Supplier Root Cause and Corrective Action (RCCA) Response and Intelex System Guideline

<table>
<thead>
<tr>
<th>Global Procurement &amp; Materials (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keysight Technologies</td>
</tr>
</tbody>
</table>
Content

1. Objectives & Scope
2. Eight Discipline (8D) Approach Guideline
3. Intelex System Guideline
Eight Discipline (8D) Approach Guideline
Objective

- This document guide suppliers
  - To identify the real root cause and implement the corrective action effectively to prevent the recurrence.
  - To answer the Supplier Corrective Action Request (SCAR)/External Sub Case (ESC) through Intelex System.
- To cascade the Keysight requirement to suppliers
  - Supplier shall respond to Supplier Corrective Action Request (SCAR) within fourteen days upon supplier receipt of the defective part. Supplier may extend the supplier’s response time to more than fourteen days with valid justification.

Scope

- All Keysight Suppliers
Supplier Corrective Action Request (SCAR)

8D APPROACH

D1 Team Formation
D2 Problem Definition
D3 Containment Action
D4 Root Cause Analysis
D5 Corrective Action
D6 Risk Management
D7 Verify Effectiveness
D8 Team Recognition
D1 Team Formation

Establish a small group of people with the process or product knowledge, allocate time, authority, and skill in the required technical disciplines to solve the problem and implement corrective actions.

Guideline:
Team members should include as below (but not limited to)

• Cross Functional or Multi Disciplinary
• Process Owner & Technical Expert
• Others involved in the containment, root cause analysis, correction and prevention of the

Example:

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashly Tan CY</td>
<td>Product Engineer</td>
<td><a href="mailto:ashly_Tan@supplier.com">ashly_Tan@supplier.com</a></td>
</tr>
<tr>
<td>Jackson Bill</td>
<td>Quality Engineer</td>
<td><a href="mailto:jackson_bill@supplier.com">jackson_bill@supplier.com</a></td>
</tr>
<tr>
<td>Yeong Wei Ting</td>
<td>Process Engineer</td>
<td><a href="mailto:weiting_yeong@supplier.com">weiting_yeong@supplier.com</a></td>
</tr>
</tbody>
</table>
**D2 Problem Definition**

Problem verification is the first step of problem investigation. There are 3 main activities:

- Verify the problem
- Collect information
- Describe the problem

**Guideline:**

To describe the problem specifically, (5W2H) terms (who, what, where, when, why, how, and how many) would help.

<table>
<thead>
<tr>
<th>5W2H</th>
<th>Questions to ask</th>
<th>Answer should be provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who</td>
<td>Who first observed? / Who is affected?</td>
<td>- Location of defect found</td>
</tr>
<tr>
<td>What</td>
<td>What type of problem? / What has the problem? / What is happening?</td>
<td>- Failure reported/ Part Number/ Model/ Detail description of failure</td>
</tr>
<tr>
<td>Why</td>
<td>Why it is a problem?</td>
<td>- Detail description on the failure and verification done/ Date code of defective part</td>
</tr>
<tr>
<td>Where</td>
<td>Where was the problem observed/ occur?</td>
<td></td>
</tr>
<tr>
<td>When</td>
<td>When the problem first noticed?</td>
<td></td>
</tr>
<tr>
<td>How much/many</td>
<td>How much/ many involved?</td>
<td>- Quantity affected</td>
</tr>
<tr>
<td>How often</td>
<td>What is the trend? Has the problem occurred previously?</td>
<td>- Failure history</td>
</tr>
</tbody>
</table>

**Example:**

- SCAR Number: 1234-SCA-567-ESC-890
- Keysight Part Number: 1234-5678
- Failure Description: 1234-5566 is received instead of the correct part (1234-5678). One piece rejected out of total received quantity hundred pieces. The defective part date code is 0421. This is the first case reported from customer.
D3 Containment Action

Containment action is to limit a problem extent while continue normal operation until the root cause is defined and permanent corrective action is implemented.

The containment area should cover production, finished goods, customer on hand (Keysight), Incoming material, and Warehouse Storage.

**Guideline**

Containment action

- Stoppage of production or shipment
- Segregation goods on pass or fail
- Additional visual control
- Informing customer about the problem
- Informing operators about the problem
- Check on similar product or processes if there is similar risk

**Example:**

<table>
<thead>
<tr>
<th>No.</th>
<th>Containment Action Plan</th>
<th>Inventory Location</th>
<th>Implementation Date</th>
<th>Responsible Person</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100% screening</td>
<td>Supplier Production</td>
<td>30/04/2021</td>
<td>Supplier</td>
<td>0 pcs/1000 pcs rejection (Date Code 0321 and 0421)</td>
</tr>
<tr>
<td>2</td>
<td>100% screening</td>
<td>Supplier Warehouse</td>
<td>30/04/2021</td>
<td>Supplier</td>
<td>0 pcs rejection</td>
</tr>
</tbody>
</table>
D4 Root Cause Analysis

Root cause identification is the most important step. The problem will be solved only if the corrective action implemented is addressing the real root cause accurately.

