PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/20/12224
1.3 Title of PCN	ST SG8E(Singapore) additional ATP TSSOP20 HDLF Assembly line for STM8S003x, STM8S103x and STM8S903x listed products
1.4 Product Category	STM8S003x, STM8S103x and STM8S903x listed products
1.5 Issue date	2020-08-26

2. PCN 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
2.1.2 Marketing Manager	Veronique BARLATIER
2.1.3 Quality Manager	Pascal NARCHE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Assembly site (SOP 2617)	- ST Shenzhen (China) - Amkor ATP (Philippines)

4. Description of change		
	Old	New
4.1 Description	Assembly site: - ST Shenzhen (China)	Assembly site: - ST Shenzhen (China) - Amkor ATP (Philippines) - added line There is no change in the product functionality. Please refer to PCN12224– Additional information attached document.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no impact on Form, Fit, Function	

5. Reason / motivation for change	
5.1 Motivation	to increase capacity
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	tracability ensured by ST internal tools

7. Timing / schedule	
7.1 Date of qualification results	2020-07-14
7.2 Intended start of delivery	2020-08-18
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	12224 MDG-MCD-RER1805 V5.0 - PCN10630_10941_12224 - STM8S - CMOSF9GO1 Transfer to AMK8 SG8E - 767XXX7 765XXX8 766XXX1 - Reliability Evaluation Report.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2020-08-26

9. Attachments (additional documentations)
12224 Public product.pdf 12224 MDG-MCD-RER1805 V5.0 - PCN10630_10941_12224 - STM8S - CMOSF9GO1 Transfer to AMK8 SG8E - 767XXX7 765XXX8 766XXX1 - Reliability Evaluation Report.pdf 12224 PCN12224_Additional information.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
	STM8S003F3P6	
	STM8S003F3P6TR	
	STM8S103F2P3	
	STM8S103F2P3TR	
	STM8S103F2P6	
	STM8S103F2P6TR	
	STM8S103F3P3	
	STM8S103F3P3TR	
	STM8S103F3P6	
	STM8S103F3P6TR	
	STM8S903F3P3	
	STM8S903F3P6	
	STM8S903F3P6TR	
	STM8SPLNB1P6	

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MDG-MCD-RER1805
Reliability Report

Qualification Type : Product & Package evaluation

ST SG9* (Singapore) additional source for STM8S001x, STM8S103x, STM8S903x, STM8S003x, STM8S20x and STM8S005, STM8S105 products

PCN10630/PCN10941/PCN12224

(*) SG9 Front End site name is now SG8E and will be used for all future communications, updated in the following table.

Product / Process / Package Information	
Commercial Product:	STM8S001x, STM8S103x, STM8S903x, STM8S003x,
Mask Set Revision:	767XXX7 (cut 1.2)
Silicon Process Technology:	CMOSF9GO1
Wafer Fabrication Location:	ST SG8E (Singapore)
Package:	LQFP32 7x7, TSSOP20, UFQFPN20L 3x3, UFQFPN32L 5x5, SO8, SO20
Assembly Plant location:	ST Muar, ST Shenzhen, AMKOR ATP1 - ATP3, StatsChippac SCCJ

Product / Process / Package Information	
Commercial Product:	STM8S20x
Mask Set Revision:	765XXX1 (cut 2.5)
Silicon Process Technology:	CMOSF9GO1
Wafer Fabrication Location:	ST SG8E (Singapore)
Package:	LQFP80 14x14, LQFP64 10x10, LQFP48 7x7
Assembly Plant location:	ST Muar, StatsChippac SCCJ

MDG-MCD-RER1805
Reliability Report

Product / Process / Package Information	
Commercial Product:	STM8S005, STM8S105
Mask Set Revision:	766XXX8 (cut 1.4)
Silicon Process Technology:	CMOSF9GO1
Wafer Fabrication Location:	ST SG8E (Singapore)
Package:	LQFP48 7x7, PDIP32
Assembly Plant location:	ST Muar, StatsChippac SCCJ, TONGFU

Approval List rev 1			
Function	**Location**	**Name**	**Date**
Division Front End Quality Manager	ST Rousset	Antonio DI GIACOMO	01st October 2018
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	01st October 2018
Division Quality Manager	ST Rousset	Pascal NARCHE	01st October 2018

Approval List rev 2			
Function	**Location**	**Name**	**Date**
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	January 16, 2019
Division Quality Manager	ST Rousset	Pascal NARCHE	January 16, 2019

Approval List rev 3			
Function	**Location**	**Name**	**Date**
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	February 20, 2019

Approval List rev 3.1			
Function	**Location**	**Name**	**Date**
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	February 21, 2019

Approval List rev 4			
Function	**Location**	**Name**	**Date**
Division Front End Quality Manager	ST Rousset	Antonio DI GIACOMO	February 11, 2020
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	February 11, 2020
Division Quality Manager	ST Rousset	Pascal NARCHE	February 11, 2020

Approval List rev 5			
Function	**Location**	**Name**	**Date**
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	July 15th, 2020

MDG-MCD-RER1805
Reliability Report

Contents

MDG-MCD-RER1805
Reliability Report

1 RELIABILITY RESULTS OVERVIEW

1.1 Objectives

The aim of this report is to present results of the reliability evaluation performed for the following products diffused in ST SG8E Singapore and assembled in the listed packages:

Test vehicles are described here below:

Product	Die	Package	Assembly plant
STM8S001x, STM8S103x, STM8S903x, STM8S003x,	767XXX7	LQFP32 7x7x1.4	ST Muar
		TSSOP20	ST Shenzhen
		TSSOP20	AMKOR ATP1
		UFQFPN3x3 20L	AMKOR ATP3
		UFQFPN5x5 32L	StatsChippac SCCJ
		SO8L	ST Shenzhen
		SO20L	ST Muar

