PRODUCT / PROCESS CHANGE INFORMATION

1. PCI basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCI No.	CRP/22/13586
1.3 Title of PCI	ATX Wei Hai* – Qualification of Reel Design Change for STM DPAK TO-252 Devices (*ATX Wei Hai formerly known as ASE Wei Hai)
1.4 Product Category	Refer to impacted product list
1.5 Issue date	2022-08-22

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	ATX Wei Hai

4. Description of change		
	Old	New
4.1 Description	Reel used for DPAK TO-252 devices fixed pin at hub to bond reel	Reel used for DPAK TO-252 devices welding at hub to bond reel.
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: No change on product	

5. Reason / motivation for change	
5.1 Motivation	The main benefits are: This change is for quality continuous improvement to have robust reel protection and enhance the reel strength by redesign.
5.2 Customer Benefit	QUALITY IMPROVEMENT

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

7. Timing / schedule	
7.1 Date of qualification results	2022-08-31
7.2 Intended start of delivery	2022-12-30
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	13586 Drop Test Result.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2022-08-22

9. Attachments (additional documentations)
13586 Public product.pdf 13586 PCI _ATX Wei Hai _Qualification of Reel Design Change for STM DPAK TO-252 Devices.pdf 13586 Jamming Assessment.pdf 13586 Drop Test Result.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
ACS120-7SB-TR	ACS120-7SB-TR	
	FERD15S50SB-TR	
	FERD2045SB-TR	
	FERD20H100SB-TR	
	FERD20S100SB-TR	
	FERD30H100SB-TR	
L78M05ABDT-TR	L78M05ABDT-TR	
L78M05ACDT-TR	L78M05ACDT-TR	
L78M05CDT-TR	L78M05CDT-TR	
L78M08CDT-TR	L78M08CDT-TR	
L78M09ABDT-TR	L78M09ABDT-TR	
L78M09CDT-TR	L78M09CDT-TR	
L78M12ABDT-TR	L78M12ABDT-TR	
L78M12ACDT-TR	L78M12ACDT-TR	
L78M12CDT-TR	L78M12CDT-TR	
L78M15ABDT-TR	L78M15ABDT-TR	
L78M15CDT-TR	L78M15CDT-TR	
LD1117DT33CTR	LD1117DT33CTR	
LM317MDT-TR	LM317MDT-TR	
	STD10N60M2	
	STD10NM60N	
	STD10NM60ND	
	STD10P6F6	
	STD11N50M2	
	STD11N65M2	
	STD11N65M5	
STD15NF10T4	STD15NF10T4	
STD17NF03LT4	STD17NF03LT4	
	STD2LN60K3	
	STD2NK100Z	
STD2NK90ZT4	STD2NK90ZT4	
	STD3N80K5	
STD3NK60ZT4	STD3NK60ZT4	
	STD4N62K3	
STD4NK60ZT4	STD4NK60ZT4	
	STD5N52K3	
	STD5N52U	
	STD5N60DM2	
	STD5N60M2	
	STD5N62K3	
STD5NK50ZT4	STD5NK50ZT4	
	STD6N52K3	
	STD6N65M2	

	STD6N80K5	
	STD7N60M2	
	STD7N80K5	
	STD7NM60N	
	STD80N10F7	
	STD8N60DM2	
	STD8N65M5	
	STD95N2LH5	
	STD9N60M2	
	STPS10170CB-TR	
STPS1045B-TR	STPS1045B-TR	
STPS15H100CB-TR	STPS15H100CB-TR	
STPS15L30CB-TR	STPS15L30CB-TR	
STPS15L45CB-TR	STPS15L45CB-TR	
STPS15L60CB-TR	STPS15L60CB-TR	
	STPS16170CB-TR	
STPS340B-TR	STPS340B-TR	
	STPS4S200B-TR	
STPS5H100B-TR	STPS5H100B-TR	
STPS5L25B-TR	STPS5L25B-TR	
STPS640CB-TR	STPS640CB-TR	
STPS8L30B-TR	STPS8L30B-TR	
STTH1002CB-TR	STTH1002CB-TR	
	STTH1003SB-TR	
	STTH25M06B-TR	
	STTH4R02B-TR	
	STTH506B-TR	
	STTH512B-TR	
STTH5L06B-TR	STTH5L06B-TR	
STTH5R06B-TR	STTH5R06B-TR	
	STTH802B-TR	
STTH802CB-TR	STTH802CB-TR	