Root Cause Analysis (RCA) is a systematic approach to identify the actual root causes of a problem.

Guideline

Below are the tools frequently used in RCA.

- 5 Whys Analysis OR
- Fishbone Diagram (Cause and Effect Diagram)

Notes: The RCA should identify root cause for both

- Occurrence (Why it occur?) AND
- Detection (Why it can’t be detected?)
5 Whys Analysis (or Why-Why Analysis) is a continuous question-asking technique used to explore the cause-and-effect relationships underlying a particular problem.

**Guideline**

i. Define the problem.

ii. Ask Why the problem happen and write down the answer.

iii. Validate the answer is it the real root cause.

iv. If no, Repeat step 3 until problem’s root cause is identified.
## D4 Root Cause Analysis

### 5 WhyS Analysis

**Example (Occurrence):**

<table>
<thead>
<tr>
<th>Why</th>
<th>Questions</th>
<th>Answer</th>
<th>Correction Action</th>
<th>Evidence &amp; Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why 1</td>
<td>Why the wrong part shipped to Keysight?</td>
<td>Wrong part was pull from the inventory</td>
<td>Retrain the stock picker - almost no benefit. The cause is come from mislabel from supplier</td>
<td>e.g., Supplier Failure Analysis Report, process flow etc.</td>
</tr>
<tr>
<td>Why 2</td>
<td>Why was the wrong part pull from the inventory?</td>
<td>The part was mislabeled</td>
<td>Perform inspection on inventory - minimum benefit Apply to on hand inventory only</td>
<td></td>
</tr>
<tr>
<td>Why 3</td>
<td>Why was the part mislabeled?</td>
<td>Our supplier mislabeled the part before ship to the warehouse.</td>
<td>Contain the problem by sorting out the mislabel part -very limited long-term benefit</td>
<td></td>
</tr>
<tr>
<td>Why 4</td>
<td>Why your supplier mislabeled the part before ship to the warehouse?</td>
<td>The operator at supplier site took the other label and placed at the product</td>
<td>Conduct training for operator – limited long-term benefit</td>
<td></td>
</tr>
<tr>
<td>Why 5</td>
<td>Why the operator at supplier site took the other label and placed at the product?</td>
<td>Many labels with different order was printed at the same location everyday so it is easy to cause mislabeled</td>
<td>Revise the process flow, only print one order at one location. Clear the location before proceeding to the subsequent order. (Mistake proof printing label process or application) – highly effective</td>
<td></td>
</tr>
</tbody>
</table>

**Example (Escapee):**

<table>
<thead>
<tr>
<th>Why</th>
<th>Questions</th>
<th>Answer</th>
<th>Correction Action</th>
<th>Evidence &amp; Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why 1</td>
<td>Why was the wrong part not detected?</td>
<td>a) Outgoing Inspection (OQA) Operator miss out to detect this b) The in-process inspector do not inspect the label.</td>
<td>a) Retrain the operator – almost no benefit. b) Alert the operator to check the label– almost no benefit.</td>
<td></td>
</tr>
<tr>
<td>Why 2</td>
<td>a) Why was the operator miss out to detect this? b) Why was the in-process inspection do not inspect the label?</td>
<td>a) The operator just check the label without checking the physical part. b) This is not stated as checking criteria in the Work Instruction.</td>
<td>a) Create alert notice for OQA operator to create awareness . limited long-term benefit b) Enhance the in-process inspection criteria to include inspection of the label versus physical part. (To detect mislabeled parts at the earlier stage) – highly effective</td>
<td></td>
</tr>
</tbody>
</table>

Evaluate the effectiveness of corrective action to identify the real root cause.
D4 Root Cause Analysis

**FISHBONE DIAGRAM (CAUSE AND EFFECT DIAGRAM)**

A fishbone diagram is a visualization tool for categorizing the potential causes of a problem in order to identify its root causes.