Product	Die	Package	Assembly plant
STM8S20x	765XXX1	LQFP80 14x14x1.4	ST Muar
		LQFP64 10x10x1.4	StatsChippac SCCJ
		LQFP48 7x7x1.4	ST Muar

Product	Die	Package	Assembly plant
STM8S005, STM8S105	766XXX8	LQFP48 7x7x1.4	StatsChippac SCCJ
		PDIP32	TONGFU

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard

1.2 Conclusion

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

According to good reliability tests results in line with validated product mission profile and reliability strategy, the qualification is granted for products diffused in ST SG8E CMOSF9GO1 process for die 767XXX7 and assembled in the following packages: LQFP 7x7, TSSOP20, UFQFPN3x3, UFQFPN5x5, SO8, SO20; die 765XXX1 and assembled in the following packages: LQFP 14x14, 10x10 & 7x7; 766XXX8 and assembled in the following packages: LQFP 7x7 & PDIP32.
Refer to Section 2.0 for reliability test results.

MDG-MCD-RER1805
Reliability Report

2 RELIABILITY EVALUATION CONTEXT / PLAN / STRATEGY & RESULTS SUMMARY

2.1 Reliability Evaluation: Context & strategy summary

Due to the success on the market of STM8 devices, ST Microcontrollers Division decided to qualify an additional front-end site to maintain state of the art service level to our customers thanks to extra capacity.

This reliability evaluation concerns the qualification of an additional plant in Singapore ST SG8E.

The process CMOSF9GO1 Logic based embedded flash, is duplicated from ST ROUSSET (3329) 8” wafer fab (Refer to PCN10630).

Dice 767, 765 and 766 has been already qualified in ST ROUSSET (3329).

PCN10630 Changes are described here below:

	Old	New
Description	Front-end source: - ST Rousset 8" France	Front-end sources: - ST Rousset 8" France - ST SG9 8" Singapore - added source There is no change in the product functionality. Please refer to PCN 10630.
Anticipated Impact on form,fit, function, quality, reliability or processability?	no change	

MDG-MCD-RER1805
Reliability Report

The transfer to ST SG8E has been assessed through reliability results of tests vehicles STM8S103x (Die 767XXX7) in packages listed and recorded in document RERMCD1805.

Package	Die	Reference	Assy Plant location	Final Test Plant location
LQFP32 7x7x1.4	F767	RERMCD1204	ST MUAR (Malaysia)	ST MUAR (Malaysia)
TSSOP20	F767	RERMCD1512	ST Shenzhen (China)	ST Shenzhen (China)

Based on these data, and according to “RELIABILITY TESTS AND CRITERIA FOR QUALIFICATION” specification (DMS 0061692), the following qualification strategy has been defined:

- Die Qualification:
  - 3 diffusion lots for die 767XXX7 (Cut1.2)
  - 1 diffusion lot for dies 765XXX1 (cut 2.5) and 766XXX8 (Cut1.4)

- Package Qualification:

Package	Body	Pitch	Package Code	Wire	Assy	Trial
LQFP32L	7x7	0.5	5V	Gold	ST Muar	3 reliablity (Die test vehicle: 767)
LQFP80L	14x14	0.65	1S	Gold	St Muar	1 reliability lot (Die test vehicle : 765)
LQFP48L	7x7	0.5	5B	Silver	JSCC	1 reliability lot (Die test vehicle : 766)
LQFP48L	7x7	0.5	5B	Silver	ST Muar	1 reliability lot
LQFP64L	10x10	0.5	5W	Silver	JSCC	1 reliability lot
TSSOP20	4.4	0.65	YA	Silver	ST Shenzhen	1 reliability lot
TSSOP20	4.4	0.65	YA	Gold	Amkor ATP1	1 reliability lot
UFQFPN 20L	3x3	0.5	E4	Gold	Amkor ATP3	1 reliability lot
UFQFPN 32L	5x5	0.5	MG	Silver	JSCC	1 reliability lot
SO8	4.9x3.9	0.15	O7	Gold	ST Shenzhen	1 reliability lot
SO20	13x7.6	0.30	Z7	Gold	ST Muar	1 reliability lot
PDIP32	28.065x8.89	1.778	76	Gold	Tongfu	1 reliability lot

MDG-MCD-RER1805
Reliability Report

2.2 Reliability Test vehicles description

STM8 Die Test Vehicles

Die Vehicle	Process Perimeter	Assembly Line	Package	Number of Reliability Lots
767	F9GO1	MUAR	LQFP7*7 32L	3 lots to qualify Process Perimeter Then 1 lot by Die
765		MUAR	LQFP14*14 80L	
766		JSCC	LQFP7*7 48L	

STM8 Package Test Vehicles

Package Line	Assembly Line	Package	Wire	Die Vehicle / Rawline (*)	Number of Reliability Lots
LQFP	MUAR	LQFP7*7 48L	Ag	765 / 5B*765	3 lots to qualify F9GO1 Technology Then 1 lot by Package Assembly Line
	JSCC	LQFP7*7 48L	Ag	766 / 5B*766	
	JSCC	LQFP10*10 64L	Ag	765 / 5W*765	
	MUAR	LQFP14*14 80L	Au	765 / 1S*765	
QFN	ATP3	UFQFPN3*3 20L	Au	767 / E4*767	
	JSCC	UFQFPN5*5 32L	Ag	767 / MG*767	
SO	SHENZHEN	SO8 0,15	Au	767 / O7*767	
	MUAR	SP20 0,30	Au	767 / Z7*767	
TSSOP	SHENZHEN	TSSOP 20	Ag	767 / YA*767	
	ATP1	TSSOP 20	Au	767 / YA*767	
PDIP	TONGFU	PDIP 32	Au	766 / 76*766	

