

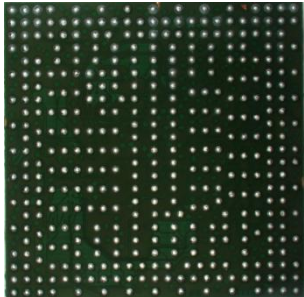
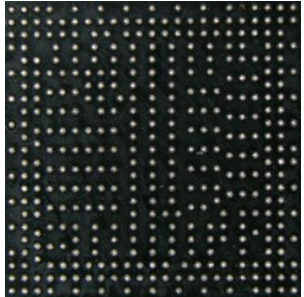
Failure Analysis Report

TO: FOXCONN		Due Date: 2023-09-16															
ATTN:		Open Date: 2023-09-03															
FROM: Amlogic		CC:															
☒ AMLOGIC FA NO. : FAZ2309S01																	
SUBJECT: S905X2-B																	
DISCIPLINE 1	INTERNAL MEMBER	EXTERNAL MEMBER															
USE TEAM APPROACH:	Member: CQE team, FAE team, test team, Sales team, Software team, etc.	Member: NA															
DISCIPLINE 2	ISSUE DESCRIPTION																
Customer: FOXCONN Device: S905X2-B Qty: 2ea																	
Problem description: The customer returned 2pcs S905X2-B chips for failure analysis after the product test. They reported "4K video noise and HDMI issue"																	
Detail information of chip as following:																	
<table border="1"><thead><tr><th>No.</th><th>PN</th><th>Lot No.</th><th>Date Code</th><th>Defect symptom</th></tr></thead><tbody><tr><td>#1</td><td>S905X2-B</td><td>PRK086.00</td><td>E22221N00813</td><td>4K video noise</td></tr><tr><td>#2</td><td>S905X2-B</td><td>PPT126.00</td><td>E2224747B333</td><td>HDMI no output</td></tr></tbody></table>			No.	PN	Lot No.	Date Code	Defect symptom	#1	S905X2-B	PRK086.00	E22221N00813	4K video noise	#2	S905X2-B	PPT126.00	E2224747B333	HDMI no output
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DISCIPLINE 3	Containment Action																
Perform analysis for suspect chips which were returned by customer to find root cause.																	
DISCIPLINE 4	Issue Investigation																

FA analysis as following :

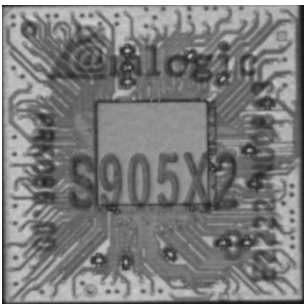
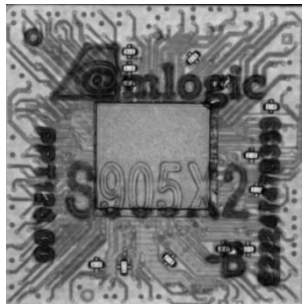
1. External Visual Examination

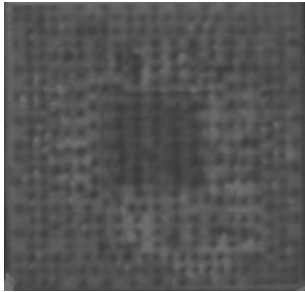
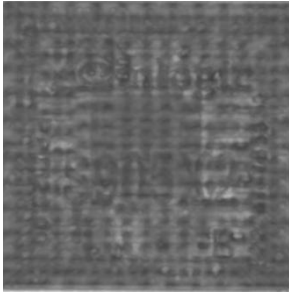
The external condition of the unit was inspected by stereo microscope.
No obvious crack or warpage etc was observed.

No.	#1	#2
Top		
Bottom		

2. Scanning Acoustic Microscopy Inspection

The internal condition of the unit was inspected by scanning acoustic microscopy.
The SAT result is normal.