**Guideline**

i. Define the problem
ii. Identify the key causes
iii. Brainstorm the causes
iv. Validate the identified root cause causes.
D4 Root Cause Analysis

FISHBONE DIAGRAM (CAUSE AND EFFECT DIAGRAM)

Example:
1. Identify potential root cause

Cause
- Tools wear and tear
- No maintenance
- Not capable
- Lack of understanding
- No agreement with supplier
- No approved by vendor
- No training
- Lack of understanding
- No proper communication
- Wrong LLM from supplier
- Not approved by vendor
- No IQA Inspection

Effect
- Wrong part pull from inventory
- No inspection
- Not listed in criteria
- Wrong label on the product
- Messy production flow
- Not approved by vendor

Problem
Description: Wrong Part sent to customer
# D4 Root Cause Analysis

## FISHBONE DIAGRAM (CAUSE AND EFFECT DIAGRAM)

### Example:

2. Validate identified root cause

<table>
<thead>
<tr>
<th>Category</th>
<th>Potential Root cause</th>
<th>Validation / investigations</th>
<th>Findings</th>
<th>Conclusion: True / false</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>Wrong product pull from inventory</td>
<td>The operator pull the product by part number following the process.</td>
<td>This is not the root cause</td>
<td>FALSE</td>
</tr>
<tr>
<td>Man</td>
<td>Lack of awareness</td>
<td>Retraining is conducted half yearly.</td>
<td>This is not the root cause</td>
<td>FALSE</td>
</tr>
<tr>
<td>Method</td>
<td>Wrong label on the product</td>
<td>The label is the correct part number (1234-5678), but the physical part is 1234-5566.</td>
<td>Many labels with different order was printed at the same location everyday so it is easy to cause mislabeled.</td>
<td>TRUE</td>
</tr>
<tr>
<td>Material</td>
<td>Wrong LLM from supplier</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
D5 Corrective Action

Corrective action (CA) is to remove the root cause and prevent a problem from ever happening again. The corrective action should correspond to the root cause identified earlier in order to eliminate the real root cause and prevent recurrence of the problem. Method such as brainstorming is recommended as it can help to select appropriate corrective action for identified root cause.

Guideline

<table>
<thead>
<tr>
<th>For root cause of “Why problem occur?”</th>
<th>For root cause of “Why not detected?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduce additional process control</td>
<td>• Introduce new testing gate</td>
</tr>
<tr>
<td>• Introduce new process</td>
<td>• Enhance previous testing coverage</td>
</tr>
</tbody>
</table>

Example:

<table>
<thead>
<tr>
<th>Area of Focus</th>
<th>Corrective Action</th>
<th>Responsible Person</th>
<th>Implementation Date</th>
<th>Status</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurrence</td>
<td>Revise the process flow, only print one order at one location. Clear the location before proceeding to the subsequent order.</td>
<td>Supplier</td>
<td>15/05/2021</td>
<td>Close</td>
<td>e.g., new process flow</td>
</tr>
<tr>
<td>Detection</td>
<td>Update in-process inspection work instruction to include criteria to inspect the label versus physical part.</td>
<td>Supplier</td>
<td>30/05/2021</td>
<td>Close</td>
<td>e.g., new inspection work instruction</td>
</tr>
</tbody>
</table>
An action to eliminate the causes of nonconformities in order to prevent recurrence which is permanent and prevent any similar cases to occur. These actions are proactive and oriented towards a potential event in the future. Preventive action need to be taken if there is any identified risk.

**Guideline**
- Update or modify management processes
- Implement the corrective action to Keysight product with similar design or product using the same process.
- Update controls system Failure Mode & Effect Analysis (FMEA), Process Control Plan (PCP), work instructions, quality alerts and procedures
- Changing the process parameter/ product specification

Note: Preventive action shall not be the same as Corrective Action

**Example:**

<table>
<thead>
<tr>
<th>Area of Focus</th>
<th>Preventive Action</th>
<th>Responsible Person</th>
<th>Implementation Date</th>
<th>Status</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>Update the control in FMEA document and process control plan.</td>
<td>Supplier QA</td>
<td>15/05/2021</td>
<td>Close</td>
<td>Updated FMEA and PCP.</td>
</tr>
<tr>
<td>Process Control</td>
<td>Implement corrective action in D5 to similar parts (KPN 1234-5566 and 8765-4321)</td>
<td>Supplier</td>
<td>30/05/2021</td>
<td>Close</td>
<td></td>
</tr>
</tbody>
</table>
D7 Verify Effectiveness

After the corrective actions is implemented, the effectiveness should be verified.
The key to verification is evidence. This evidence usually takes the form of data, records or first-hand observations.
It is recommended the verification made by monitoring the quality of next deliveries

**Guideline**

Items to be included (but not limited to the following)

- Monitoring Method (e.g., Type of testing, monitoring area and expected results)
- Duration of monitoring (minimum three months)
- Serial number/Batch/ Lot Number (minimum three batch/lot should be inspected)
- Evidence of monitoring (e.g., testing data, inspection results)

Note: For low volume production, batch/lot required could be reduced (with justification and consensus from Keysight)

**Example:**

<table>
<thead>
<tr>
<th>Monitoring Metrics</th>
<th>Responsible Person</th>
<th>Monitoring Period</th>
<th>Results</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor the next three lots for any recurrence</td>
<td>Supplier</td>
<td>Monitor for three months</td>
<td>Monitored for three lots, date code 200920, 201003 and 201117. No similar issue reported.</td>
<td>*Attached the outgoing inspection results</td>
</tr>
</tbody>
</table>
D8 Team Recognition

To congratulate and recognize the team efforts and special team member contribution. This is a good section to document lessons learned.