MDG-MCD-RER1805
Reliability Report

2.3 Reliability Information

Lot ID	Lot 1 Die + package	Lot 2 Die + package	Lot 3 Die + package	Lot 4 Package	Lot 5 Package	Lot 6 Package	Lot 7 Package	Lot 8 Package
Finish Good:	ES8S003K3T6CS$9D			IS8S003 F3P6$CD	ET8S003 F3U6$PD	IS8S903 K3U3$SD	ES8S001 J3M3$CD	ES8S103 F3M6$UD
Die Name /cut:	F767XXX7 Cut 1.2							
Diffusion Lot Number:	S805777	S806800	S805777	S805777	C817801	C817801	C817801	C817801
Trace Code:	998200U6	998200DU	GK824130	GK824130	7B826A7R	GQ82625A	GK8270RE	99827106
Reliability Lab location:	ST Rousset							
Fab name location:	ST SG8E Singapore							
Assembly plant location:	ST Muar (Malaysia)			ST Shenzhen (China)	AMKOR ATP3 (Philippines)	StatsChippac SCCJ (China)	ST Shenzhen (China)	ST Muar (Malaysia)
Package description:	LQFP32 7x7x1.4			TSSOP20	UFQFPN 20L 3x3	UFQFPN 32L 5x5	SO8	SO20

Lot ID	Lot 9 Die + package	Lot 10 package	Lot 11 package	Lot 12 Die + package	Lot 13 Package	Lot 14 Package
Finish Good:	ES8S208 MBT6B$UD	IS8S207 C8T6$JD	IS8207 RBT6$SD	IS8S005 C6T6$S9	ES8S105 K6B6$V9	ES8S003 F3P6$XD
Die Name /cut:	F765XXX1 Cut 2.5	F765XXX1 Cut 2.5		F766XXX8 Cut 1.4	F766XXX8 Cut 1.4	F767XXX7 Cut 1.2
Diffusion Lot Number:	C829V7V	C829V7V	C829V7V	C826V3H	C826V3H	C849T49
Trace Code:	998440HQ	998440HQ	GQ845246	GQ84428L	GF846459	7B930295
Reliability Lab location:	ST Rousset					
Fab name location:	ST SG8E Singapore					
Assembly plant location:	ST Muar (Malaysia)	ST Muar (Malaysia)	StatsChippac SCCJ (China)	StatsChippac SCCJ (China)	TONGFU (China)	AMKOR ATP1 (Philippines)
Package description:	LQFP80 14x14x1.4	LQFP48 7x7x1.4	LQFP64 10x10x1.4	LQFP48 7x7x1.4	PDIP32	TSSOP20 HDLF

Comment:
ST is certified ISO/TS 16949. This induces certification for all internal and subcontractor plants
ST certification document can be downloaded under the following link:
http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html.

MDG-MCD-RER1805
Reliability Report

2.4 Reliability Evaluation: Results summary

Die oriented test results: ***LQFP7x7 32L Muar***

Die Related Tests Product drivers						Results		
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 1***	***Lot 2***	***Lot 3***
						767 Cut1.2	767 Cut1.2	767 Cut1.2
Electrostatic discharge - Human Body Model								
ESD HBM	ANSI/ESDA/ JEDEC JS-001 JESD22-A114	1500 Ω, 100 pF	3	4kV class IIIA	4KV	0/3	0/3	0/3
Latch Up								
LU	JESD78	125°C, 100mA	6	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	125°C	0/6	0/6	0/6
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 125°C then Storage								
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 1500h	10Kcy 300Kcy	0/77	0/77	0/77
					1500h	0/77	0/77	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 25°C then Storage								
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77	0/77	0/77
					168h	0/77	0/77	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ -40°C then Storage								
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77	0/77	0/77
					168h	0/77	0/77	0/77
Early Failure Rate								
ELFR	JESD22-A108 JESD74	HTOL 125°C, 5V6	800	A0/R1	48h	0/800	0/800	0/800
High Temperature Operating Live								
HTOL	JESD22-A108	HTOL 125°C, 5V6	77	A0/R1	1200h	0/77	0/77	0/77

MDG-MCD-RER1805
Reliability Report

Die oriented test results: ***LQFP14x14 80L Muar***

Die Related Tests Product drivers						Results
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 9***
						765 Cut2.5
Electrostatic discharge - Human Body Model						
ESD HBM	ANSI/ESDA/ JEDEC JS-001	1500 Ω, 100 pF	3	1kV Class III	1KV	0/3
Latch Up						
LU	JESD78	125°C, 100mA	6	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	125°C	0/6
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 125°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 1500h	10Kcy 300Kcy	0/77
					1500h	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 25°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77
					168h	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ -40°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77
					168h	0/77
Early Failure Rate						
ELFR	JESD22-A108 JESD74	HTOL 125°C, 5V6	800	A0/R1	48h	0/800
High Temperature Operating Live						
HTOL	JESD22-A108	HTOL 125°C, 5V6	77	A0/R1	1200h	0/77