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Drop Test Comparison For New and Current TO-252 Reel

GOBM Tommy TAO

Drop test for Current Vs New Reel

Drop test 1

1.Purpose

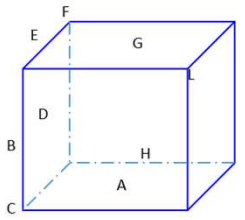
Verify current and new reel meet STM spec(doc no:7416802)

2.Scope

This evaluation applies to TO-252 product in inner box and outer box

3.Condition:

height (mm)	Figure	Test position
1200	Figure 1	Face A 、Edge B、Corner C
	Figure 2	Face D 、Edge E、Corner F
	Figure 3	Face G 、Edge H、Corner L



4. Procedure

a. Lift the test package and hold it in the predetermined attitude and height

b. Loose hand and make the product to free fall to the ground

c. Inspect reel & products after dropping

5. Conclusion

After drop test , both reel all pass with 7416802 spec.

Result	Box	Drop height	Follow STM spec requirement
Current	Outbox	1200mm	Pass
New	Outbox	1200mm	Pass
Current	Inner box	1200mm	Pass
New	Inner box	1200mm	Pass

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Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

7 PROCEDURES

7.1 Frequency: The tests must be carried out for the qualification of a new supplier and/or type of packing material.

7.2 Method of the execution:

7.2.1 Number of test specimens: Three test specimens (one for each of the three trials as described in

7.2.2 Area of impact: The area of impact must be a surface rigid, plain, smooth and horizontal

7.2.3 Height of drop: The box under test must be dropped from an approximate height of 120 cm, equivalent to the height typical for the manual transportation.

7.3 Execution and result of the tests:

7.3.1 Before the drop, the samples for the tests must be held in such a manner that their center of gravity is approximately situated on the vertical of the impact point.

7.3.2 Description of test: This test described below applies to drop tests done on the outer box.

Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

7.3.2.1 First specimen of test. Box under test is to be placed in position as indicated in Fig. 2.

a) First drop: flat on the bottom (see fig.1 / A)
b) Second drop: on an edge (see fig. 1 / B)
c) Third drop: on an angle (see fig. 1 / C)

7.3.2.2 Second specimen of test: Box under test is to be placed in position as indicated in Fig 3.

a) First drop: flat on a longitudinal side (see fig.1 / D)
b) Second drop: on a longitudinal edge (see fig. 1 / E)
c) Third drop: on an angle (see fig. 1 / F)

7.3.2.3 Third specimen of test: Box under test is to be placed in position as indicated in Fig 4.

a) First drop: flat on a transversal side (see fig.1 / G)
b) Second drop: on a transversal edge (see fig. 1 / H)
c) Third drop: on an angle (see fig. 1 / I)

7.3.3 In the case of a drop test performed on the inner box, the methodology is the same as that described in 7.3.2.1 to 7.3.2.3 above. The drop tests are however performed on three specimens of inner box each filled with devices. The faces of the box remain as those shown in Figure 1.

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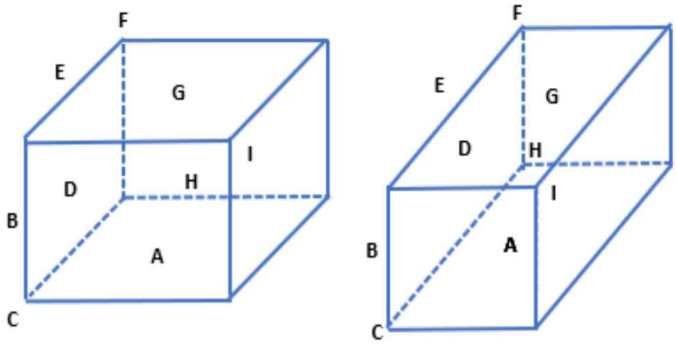
Drop test for Current Vs New Reel

