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FAILURE ANALYSIS REPORT

(KLM8G1GETF-B041)

For: FOXCONN TECHNOLOGY CO., LTD-TW

Aug 22, 2024

Memory Quality Assurance

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I GENERAL INFORMATION

The plan for solving the problem was based on the following general information and prerequisites:

Customer	FOXCONN TECHNOLOGY CO., LTD-TW	Samsung FAR No.	TW240259
ODM Customer	-	Customer FAR NO.	-

Branch Far No.		Date of Failure.	Jun 29, 2024
Failure Location	Field	Failure Rate	-
Customer Part No.	-	Return Quantity	5
Samsung Part No.	KLM8G1GETF-B041	Device Type	eMMC
Week Code	See the next page.	Lot No	See the next page.
Customer Application	Etc	Model Name	-
Received Date	Aug 02, 2024	Report Date	Aug 22, 2024

II FAILURE ANALYSIS RESULT

DISCIPLINE 1. TEAM MEMBERS

This is a Failure Analysis report for the Samsung eMMC(eMCP) product returned for analysis. The failure analysis was performed by a team consist of Quality Assurance engineers, Product engineers, Package engineers, Design engineers and Software engineers.

1.1 TEAM MEMBERS INFORMATION

Team Members	Department	Name	Job Title
	Quality Assurance	HS, Min	Project Leader
		Jinhwan Kim	Staff Engineer
	CS	Jongwoo Paek	Project Leader
		Suhyun Ahn	Engineer

DISCIPLINE 2. DESCRIPTION OF THE PROBLEM

The device(s) were returned based on the following background information and expectations:

Return Category	Field
Failure Rate	-
Failure Symptom or Analysis Result	Cannot upload file to eMMC.
Customer Comment	Failure analysis & Corrective action

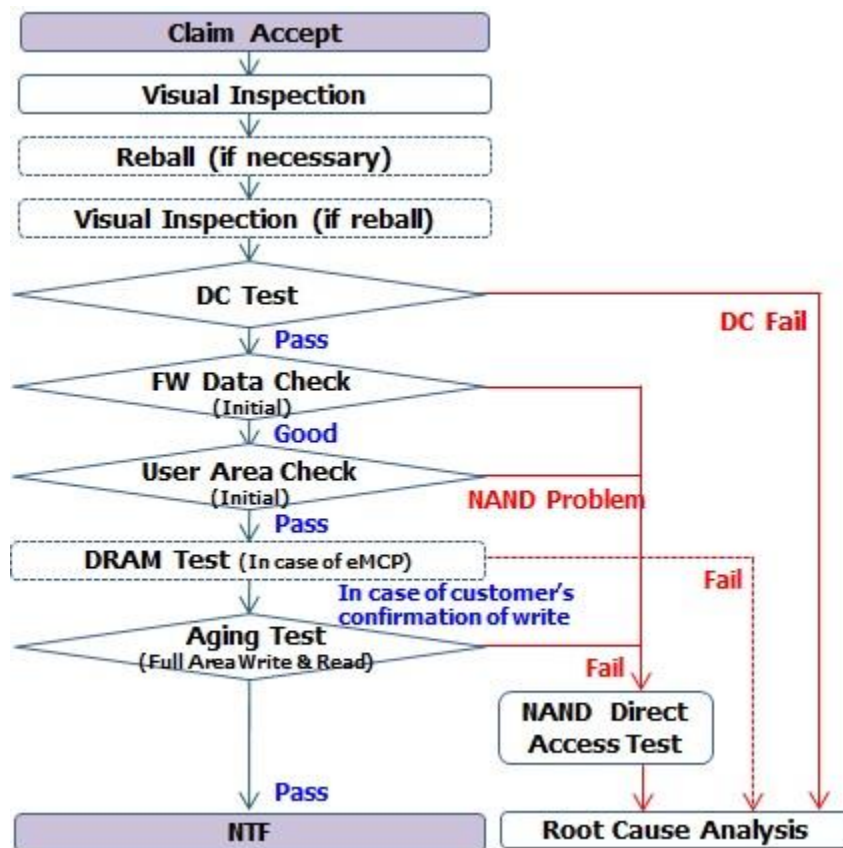
DISCIPLINE 3. DEFINE THE ROOT CAUSE

3.1 Summary

Based on our analysis, the returned part(s) has been verified and the FA result is presented below;