MDG-MCD-RER1805
Reliability Report

Die oriented test results: ***LQFP7x7 48L JSCC***

Die Related Tests Product drivers						Results
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 12***
						766 Cut1.4
Electrostatic discharge - Human Body Model						
ESD HBM	ANSI/ESDA/ JEDEC JS-001	1500 Ω, 100 pF	3	2kV Class 2	2KV	0/3
Latch Up						
LU	JESD78	125°C, 100mA	6	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	125°C	0/6
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 125°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 1500h	10Kcy 300Kcy	0/77
					1500h	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ 25°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77
					168h	0/77
NVM Endurance & Data Retention – 10Kcy/300Kcyc EW @ -40°C then Storage						
EDR	JESD22-A117	HTB 150°C	77	A0/R1 10kcyc + 300Kcyc + 168h	10Kcy 300Kcyc	0/77
					168h	0/77
Early Failure Rate						
ELFR	JESD22-A108 JESD74	HTOL 125°C, 5V6	800	A0/R1	48h	0/800
High Temperature Operating Live						
HTOL	JESD22-A108	HTOL 125°C, 5V6	77	A0/R1	1200h	0/77

MDG-MCD-RER1805
Reliability Report

Package oriented test results: ***LQFP7x7 32L Muar***

Package Related Tests Products driver						Results		
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 1***	***Lot 2***	***Lot 3***
						767 Cut1.2	767 Cut1.2	767 Cut1.2
Electrostatic discharge – Charge Device Model								
ESD CDM	JESD22-C101	N.A	3	1000V Class IV	1000V	0/3	0/3	0/3
Preconditioning: Moisture Sensitivity Level : MSL3								
PC	J-STD-020 JESD22-A113	24h bake @ 125°C 192h @ 30°C / 60% RH Reflow simulation (3 times) @ 260°C peak temperature	308	A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308	0/308
		Delamination	60	No delaminati on		0/60	0/60	0/60
High Temperature Storage Life after Preconditioning								
HTSL	JESD 22-A103	150°C	77	A0/R1 1000h	1000h	0/77	0/77	0/77
Thermal Cycling after Preconditioning								
TC	JESD 22-A104	-65c/+150°c	77	A0/R1 500cy	500cy	0/77	0/77	0/77
Unbiased HAST after Preconditioning								
UHAST	JESD 22-A118	130°C ,85% 2Atm RH	77	A0/R1 96h	96h	0/77	0/77	0/77
Temperature Humidity Bias after Preconditioning								
THB	JESD 22-A110	85°C/85%RH Bias VDD=3v6	77	A0/R1 1000h	1000h	0/77	0/77	0/77
Construction Analysis								
CA	Construction Analysis including: -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	50	No major concern	N.A	No concern		

MDG-MCD-RER1805
Reliability Report

Package oriented test results: ***LQFP7x7 48L***

Package Related Tests Products driver						Results	Results
Description	***Lot 1***	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 10***	***Lot 12***
						765 Cut2.5	766 Cut1.4
	Electrostatic discharge – Charge Device Model						
ESD CDM	JESD22-C101	N.A	3	1000V Class IV	1000V	0/3	0/3
	Preconditioning: Moisture Sensitivity Level : MSL3						
PC	J-STD-020 JESD22-A113	24h bake @ 125°C 192h @ 30°C / 60% RH Reflow simulation (3 times) @ 260°C peak temperature	308	A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308
		Delamination	60	No delaminati on		0/60	0/60
	High Temperature Storage Life after Preconditioning						
HTSL	JESD 22-A103	150°C	77	A0/R1 1000h	1000h	0/77	0/77
	Thermal Cycling after Preconditioning						
TC	JESD 22-A104	-65c/+150°c	77	A0/R1 500cy	500cy	0/77	0/77
	Unbiased HAST after Preconditioning						
UHAST	JESD 22-A118	130°C ,85% 2Atm RH	77	A0/R1 96h	96h	0/77	0/77
	Temperature Humidity Bias after Preconditioning						
THB	JESD 22-A110	85°C/85%RH Bias VDD=3v6	77	A0/R1 1000h	1000h	0/77	0/77
	Construction Analysis						
CA	Construction Analysis including: -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	50	No major concern	N.A	No concern	No concern

MDG-MCD-RER1805
Reliability Report

Package oriented test results: ***LQFP14x14 80L, LQFP10x10 64L, PDIP32***

Package Related Tests Products driver						Results		
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 9*** ***LQFP80***	***Lot 11*** ***LQFP64***	***Lot 13*** ***PDIP32***
						765 Cut2.5	765 Cut1.2	766 Cut1.2
Electrostatic discharge – Charge Device Model								
ESD CDM	JESD22-C101	N.A	3	1000V Class IV	1000V	0/3	0/3	0/3
Preconditioning: Moisture Sensitivity Level : MSL3								
PC	J-STD-020 JESD22-A113	24h bake @ 125°C 192h @ 30°C / 60% RH Reflow simulation (3 times) @ 260°C peak temperature	308	A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308	0/308
		Delamination	60	No delaminati on		0/60	0/60	
High Temperature Storage Life after Preconditioning								
HTSL	JESD 22-A103	150°C	77	A0/R1 1000h	1000h	0/77	0/77	0/77
Thermal Cycling after Preconditioning								
TC	JESD 22-A104	-65c/+150°c	77	A0/R1 500cy	500cy	0/77	0/77	0/77
Unbiased HAST after Preconditioning								
UHAST	JESD 22-A118	130°C ,85% 2Atm RH	77	A0/R1 96h	96h	0/77	0/77	0/77
Temperature Humidity Bias after Preconditioning								
THB	JESD 22-A110	85°C/85%RH Bias VDD=3v6	77	A0/R1 1000h	1000h	0/77	0/77	0/77
Construction Analysis								
CA	Construction Analysis including: -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	50	No major concern	N.A	No concern	No concern	No concern