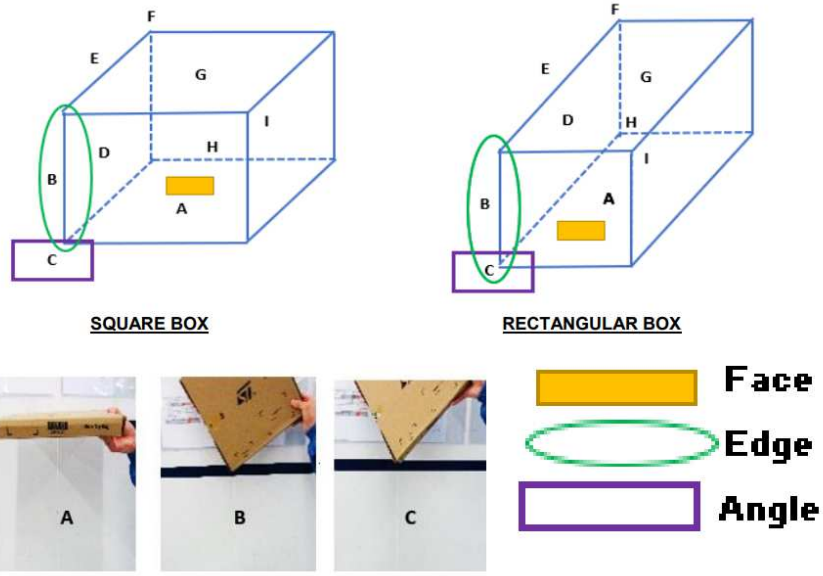
Drop test procedure defined in STM spec(doc no:7416802)

FIGURE 1



SQUARE BOX RECTANGULAR BOX

Figure 2: Box position for drop test on Face A, Edge B and Corner C.(Refer as well to sample Box picture)

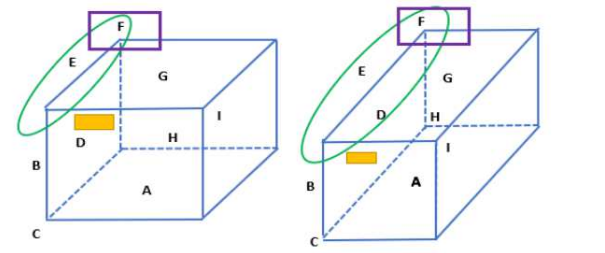


SQUARE BOX RECTANGULAR BOX

Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

Figure 3: Box position for drop test on Face D, Edge E and Corner F



SQUARE BOX RECTANGULAR BOX

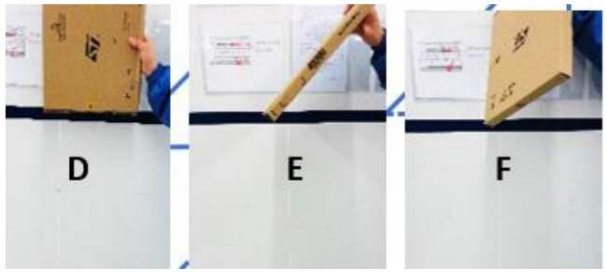
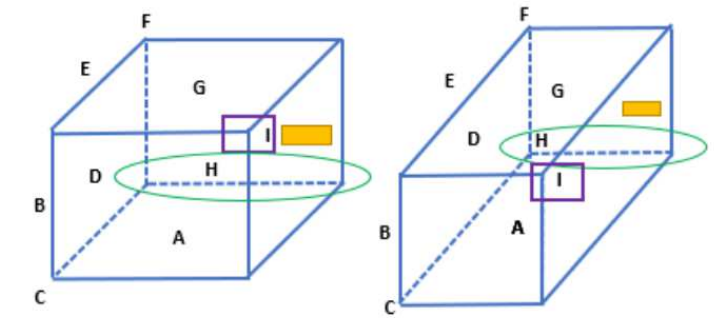
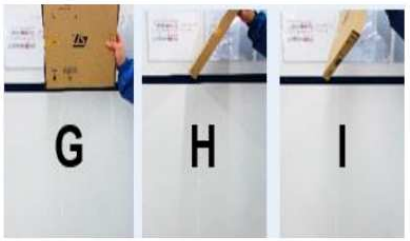


Figure 4: Position of inner box for drop tests on Face G, Edge H and Corner I.