S/N	Customer S/N	W/C	Lot No	Failure Information	Analysis Result
1	1	249	NU8F1LJF	Cannot upload file to eMMC	CND
2	2	246	NUBVKSJUS		CND
3	3	249	NURPKNKVN		CND
4	4	237	NU956UHJU		CND
5	5	246	NUAZ9LHR		Mechanical Damage

3.1.1 Analysis Flow Chart



3.2 Failure Analysis Techniques and Results

3.2.1 Visual Inspection

Visual inspection was performed using naked eyes, and followed by a microscope inspection to find any defect or contaminations. Please refer to the followings:

S/N	Customer S/N	W/C	Lot No	Analysis Results
1	1	249	NU8F1LJF	GOOD
2	2	246	NUBVKSJUS	GOOD
3	3	249	NURPKNKVN	GOOD
4	4	237	NU956UHJU	GOOD
5	5	246	NUAZ9LHR	GOOD

3.2.2 DC Test

A DC test was performed on the returned unit(s) and the Table below has the results:

S/N	Customer S/N	DC Test		
		Open/Short Test	Leakage Current Test	Standby Test
1	1	PASS	PASS	PASS
2	2	PASS	PASS	PASS
3	3	PASS	PASS	PASS
4	4	PASS	PASS	PASS
5	5	PASS	PASS	FAIL

3.2.3 FW Analysis Result

A firmware analysis was performed and the Table below has the test results.

S/N	Customer S/N	W/C	Lot No	Initialization Test Results	FW Analysis Results
1	1	249	NU8F1LJF	FAIL	Meta corruption
2	2	246	NUBVKSJUS	FAIL	Meta corruption
3	3	249	NURPKNKVN	FAIL	Meta corruption
4	4	237	NU956UHJU	FAIL	Meta corruption
5	5	246	NUAZ9LHR	FAIL	NAND ID Read Fail

3.2.4 NAND Level Test Result

To duplicate the customer failure symptom, functional test was performed. The results are as below;

S/N	Customer S/N	W/C	Lot No	Analysis Results
1	1	213	NTWF99IKU	PASS
2	2	210	NTB7KKIIS	PASS
3	3	243	SHVR4SGAS	PASS
4	4	249	NV2AWSGQS	PASS

3.2.5 Functionality & Aging Test

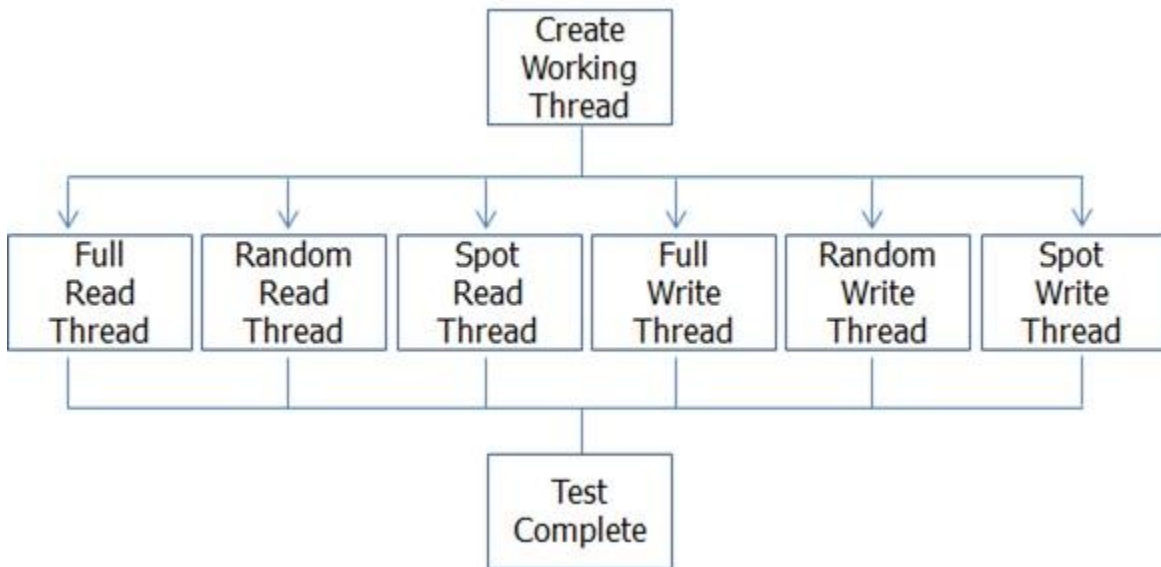
To duplicate the customer failure symptom, functional test and aging test was performed. The results are as below;

S/N	Customer S/N	W/C	Lot No	Functionality Results	Aging Results
1	1	213	NTWF99IKU	PASS	PASS
2	2	210	NTB7KKIIS	PASS	PASS
3	3	243	SHVR4SGAS	PASS	PASS
4	4	249	NV2AWSGQS	PASS	PASS

We performed the Aging test over 24 hours totally on the chamber.