MDG-MCD-RER1805
Reliability Report

Package oriented test results: ***TSSOP20 4.4, UFQFPN 3x3, UFQFPN 5x5***

Package Related Tests Products driver						Results			
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 4*** ***TSSOP20***	***Lot 14*** ***TSSOP20 HDLF***	***Lot 5*** ***UFQFPN 3x3***	***Lot 6*** ***UFQFPN 5x5***
						767 Cut1.2	767 Cut1.2	767 Cut1.2	767 Cut1.2
Electrostatic discharge – Charge Device Model									
ESD CDM	JESD22-C101	N.A	3	1000V Class IV	N.A	0/3		0/3	0/3
Preconditioning: Moisture Sensitivity Level : MSL1/MSL3									
PC	J-STD-020 JESD22-A113	MSL1: 24h bake @125°C 168h @ 85°C/ 85% RH Reflow simulation (3 times) @260°C peak temperature	308	A0/R1 (Accepted 0 reject/ Rejected 1 reject)	N.A	0/308	0/308	0/308	
		MSL3:24h bake @125°C 192h @ 30°C/ 60% RH Reflow simulation (3times) @260°C peak temperature	308						0/308
		Delamination	60	No delaminati on		0/60	0/60	0/60	0/60
High Temperature Storage Life after Preconditioning									
HTSL	JESD 22-A103	150°C	77	A0/R1 1000h	1000h	0/77		0/77	0/77
HTSL	JESD 22-A103	175°C	77	A0/R1 1000h	1000h		0/77		
Thermal Cycling after Preconditioning									
TC	JESD 22-A104	-65c/+150°c	77	A0/R1 500cy	500cy	0/77	0/77	0/77	0/77
Unbiased HAST after Preconditioning									
UHAST	JESD 22-A118	130°C ,85% 2Atm RH	77	A0/R1 96h	96h	0/77	0/77	0/77	0/77
Temperature Humidity Bias after Preconditioning									
THB	JESD 22-A110	85°C/85%RH Bias VDD=3v6	77	A0/R1 1000h	1000h	0/77	0/77	0/77	0/77
Construction Analysis									
CA	Construction Analysis including: -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	50	No major concern	N.A	No concern		No concern	No concern

MDG-MCD-RER1805
Reliability Report

Package oriented test results: ***SO8, SO20***

Package Related Tests Products driver						Results	Results
Description	***Lot 1***	Conditions	Sample Size	Criteria	Readout / Duration	***Lot 7*** ***SO8***	***Lot 8*** ***SO20***
						767 Cut1.2	767 Cut1.2
Electrostatic discharge – Charge Device Model							
ESD CDM	JESD22-C101	N.A	3	1000V Class IV	1000V	0/3	0/3
Preconditioning: Moisture Sensitivity Level : MSL3							
PC	J-STD-020 JESD22-A113	24h bake @ 125°C 192h @ 30°C / 60% RH Reflow simulation (3 times) @ 260°C peak temperature	308	A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308
		Delamination	60	No delamination		0/60	0/60
High Temperature Storage Life after Preconditioning							
HTSL	JESD 22-A103	150°C	77	A0/R1 1000h	1000h	0/77	0/77
Thermal Cycling after Preconditioning							
TC	JESD 22-A104	-65c/+150°c	77	A0/R1 500cy	500cy	0/77	0/77
Unbiased HAST after Preconditioning							
UHAST	JESD 22-A118	130°C ,85% 2Atm RH	77	A0/R1 96h	96h	0/77	0/77
Temperature Humidity Bias after Preconditioning							
THB	JESD 22-A110	85°C/85%RH Bias VDD=3v6	77	A0/R1 1000h	1000h	0/77	0/77
Construction Analysis							
CA	Construction Analysis including: -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/ B108	50	No major concern	N.A	No concern	No concern

RELIABILITY TEST VEHICLES CHARACTERISTICS

MDG-MCD-RER1805
Reliability Report

2.5 Front-End information

Front-End	Diffusion FAB
Die	767
Wafer Fab Name	ST SG8E
Wafer Fab Location/ Address	8 Ang Mo Kio Ave 12, Singapore 569709
Process Technology Name	CMOSF9 GO1
Wafer Diameter	8 inch
Wafer Thickness	375+/-25µm
Die Size	X: 1334 µm Y: 2210 µm / 2.95 mm^2
Technology Mask Number	29
Scribe Line size x/y:	80 x 80µm
Pad Die Size /Pad type:	65 x 108µm
Metal Layers Number Materials Thickness	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 TaN/Ta/Cu 0.350 µm Metal 3 TaN/Ta/Cu 0.350 µm Metal 4 Ti/AlCu/TxTN 0.900 µm
Passivation Layers Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING
Die overcoat: Material Thickness	NA
Other Device using same process	STM8S product family
FIT Level (Ea=0.7eV, C.L: 60%, 55°C)	FIT = 7.0 at qualification date
Soft Error Rate Alpha SER [FIT/Mb] Neutron SER [FIT/Mb] Conditions	Alpha SER: 680 FIT/Mb Neutron SER: 685 FIT/Mb Conditions: Alpha SER 0.001α/cm^2/h Neutron = 125°C 14n/cm^2/h
Wafer Level Reliability Electro-Migration (EM) Time Dependent Dielectric Breakdown (TDDB) or Gate Oxide Integrity (GOI) Hot Carrier Injection (HCI) Negative Bias Thermal Instability (NBTI)	 Yes Yes Yes Yes