SQUARE BOX RECTANGULAR BOX



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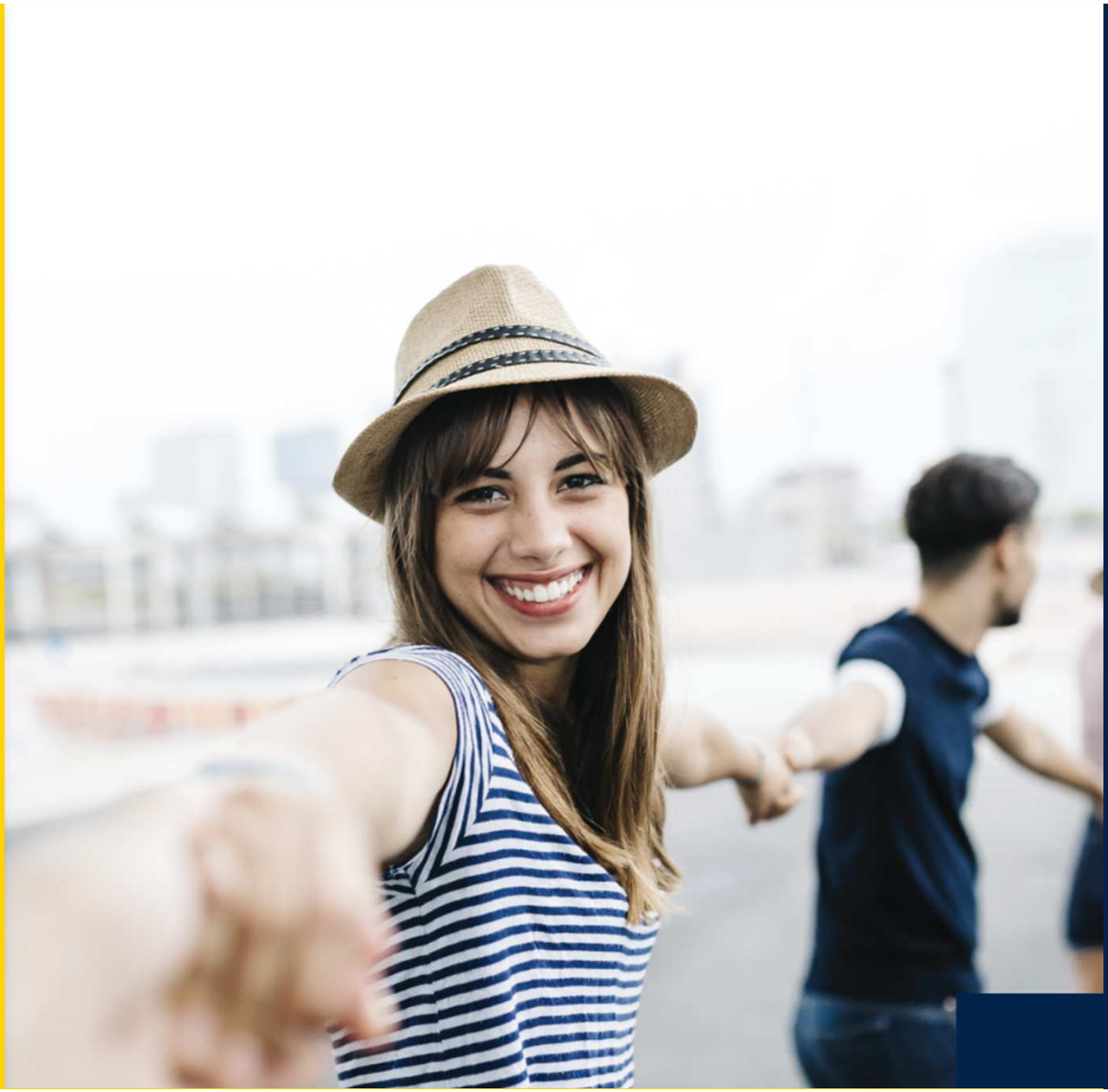

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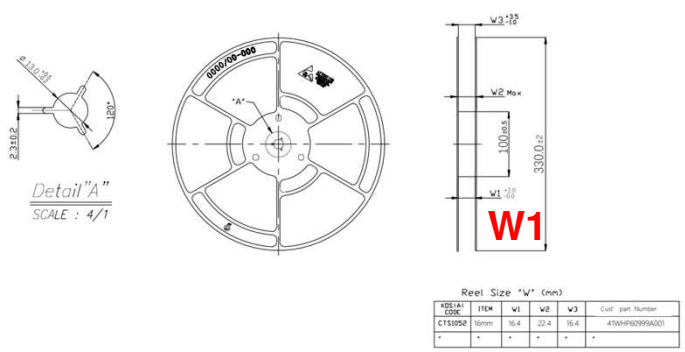
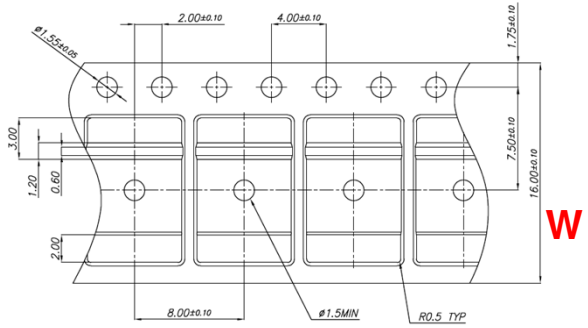
Jamming Assessment