As a result, device had passed an additional test without any failure symptoms.

Test conditions are as below.



[Test Flow]

Test Item :

1. Operation : Sequential Write & Read, Random Write & Read
2. eMMC Pattern : Test Worst Pattern & Random Pattern
3. User Scenario (File Copy & Paste)

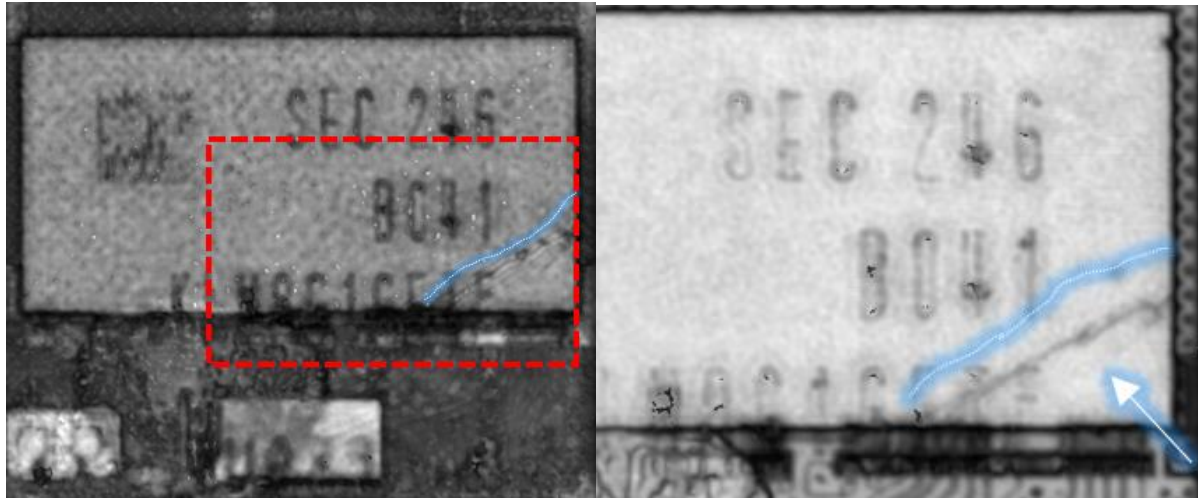
3.2.6 Physical Analysis Result

To figure out the defect point(s) visually, physical analysis was performed. The result is as below;

3.2.6.1 Non-destructive Analysis

To find a root cause of failure, non-destructive analysis was performed. The analysis results are as below;

[Sample #5] – Chip Crack



DISCIPLINE 4. CONTAINMENT PLAN

NA

DISCIPLINE 5. PERMANENT CORRECTIVE ACTION

NA

DISCIPLINE 6. VERIFICATION OF EFFECTIVENESS

NA

DISCIPLINE 7. PREVENT RECURRENCE

Based on our analysis, conclusion was made for the returned part(s) as per below and please refer to our action(s) for each mode(s).

Conclusion

Fail Mode	Quantity		Sample No.
CND	4	Part(s)	1,2,3,4
Mechanical Damage	1	Part(s)	5

7.1 CND (Can Not Duplicated)

Based on the test results, we think the failed units were caused by unexpected environment which is sudden power off, unstable power supply etc.

7.2 Mechanical Damage

Based upon our analysis, the returned unit(s) was verified as initial failure due to mechanical damage cause by some external stress (Handling mistake, etc.). This type of mechanical damage problem can come from handling mistake in user site. We have already done continuous education for the people in production line to deal with device carefully so that we can eliminate damage possibility. Thus, we believe it is low possibility that this problem happens during our packing process. Also, we kindly ask careful handling for this product at your site.

DISCIPLINE 8. CONGRATULATE THE TEAM

We really appreciate customer's feedback to improve the quality of SAMSUNG products. We have been doing our best to resolve each quality issue from customers continuously.