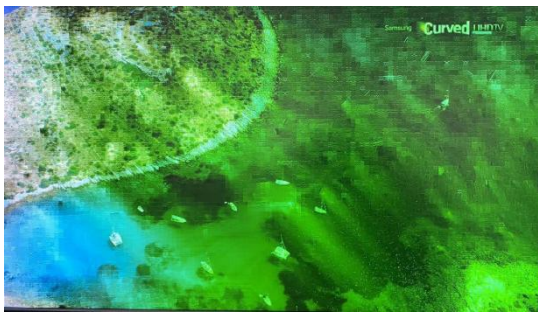
No.	#1	#2
C-scan		

No.	#1	#2
T-scan		

3. Socket Board Test(SKT)

The units were tested by socket board test, the test result was as follows:

NO.	Test result
#1	System could bootup normally but played 4KH265 video abnormally
#2	System could bootup normally and played 4KH265 video normally

NO.	4KH264 normal	4KH265 abnormal
#1		

NO.	4KH264 normal	4KH265 normal
#2		

4. Automatic Test Equipment Testing

The units were tested by automatic test equipment, the test result was as follows:

NO.	FT Test result
#1	BIST failed
#2	Function failed

Partial data is as below:

#1

```
===== Started Testsuite test547_BIST_M4_ROM_ONLY =====

***** Started Site : 1 *****
Equation Set 34; Spec Set 1; Timing Set 1
Equation Set 2; Spec Set 1; Level Set 1
Startlabel: G12A_test547_BIST_M4_ROM_ONLY_2018_03_21_RevB
test_number : 67

----- Test Name: Functional[1]: FAILED -----
Functional[1]: FAILED
Pass/Fail Limit: 1.000000 (Equal means passed)
----- Pin Results -----
      (null) FAILED 0.000000
```

#2

```
(null) FAILED 24998.000000
----- Test Name: VER_limit[1]: FAILED -----
VER_limit[1]: FAILED
      (null) FAILED 0.000000
Executed Testmethod G12A tml.t580.t580_spi_with_binfile_check on Site 3: FAILED
Site 3 has FAILED. Binned to bin 801(8)
----- Test Name: SPI_limit[1]: FAILED -----
SPI_limit[1]: FAILED
      (null) FAILED 0.000000
----- Test Name: debug_valid[1]: FAILED -----
debug_valid[1]: FAILED
      (null) FAILED 0.000000
Executed Testmethod G12A tml.efuse.Efuse_Read_Check_Index on Site 3: FAILED
Site 3 has FAILED. Binned to bin 810(8)
----- Test Name: SPI_limit[1]: FAILED -----
SPI_limit[1]: FAILED
      (null) FAILED 0.000000
----- Test Name: debug_valid[1]: FAILED -----
debug_valid[1]: FAILED
      (null) FAILED 0.000000
Executed Testmethod G12A tml.efuse.Efuse_Read_Check_Index_recheck on Site 3: FAILED
Site 3 has FAILED. Binned to bin 814(8)
----- Test Name: EDGE[1]: FAILED -----
EDGE[1]: FAILED
```

5. System level Test

The suspected chip need to be decrypted by customer if performing SLT

6. RD Analysis:

The #1 chip was Decoder module damaged,the current FT and SLT could filter this defective chip

FA Summary:

No.	Issue description	Visual inspection	SAT	SKT	FT	RD
#1	4K video noise	Normal	Normal	4KH265 video abnormal	BIST failed	Decoder module damaged
#2	HDMI no output	Normal	Normal	Normal	Function failed	NA

DISCIPLINE 5**Root Cause**

As a result of FA summary:

- 1.The No.1 chip conclusion is Decoder module failed. It occurred after shipment because Amlogic's FT/SLT program is able to 100% screen this defect and the chips are 100% tested.
- 2.The No.2 chip failed FT due to IC encryption,but could play 4K video normally on the socket board test.
Recommended customer performing correlation.

DISCIPLINE 6**Verification of Corrective Action**

NA

DISCIPLINE 7**Preventive Action**

NA

DISCIPLINE 8**Final Approval**

Appreciated team members' cooperation.