GOBM Tommy TAO

Drawing design assessment



Reel drawing



Carrier tape drawing

The lower limit of reel width(W1) is 16.4mm.
The upper limit of carrier tape width(W) is 16.1mm.
So, there is no jamming risk even at the limit condition.

Winding and unwinding test

Winding test

Procedure :
1)Prepare 5ea current reels and 5ea new reels.
2)Winding the tape into reel in order by handler.
3)Monitor the winding status.
Result:

	Current reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

	New reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

Unwinding test

Procedure :
1)Prepare 5ea current reels and 5ea new reels with carrier tape.
2)Unwinding the tape out of reel in order on FVI workbench.
3)Monitor the unwinding status.
Result:

	Current reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

	New reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

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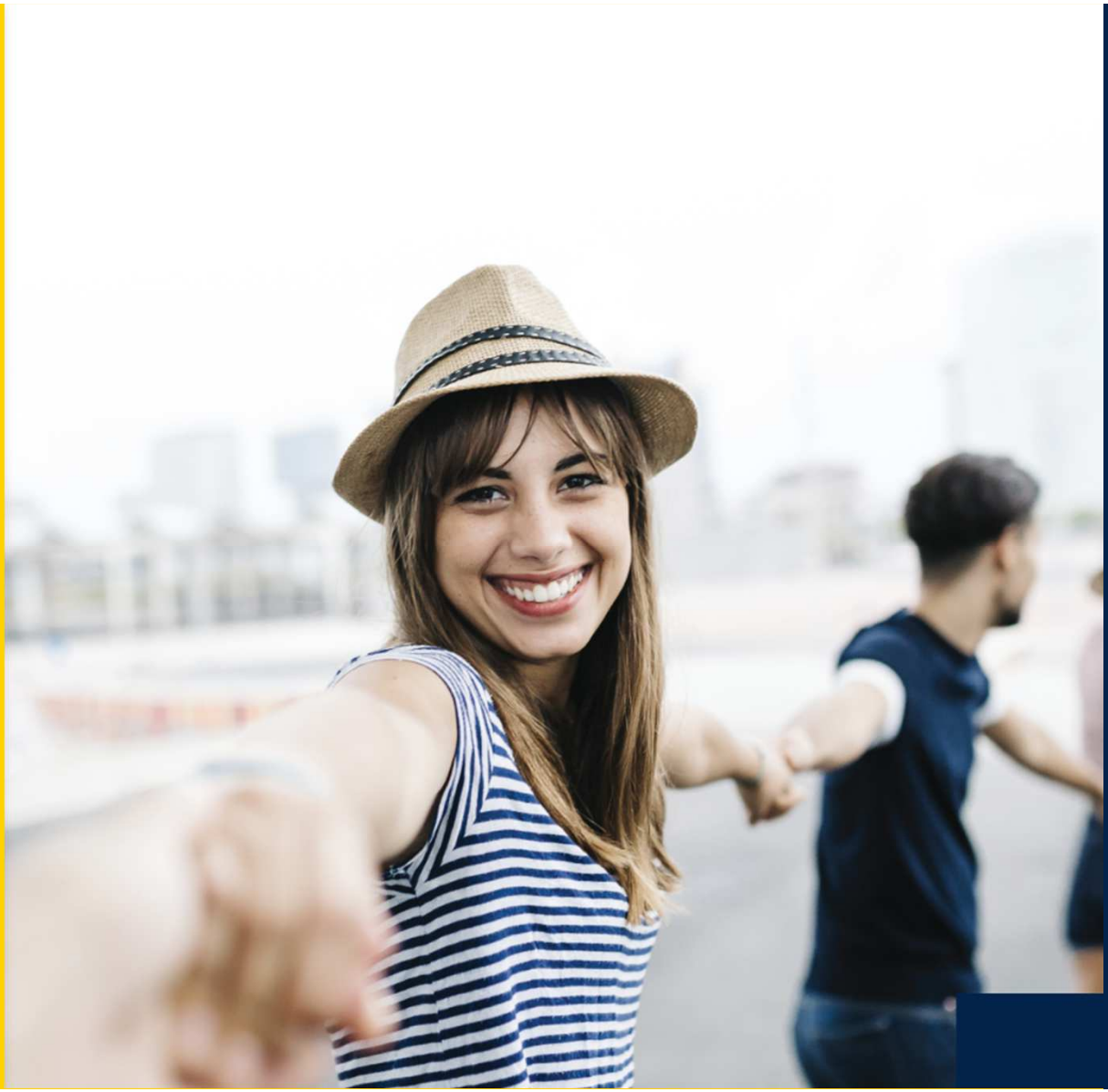