MDG-MCD-RER1805
Reliability Report

Front-End	Diffusion FAB
Die	765
Wafer Fab Name	ST SG8E
Wafer Fab Location/ Address	8 Ang Mo Kio Ave 12, Singapore 569709
Process Technology Name	CMOSF9 GO1
Wafer Diameter	8 inch
Wafer Thickness	375+/-25µm
Die Size	X: 2930 µm Y: 2378 µm / 6.97 mm2
Technology Mask Number	29
Scribe Line size x/y:	80 x 80µm
Pad Die Size /Pad type:	65 x 108µm
Metal Layers Number Materials Thickness	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 TaN/Ta/Cu 0.350 µm Metal 3 TaN/Ta/Cu 0.350 µm Metal 4 Ti/AlCu/TxTN 0.900 µm
Passivation Layers Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING
Die overcoat: Material Thickness	NA
Other Device using same process	STM8S product family
FIT Level (Ea=0.7eV, C.L: 60%, 55°C)	FIT = 4.0 at qualification date
Soft Error Rate Alpha SER [FIT/Mb] Neutron SER [FIT/Mb] Conditions	Alpha SER: 680 FIT/Mb Neutron SER: 685 FIT/Mb Conditions: Alpha SER 0.001α/cm²/h Neutron = 125°C 14n/cm²/h
Wafer Level Reliability Electro-Migration (EM) Time Dependent Dielectric Breakdown (TDDB) or Gate Oxide Integrity (GOI) Hot Carrier Injection (HCI) Negative Bias Thermal Instability (NBTI)	 Yes Yes Yes Yes

MDG-MCD-RER1805
Reliability Report

Front-End	Diffusion FAB
Die	766
Wafer Fab Name	ST SG8E
Wafer Fab Location/ Address	8 Ang Mo Kio Ave 12, Singapore 569709
Process Technology Name	CMOSF9 GO1
Wafer Diameter	8 inch
Wafer Thickness	375+/-25µm
Die Size	X: 2038 µm Y=2278 µm / 4.64 mm2
Technology Mask Number	29
Scribe Line size x/y:	80 x 80µm
Pad Die Size /Pad type:	65 x 108µm
Metal Layers Number Materials Thickness	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 TaN/Ta/Cu 0.350 µm Metal 3 TaN/Ta/Cu 0.350 µm Metal 4 Ti/AlCu/TxTN 0.900 µm
Passivation Layers Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING
Die overcoat: Material Thickness	NA
Other Device using same process	STM8S product family
FIT Level (Ea=0.7eV, C.L: 60%, 55°C)	FIT = 4.0 at qualification date
Soft Error Rate Alpha SER [FIT/Mb] Neutron SER [FIT/Mb] Conditions	Alpha SER: 680 FIT/Mb Neutron SER: 685 FIT/Mb Conditions: Alpha SER 0.001α/cm²/h Neutron = 125°C 14n/cm²/h
Wafer Level Reliability Electro-Migration (EM) Time Dependent Dielectric Breakdown (TDDB) or Gate Oxide Integrity (GOI) Hot Carrier Injection (HCI) Negative Bias Thermal Instability (NBTI)	 Yes Yes Yes Yes

MDG-MCD-RER1805
Reliability Report

2.6 Back-End information

Back-End	Package 1 LQFP32 7x7	Package 2 TSSOP20 4.4	Package 3 UFQFPN 20L 3x3	Package 4 UFQFPN 32L 5x5
Assembly Plant Location/ Address:	STM Muar Industrial center Muar, Tanjong Agas Industrial Area PO Box 28 84007 Muar Johore, Malaysia	STM Shenzhen 16,Tao Hua Rd. Futian Free Trade Zone Shenzhen 518048, P.R. China.	AMKOR ATP3 119 North Science Avenue Special Economic Processing Zone, Binan Laguna, 4024, Philippines	STATSChipPAC China (JSCC) 188 Hua Xu Road, Xujing County, Qingpu District 201702 Shanghai, China
Die Thickness after Back grinding:	375µm +/- 25µm	280µm +/- 20µm	150µm +/- 25µm	150µm +/- 25µm
Die sawing method:	Step cut	Step cut	Step cut	Step cut
Die attach material: **Type:** **Supplier:**	3280T ABLESTIK LOCTITE	8601S-25 ABLESTIK LOCTITE	ATB F125E ABLESTIK LOCTITE	8290 ABLEBOND
Lead frame material: **L/F Finishing Type:** **Die paddle size:**	Copper LQFP 32L 7x7 5,003x5.003 mm	Copper TSSOP 20L PPF 2x3.35 mm	Ru PPF C7025 UQFN 3x3 20L 1.334x2.21 mm	Sn UQFN 5x5 32L 3,1x.3,1 mm
Lead Plating Natures Thickness	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max	Sn: 7µm min 20µm max
Wire bonding: Type /Diameter:	Au D1 0.8 mils	Ag 96.5% 0.8 mils	Au 4N 0.8 mils	Ag 96.5% 0.8 mils
Molding Compound Supplier:	Sumitomo EMEG700L	Sumitomo EME-G700KC	Sumitomo G770Y	Sumitomo G770
Package Moisture Sensitivity Level (JEDEC J-STD020D):	MSL 3	MSL 1	MSL 1	MSL 3

