysis
HTSL	High temperature storage life
PC	Preconditioning
TC	Temperature Cycling
THB	Temperature Humidity Bias
bHAST	Biased Highly Accelerated temperature & humidity Stress Test
UHAST	Unbiased HAST (Highly Accelerated Stress Test)
DMS	ST Advanced Documentation Controlled system/ Documentation Management system

6. REVISION HISTORY

Release	Date	Description
1.0	March 26th 2024	Initial release

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