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PRODUCT / PROCESS CHANGE INFORMATION

PCI – ATX Wei Hai* – Qualification of Reel Design Change for STM DPAK TO-252 Devices

*: ATX Wei Hai formerly known as ASE Wei Hai

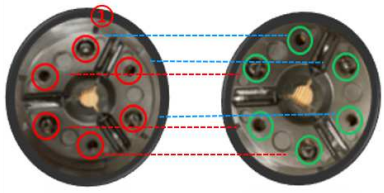
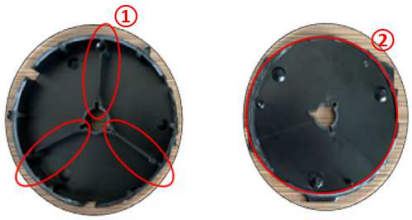
What is the change?

Current Condition:

Reel used for DPAK TO-252 devices **fixed pin** at hub to bond reel.

Proposed Condition:

Reel used for DPAK TO-252 devices **welding** at hub to bond reel.

Current reel (Fixed pin at hub)	New reel(Welding at hub)
	
① Hub connect by fix pin	① Hub have 3 stiffener ② Hub connect by side welding

Why?

The main benefits are:

This change is for quality continuous improvement to have robust reel protection and enhance the reel strength by redesign.

When will this change occur?

The change will be implemented at the end of Dec'22.

How will the change be qualified?

Perform drop test, jamming assessment and dimension comparison between current reel and new design reel. (**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: No change on product.

APPENDICES:

APPENDIX 1 Risk Assessment

APPENDIX 2 Qualification Plan

APPENDIX 3 Qualification Results

APPENDIX 1: RISK ASSESSMENT

Change Risk Assessment				
Category	**S/N**	**Risk Description**	**Risk Level (H/M/L)**	**Risk Mitigation Plan Description**
Change to process	1	Wrong information on Lot card	L	Engineer setup new packing part No. on the Lot card and other engineer pre-view information on Lot card is correct by device
	2	Wrong reel used	L	Follow Lot card information to take new packing material, training operator double check follow with Lot card and FVI operator double check it
Change to material	3	Carrier tape jamming in reel	L	1. Size comparison for carrier tape and reel design 2. IQA sample check received reel dimension 3. Operator monitor reel rolling status with carrier tape

APPENDIX 2: QUALIFICATION PLAN

1. Perform drop test 1 to verify current reel and new reel whether meet STM spec 7416802.

2. TO-252 reel dimension measurement comparison to check the gap between current reel and new reel, and to check whether meet STM spec 0084694.

3. Perform jamming assessment by winding and unwinding test:
    a. Total 5ea current reels and 5ea new reels per test.
    b. Wind the tape into reel in order by handler.
    c. Unwinding the tape out of reel in order on FVI workbench.

APPENDIX 3: QUALIFICATION RESULTS

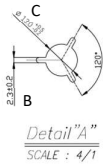
1. Drop test 1 is passed.

