

PRODUCT / PROCESS CHANGE INFORMATION

1. PCI basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCI No.		CRP/18/10710
1.3 Title of PCI		ALTERNATIVE METHODOLOGY FOR BIAS & LINEARITY STUDIES IN SEMICONDUCTOR INDUSTRY
1.4 Product Category		ALL automotive products
1.5 Issue date		2018-05-10

2. PCI Team

2.1 Contact supplier	
2.1.1 Name	MARSHALL DAVE
2.1.2 Phone	
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2.2 Change responsibility	
2.2.1 Process Owner	Guy CAUQUIL
2.1.2 Corporate Quality Manager	Roberto LISSONI

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Parametric Test	Modification of testing method or program with no change of test coverage and no change of spec limit	The improved methodology is ready to be applied on all ST manufacturing Front End plants.

4. Description of change

	Old	New
4.1 Description	<p>To conduct bias & linearity studies, AIAG MSA manual rely on a statistical approach based on t-test statistical value, which provides a criteria to judge if the difference in bias or linearity response is statistically different from zero compared to the repeatability of the metrology system.</p> <p>Bias & Linearity studies based on Ttest statistics approach conducted at several ST Front-End manufacturing plants, involving either identical or different metrology techniques tested over their operating range, all exhibit some bias error and nonlinear behavior.</p> <p>A clear picture on the consequences of this established situation versus the accuracy requirement has been highlighted by Sematech consortium few years ago and is summarized in the Sematech internal document in: http://sematech.org/docubase/document/Semiconductor_Industry_MSA_Practices.pdf</p>	<p>An alternative methodology to outdoing classical statistical approach as described in the AIAG MSA Manual - which appears to be no more suitable to the semiconductor industries - is provided by rather focusing the statistical studies on:</p> <ul style="list-style-type: none"> - The compliance of the bias to the metrology supplier accuracy - The stability of the linearity response of the system over time - The consistency of the linearity response within equipment fleet <p>The method which is described in the ST Company Specification "MEASURING SYSTEM ANALYSIS (M.S.A.)", DMS #0151977 is based on a statistical analysis to verify the good correlation (R2) between the values given by the metrology systems over their operation range. The method also allow to verify that the level of misalignment between metrology systems does not impact the quality decision judgment.</p>
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	form: no changes in the product fit: no changes in the product function: no changes in the product reliability or processability: no changes in the product	

5. Reason / motivation for change

5.1 Motivation	<p>Modern wafer fab's requirements have now even surpassed the expectations in the AIAG MSA manual. To fulfill the aggressive requirement of semiconductor product specifications, the metrology repeatability and stability improved very drastically. Two main aspects can be highlighted:</p> <ul style="list-style-type: none"> - In many cases, tolerance of reference standards are now much larger than the precision of the semiconductor metrology equipment themselves. This inevitably leads to the conclusion that statistically it exists a significant Bias even if this Bias is included in the tolerance provided by the best in-class worldwide certified instrument. Being this bias within the potential values, it is fully acceptable. - In the field of semiconductor metrology, metrology systems are used indifferently to measure all parameters in the manufacturing line coming from multiple products and equipment monitoring. They have to cover a very wide measurement range not only one product specifications. Linearity as well as uniformity (change in repeatability over operating range) or consistency (change in repeatability over time) actually varies significantly over the operating range of our metrology equipment. This is totally in compliance with process control requirements over the operating range. Still, due to the excellent repeatability of our metrology system, which is inherent to our industry requirements, this inevitably leads to the conclusion that the linearity error of our measurement systems is statistically significantly different from zero when compared to their repeatability. It appeared that the statistical approach for Bias and linearity studies as described in AIAG is not adapted to FE metrology semiconductor equipment due to their excellent repeatability. <p>Do not consider following Chapter 8 "Qualification / Validation": Please refer to ATTACHMENT to this notification for all details regarding qualification strategy (10710 PRODUCT - PROCESS CHANGE NOTIFICATION_rev3.docx).</p>
5.2 Customer Benefit	QUALITY IMPROVEMENT

6. Marking of parts / traceability of change

6.1 Description	ALL automotive products in the list
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7. Timing / schedule

7.1 Date of qualification results	2018-01-31
7.2 Intended start of delivery	2018-06-18
7.3 Qualification sample available?	Not Applicable

8. Qualification / Validation

8.1 Description			
8.2 Qualification report and qualification results	In progress	Issue Date	

9. Attachments (additional documentations)

10710 Public product.pdf
10710 PRODUCT - PROCESS CHANGE NOTIFICATION_rev3.docx

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
	BAT54SFILMY	
	BU941ZPFI	
	ESDAXLC6-1BT2	
	ESDCAN01-2BLY	
	L99SD01-E	
	SM15T200A	
	SM30T12AY	
	SMA6J5.0CA-TR	
	SMAJ15A-TR	
	SMAJ24CA-TR	
	SMAJ40CA-TR	
	STH315N10F7-2	
	STN3NF06L	
	STP315N10F7	
	STPS1H100AY	
1611385	STPS2150A	
	STPS2200U	

	STPS2H100AY	
	STPS3150U	
	STS5NF60L	
	STTH1L06A	
	STTH2R02A	
	STTH310UFY	
	USBLC6-2SC6Y	
	VN750PT-E	
	VN750PTTR-E	
	VND5N07-E	
	VNH3SP30TR-E	
	VNP10N07-E	
	VNP20N07-E	
	SMAJ170A-TR	
	STB75NF75LT4	
	VNP35N07-E	
	ESDA6V1-5SC6Y	
	SM30T10CAY	
	SM30T15AY	
	SM30T42AY	
	SM30T6.8AY	
	SM6T250CAY	
	ST25R3914-AQFT	
	ST25R3915-AQFT	
	STB27NM60ND	
	STBR3012WY	
	STGB20N45LZAG	
	STGB25N40LZAG	
	STGD20N45LZAG	
	STGD25N40LZAG	
	STGYA120M65DF2AG	
	STH410N4F7-6AG	
	STL115N10F7AG	
	STL140N4F7AG	
	STL190N4F7AG	
	STL45N10F7AG	
	STM8AF62A6UCY	
	STPS1L40ZFY	
	STPS1L60ZFY	
	STPS20H100CGY-TR	
	STPS2H100ZFY	
	STPS2L40ZFY	
	STPS2L60ZFY	
	STPS360AFY	
	STPS3H100AFY	
	STPSC10H12DY	
	STPSC10H12GY-TR	
	STPSC12065DY	
	STPSC15H12DY	
	STPSC20065DY	
	STPSC20065WY	

	STPSC20H12GY-TR	
	STTH15RQ06GY-TR	
	STTH16L06CTY	
	STTH1L06UFY	
	STTH2L06UFY	
	STTH2R02AFY	
	STTH30RQ06GY-TR	
	STTH3L06UFY	
	STTH3R02AFY	
	VN7050AJTR	
	VND7020AJTR	
	VNH5180ATR-E	
	VNH7070ASTR	
	VNH7070BASTR	
	VNH7100ASTR	
	VNH7100BASTR	

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