MDG-MCD-RER1805
Reliability Report

Back-End	Package 5 SO8	Package 6 SO20	Package 7 LQFP80 14x14	Package 8 LQFP48 7x7
Assembly Plant Location/ Address:	STM Shenzhen 16,Tao Hua Rd. Futian Free Trade Zone Shenzhen 518048, P.R. China.	STM Muar Industrial center Muar, Tanjong Agas Industrial Area PO Box 28 84007 Muar Johore, Malaysia	STM Muar Industrial center Muar, Tanjong Agas Industrial Area PO Box 28 84007 Muar Johore, Malaysia	STATSChipPAC China (JSCC) 188 Hua Xu Road, Xujing County, Qingpu District 201702 Shanghai, China
Die Thickness after Back grinding:	375µm +/- 25µm	375µm +/- 25µm	375µm +/- 25µm	375µm +/- 25µm
Die sawing method:	Step cut	Step cut	Step cut	Step cut
Die attach material: Type: Supplier:	ABLESTIK LOCTITE 8601S-25	ABLESTIK LOCTITE ABP8302	LOCTITE ABLESTIK 3280T	ABLESTIK 3230
Lead frame material: L/F Finishing Type: Die paddle size:	SHD OpR DP 4Layers SO 8L 2,413 x 3,302mm	Flo OpC V2 RgAg+ME2 SO 20L 3,81x5,08 mm	LQFP 80L 14x14 7.2sq FP OpG NiPdAu 7.2x7.2mm	LQFP48L 210sq no slots STMP LF JSCC 4.57x4.57mm
Lead Plating Natures Thickness	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max	Sn: 7µm min 20µm max	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max	Sn: 7µm min 20µm max
Wire bonding: Type /Diameter:	Au 0.8 MIL Diam	Au 0.8 MIL Diam	Au 1 MIL Diam	Ag 96.5% 0.8 MIL Diam
Molding Compound Supplier:	Sumitomo EME-G700KC	Sumitomo EME-G633CA	Sumitomo EME-G700L	SUMITOMO LOW ALPHA G631SHQ
Package Moisture Sensitivity Level (JEDEC J-STD020D):	MSL 3	MSL 3	MSL 3	MSL 3

MDG-MCD-RER1805
Reliability Report

Back-End	Package 9 LQFP48 7x7	Package 10 LQFP64 10x10	Package 11 PDIP32	Package 12 TSSOP20 4.4 HDLF
Assembly Plant Location/ Address:	STM Muar Industrial center Muar, Tanjong Agas Industrial Area PO Box 28 84007 Muar Johore, Malaysia	STATSChipPAC China (JSCC) 188 Hua Xu Road, Xujing County, Qingpu District 201702 Shanghai, China	TONGFU No.288,Chongchuan Road,Nantong, Jiangsu 226006 China	AMKOR ATP1 119 North Science Avenue Special Economic Processing Zone, Binan Laguna, 4024, Philippines
Die Thickness after Back grinding:	375µm +/- 25µm	375µm +/- 25µm	375µm +/- 25µm	275µm +/- 25µm
Die sawing method:	Step cut	Step cut	Step cut	Step cut
Die attach material: Type: Supplier:	HITACHI EN4900 ST16 10cc/35g Sy 5ST50030	ABLESTIK 3230	CRM - 1033BF SUMITOMO EPOXY GLUE	ABLESTIK 8290
Lead frame material: L/F Finishing Type: Die paddle size:	FRAME LQFP 48L 7x7 3.6sq HD RTUPG uPPF ET 3.6mmx3.6mm	LQFP64 236sq no slots STMP LF JSCC 5.994mm x 5.994mm	FRAME FOR DIP32S 4.902mm x 5.511mm	FRAME FOR TSSOP20 NiPd 2.4mm x 3.6 mm
Lead Plating Natures Thickness	Nickel : 0.25µm min 1.3µm max Palladium : 0.005µm min 0.05µm max Gold Silver : 0.01µm min 0.08µm max	Sn: 7µm min 20µm max	Sn: 7µm min 20µm max	Nickel : 0.4µm min 1.5µm max Palladium : 0.02µm min 0.15µm max Gold : 0.003µm min 0.02µm max
Wire bonding: Type /Diameter:	Ag 96.5% 0.8 MIL Diam	Ag 96.5% 0.8 MIL Diam	Au 1 MIL Diam	Au 0.8 MIL Diam
Molding Compound Supplier:	SUMITOMO EME-G700LS	SUMITOMO LOW ALPHA G631SHQ	SAMSUNG SG8300SY	Sumitomo EME-G700K
Package Moisture Sensitivity Level (JEDEC J-STD020D):	MSL 3	MSL 3	NO	MSL 1

MDG-MCD-RER1805
Reliability Report

3 APPLICABLE AND REFERENCE DOCUMENTS

DMS 0061692 :	Reliability Tests And Criteria For Qualifications
SOP 2.6.2:	Process qualification and transfer management
SOP 2.6.7:	Product Maturity Level
SOP 2.6.9:	Package and process maturity management in Back End
SOP 2.6.11:	Program management from product qualification
SOP 2.6.19:	Process maturity level
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
ANSI/ESDA/ JEDEC JS-001	Electrostatic discharge (ESD) sensitivity testing human body model (HBM)
ANSI/ESD STM5.3.1	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JEDEC JESD-C101	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JESD78	IC Latch-up test
JESD 22-A108	Temperature, Bias and Operating Life
JESD 22-A117	Endurance and Data retention
JESD 22-A103	High Temperature Storage Life
J-STD-020:	Moisture/reflow sensitivity classification for non-hermetic solid state surface mount devices
JESD22-A113:	Preconditioning of non-hermetic surface mount devices prior to reliability testing
JESD22-A118:	Unbiased Highly Accelerated temperature & humidity Stress Test
JESD22-A104:	Temperature cycling
JESD22-A101:	Temperature Humidity Bias
JESD22-A110:	Biased Highly Accelerated temperature & humidity stress Test

