

## Failure Analysis Report

### 1. GENERAL INFORMATION

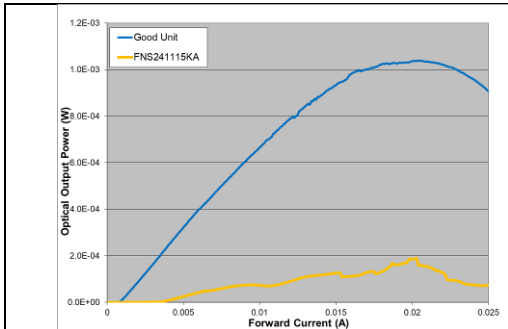
<b>Coherent RMA Number</b>	987360 - 1.1	<b>Customer</b>	JABIL CIRCUIT SDN BHD (IPC)
<b>Coherent Part Number</b>	FTLF8518P4BNL-C1 (Cisco P/N: 10-2626-01)	<b>End Customer</b>	CISCO SYSTEMS
<b>Failure Analysis Report Date</b>	02/07/2023	<b>Customer Reference</b>	3908620-CISCO
<b>Analysis by</b>	Liau Jian Yang	<b>Received Date</b>	02/01/2023

### 2. Summary

Serial number (S/N)	Date Code / Traceability	Customer Reported Failure / Issue	FA Findings
FNS241115KA [N36C7ZV]	20-11	TRAFFIC_TEST_RESULT Slot : 6 = FAIL Failed () TRAFFIC_TEST_RESULT Slot : 4 = FAIL Failed () TRAFFIC_TEST_RESULT Slot : 2 = FAIL Failed () TRAFFIC_TEST_RESULT Slot : 1 = FAIL Failed () PACKETS_DROPPED = 1000.0 Failed () DDM_TX_POWER = -999.9	Customer reported failure was confirmed. Module failed with low Tx power. The failure was isolated to faulty VCSEL with TOSA.

### 3. Failure Analysis Details

S/N(s): FNS241115KA

FA Steps	Results												
Visual-Mechanical Inspection	No anomaly could be observed on the module.												
Functional tests	The module failed with low Tx power.												
Digital Diagnostic test	<div>Module digital diagnostics (DDM) reported high laser bias current (LDI) and nominal Tx power. The comparison between pre-shipment and post-shipment data is summarized in the table below.</div> <table><thead><tr><th>Condition</th><th>LDI (mA)</th><th>Diagnostic Tx power (dBm)</th><th>Measured Tx power (dBm)</th></tr></thead><tbody><tr><td>Before Shipment</td><td>-</td><td>-4.48</td><td>-4.36</td></tr><tr><td>Upon Return</td><td>11.928</td><td>-12.35</td><td>-12.68</td></tr></tbody></table>	Condition	LDI (mA)	Diagnostic Tx power (dBm)	Measured Tx power (dBm)	Before Shipment	-	-4.48	-4.36	Upon Return	11.928	-12.35	-12.68
Condition	LDI (mA)	Diagnostic Tx power (dBm)	Measured Tx power (dBm)										
Before Shipment	-	-4.48	-4.36										
Upon Return	11.928	-12.35	-12.68										
Internal inspection	No anomaly could be observed on the PCBA and OSA assembly.												
Electrical probing	Probing on the components of PCBA up to Tx hotbar area along the Tx path did not show any abnormality. This suggests the fault was internal to the TOSA.												
TOSA light current voltage curve (LIV)	<div>TOSA was then removed and tested separately. LI sweep showed low optical output power (Fig. 1). This confirms the failure was due to a faulty VCSEL within the TOSA.</div> <div></div> <div>Fig. 1 - Forward LI Traces</div>												

### 4. Root cause (RC), containment, and corrective actions

RC analysis	Module failed with high laser bias current. Failure was isolated to a faulty VCSEL within the TOSA.
Failure mechanism	A faulty VCSEL within the TOSA caused the module to fail.
Containment/ Corrective action(s)	N/A
Risk Assessment	<p>Wafer#: 180105-70</p> <p>Coherent has been shipping this product in high volume for more than 4 years and the failure rate is less than 100 DPPM.</p>

## 5. Conclusion

S/N(s): FNS241115KA

Customer reported failure was confirmed. Module failed with low Tx power. The failure was isolated to faulty VCSEL within the TOSA.

Coherent has been shipping this product in high volume for more than 4 years and the failure rate is less than 100 DPPM.

*Note: This FAR is considered closed should there be no feedback from the customer within 2 weeks*