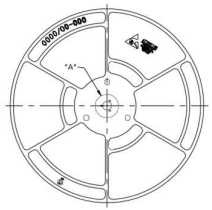
Drop Test Result.pptx

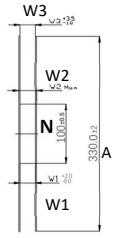
2. New reel meets ST spec and has little gap compared with current reel. (Difference is marked in red)

ITEM NO.	A	N	W1	W2	W3	C	B
Current Reel	330 ± 2.0	100+2.0/-0.5	17.65+1.75/-0.75	22.4MAX	17.65+3.5/-1.0	13.0+0.5/-0.2	1.5min
Sample1	330.40	100.35	17.21	21.22	17.42	13.13	2.15
Sample2	330.50	100.55	17.30	21.34	17.51	13.21	2.13
Sample3	330.50	100.40	17.11	21.10	17.29	13.19	2.19
Sample4	330.30	100.21	17.22	21.22	17.40	13.20	2.16
Sample5	330.00	100.10	17.25	21.25	17.41	13.22	2.13
Result	PASS	PASS	PASS	PASS	PASS	PASS	PASS

ITEM NO.	A	N	W1	W2	W3	C	B
New Reel	330 ± 2.0	100 ± 0.5	16.4+2.0/-0.0	22.4MAX	16.4+3.5/-1.0	13.0+0.5/-0.2	2.3 ± 0.2
Sample1	330.50	100.31	16.79	20.86	16.92	13.26	2.21
Sample2	330.40	100.25	16.93	20.95	17.21	13.38	2.29
Sample3	330.40	100.13	16.74	20.81	16.90	13.39	2.30
Sample4	330.30	100.26	16.88	20.92	16.98	13.41	2.31
Sample5	330.20	100.11	16.69	20.77	16.90	13.32	2.22
Result	PASS	PASS	PASS	PASS	PASS	PASS	PASS







Reel Size "W" (mm)

KOSTAT CODE	ITEM	W1	W2	W3	Cust' part Number
CT33052	16mm	16.4	22.4	16.4	41WHP60999A001
-	-	-	-	-	-

3. No jamming happened.

Jamming Assessment.pptx

Conclusion

1. Qualification results are positive.
2. In the dimension comparison, W1 and W3 have a gap and narrower than current reel. They are related to rolling status with carrier tape.
   After jamming simulation, no risk for W1 and W3 dimension gap.
3. In the dimension comparison, the range of B has changed. It is related to reel placed in the machine.
   Due to gap of sample check is close and both can fix in the machine, no risk for B dimension gap.

Public Products List

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PCI Title : ATX Wei Hai* – Qualification of Reel Design Change for STM DPAK TO-252 Devices (*ATX Wei Hai formerly known as ASE Wei Hai)

PCI Reference : CRP/22/13586

Subject : Public Products List

Dear Customer,

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

L78M09CDT-TR	STTH802B-TR	ACS120-7SB-TR
L78M05ACDT-TR	STPS640CB-TR	STTH1004SB-TR
STPS15H100CB-TR	STD3NK80ZT4	STTH506B-TR
L78M05ABDT-TR	STPS15L30CB-TR	STD8N60DM2
STD7N80K5	STD2NK100Z	STD7NM60N
STTH4R02B-TR	STD5N52U	STPS1045B-TR
STD4NK60ZT4	STPS4S200B-TR	FERD2045SB-TR
STD11N65M5	STTH10LCD06SB-TR	L78M08ABDT-TR
STD10P6F6	STD95N2LH5	STPS8L30B-TR
STD7NK40ZT4	FERD20H100SB-TR	STPS16170CB-TR
STD5N62K3	STD4N62K3	STD11N65M2
STD5N60DM2	STTH802CB-TR	STTH8S06B-TR
STD2NK90ZT4	STD10NM60N	STD5N60M2
STTH1002CB-TR	FERD20S100SB-TR	L78M15CDT-TR
STD6N65M2	STPS15L45CB-TR	STTH25M06B-TR
STTH1003SB-TR	STD2LN60K3	FERD15S50SB-TR
L78M08CDT-TR	STPS15L60CB-TR	STD10N60M2
STD5NK50ZT4	L78M09ABDT-TR	L78M15ABDT-TR
STD3N80K5	STD9N60M2	STTH5R06B-TR
STPS5L25B-TR	STPS20120CB-TR	STD80N10F7
LD1117DT33CTR	L78M12ABDT-TR	STD5N52K3
FERD30H100SB-TR	STTH5L06B-TR	L78M12ACDT-TR
STPS5H100B-TR	L78M12CDT-TR	STPS340B-TR
STD6N80K5	LM317MDT-TR	STD3NK60ZT4
STD11N50M2	STD7N60M2	STPS10170CB-TR
L78M05CDT-TR	STD15NF10T4	STD8N65M5
STTH512B-TR	STD6N52K3	

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