4 GLOSSARY AND TESTS DESCIPTION

HTOL	High Temperature Operating Life
EDR	Endurance and Data Retention
ELFR	Early Failure Rate
PC	Preconditioning (solder simulation)
THB	Temperature Humidity Bias
TC	Temperature cycling
uHAST	Unbiased Highly Accelerated Stress Test
HAST	Highly Accelerated temperature & humidity stress Test
HTSL	High temperature storage life
DMS	ST Advanced Documentation Controlled system/ Documentation Management system
ESD HBM	Electrostatic discharge (human body model)
ESD CDM	Electrostatic discharge (charge device model)
LU	Latch-up
CA	Construction Analysis

MDG-MCD-RER1805
Reliability Report

5 REVISION HISTORY

Version	Date	Author	Comment
1	01st October 2018	Antonio Di Giacomo	Initial release for LQFP32 & TSSOP20 Packages
2	16th January 2019	Cédric Chastang	Update package for UFQFPN 20L, UFQFPN 32L, SO8L, SO20L and back end Information typo error change in p13
3	20st February 2019	Cédric Chastang	Address SG8E change in p12
3.1	21st February 2019	Cédric Chastang	Change the second Approval List rev2 in rev 3.
4	11st February 2020	Antonio Di Giacomo Cédric Chastang	Add 765 and 766 products in LQFP80 and LQFP48 respectively Add 765 product in LQFP48 and LQFP64 and 766 in PDIP32
5	15th July 2020	Cédric Chastang	Add TSSOP20 Packages assembly line AMKOR ATP1 for 767

MDG-MCD-RER1805
Reliability Report

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PRODUCT/PROCESS CHANGE NOTIFICATION
PCN12224– Additional information

ST SG8E(Singapore)
additional ATP TSSOP20 HDLF Assembly line
for STM8S003x, STM8S103x and STM8S903x listed products

MDG - Microcontrollers Division (MCD)

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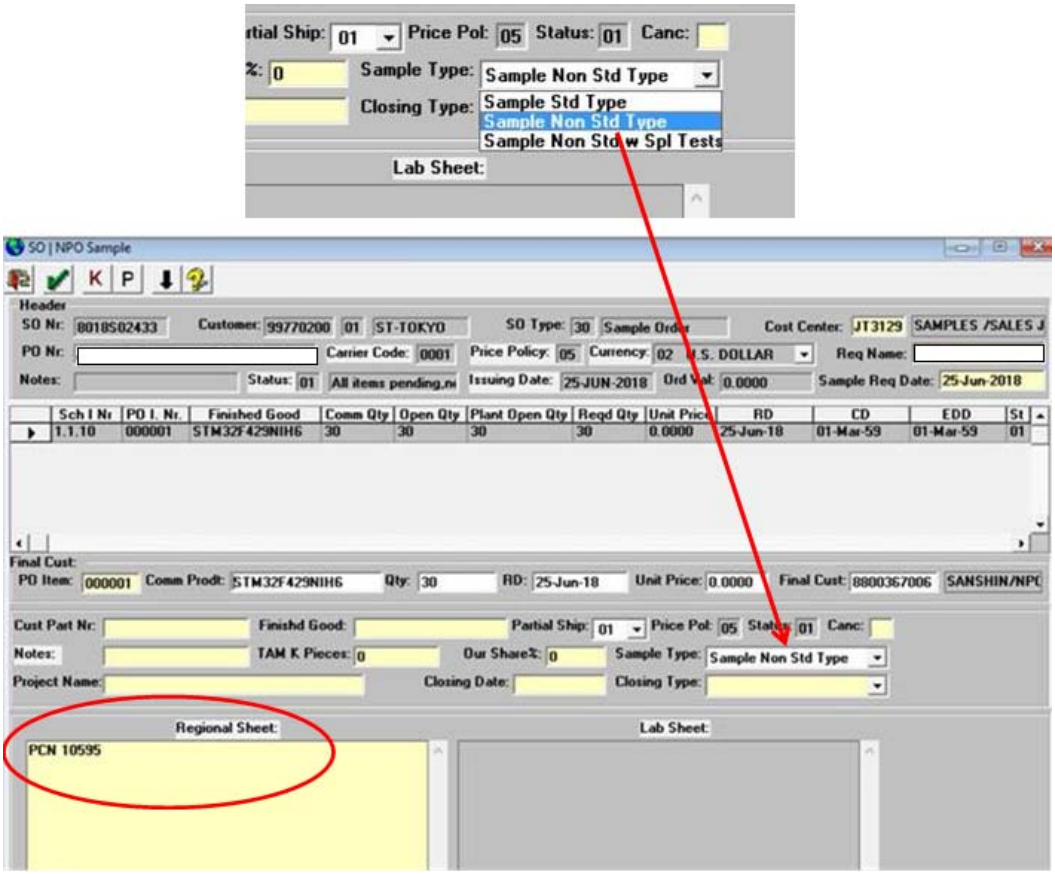
For all samples request linked to this PCN, please:

- place a **Non-standard** sample order (choose Sample Non Std Type from pull down menu)
- insert the PCN number "**PCN12224**" into the NPO Electronic Sheet/**Regional Sheet**
- request sample(s) through Notice tool, indicating a single Commercial Product for each request



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PCN Title : ST SG8E(Singapore) additional ATP TSSOP20 HDLF Assembly line for STM8S003x, STM8S103x and STM8S903x listed products

PCN Reference : MDG/20/12224

Subject : Public Products List

Dear Customer,

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

STM8S103F2P6	STM8S103F3P6	STM8S103F3P6TR
STM8S103F3P3TR	STM8S003F3P6TR	STM8S103F2P3
STM8S903F3P6	STM8S903F3P6TR	STM8S003F3P6
STM8S103F2P6TR	STM8S903F3P3	STM8S103F3P3
STM8SPLNB1P6	STM8S103F2P3TR	

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