Example:

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashly Tan CY</td>
<td>Product Engineer</td>
<td><a href="mailto:ashly_Tan@supplier.com">ashly_Tan@supplier.com</a></td>
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<td>Jackson Bill</td>
<td>Quality Engineer</td>
<td><a href="mailto:jackson_bill@supplier.com">jackson_bill@supplier.com</a></td>
</tr>
<tr>
<td>Yeong Wei Ting</td>
<td>Process Engineer</td>
<td><a href="mailto:weiting_yeong@supplier.com">weiting_yeong@supplier.com</a></td>
</tr>
</tbody>
</table>
## Appendix

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>8D</td>
<td>Eight Discipline</td>
</tr>
<tr>
<td>RCCA</td>
<td>Root Cause and Corrective Action</td>
</tr>
<tr>
<td>SCAR</td>
<td>Supplier Corrective Action Request</td>
</tr>
<tr>
<td>FMEA</td>
<td>Failure Mode and Effects Analysis</td>
</tr>
<tr>
<td>PCP</td>
<td>Process Control Plan</td>
</tr>
<tr>
<td>CA</td>
<td>Corrective Action</td>
</tr>
</tbody>
</table>
Intelex System Guideline
Steps:

Step 1: Log in to Intelex System

Step 2: Acknowledge the ESC

Step 3: Submit the 8D Report

Step 4: Verify the Corrective Action Effectiveness
Step 1: Log in INTELEX System

Email Notification

External Sub Case 41420-SCA-2332-ESC-41421 has been assigned

To: <ESC Owner>
Initiator: <SCA Owner>
CC:

External Sub Case Action 41420-SCA-2332-ESC-41421 has been assigned to ESC Owner. Please acknowledge it by 2021-05-04 1:22:09 AM and complete it within 30 days after acknowledgement.

As Keysight user please click here for case details and as external user click here.

Comment:

External Sub Case No.: 41420-SCA-2332-ESC-41421
Supplier Name: Malaysia Penang
Part Number(s) Returned: 1
Commodity (ICAT): 2
Part Description: 3
Component Quality Alert Number: 4
Partinfo Arrival Date: 5
RMA#: 6
Quantity Returned: 7
Additional Part Information: 8
Sub Case Action No.: 9
Master Case Record No.: 10
Source of Failure: 11
Service Request Number: 12
Product Line: 13
Product Serial Number: 14
Part Number: 15
Assigned By: 16

<table>
<thead>
<tr>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The following email will be sent to the Supplier (ESC Owner), copying the SCA Owner and other recipients in the Distribution List.</td>
</tr>
<tr>
<td>2. Click the Link “here” in email to access to the assigned ESC.</td>
</tr>
<tr>
<td>3. Log in to Intelex using the username and password set</td>
</tr>
</tbody>
</table>
Step 2: Acknowledge External Sub Case (ESC)

Now you are here

Depending on the workflow, stages with * might be by passed.
Step 2: Acknowledge External Sub Case (ESC)

1. Review information provided in “Initiation Details” session.

2. Click “Edit” to fill in acknowledgement Message and Part/Info Arrival Date.

3. Click “Acknowledge” to complete task.
Step 2: Acknowledge External Sub Case (ESC)

Email Notification

External Sub Case 41428-SCA-2336-ESC-41429 has been acknowledged

TO:   <SCA Owner>
CC:   <ESC Owner> <ESC Approver>

External Sub Case 41428-SCA-2336-ESC-41429 has been acknowledged by <ESC Owner>

As Keysight user please click here for case details and as external user click here.

Acknowledgement Message:

External Sub Case No.: 41428-SCA-2336-ESC-41429
Supplier Name: <Supplier>
Part Number(s) Returned:
Commodity (ICAT):
Part Description:
Component Quality Alert Number:
Part Info Arrival Date: 2021-04-29
RMA#:
Quantity Returned:
Additional Part Information:
Sub Case Action No. 41428-SCA-2336

Master Case Record No.: 41428
Source of Failure: Other
Service Request Number:
Product Line:
Product Serial Number:
Part Number:
Assigned By: <SCA Owner>
Step 3: Submit the 8D Report

Now you are here

Assign → Acknowledge → In Progress → Review → *Approval → *Effectiveness → Closure → Closed

Depending on the workflow, stages with * might be bypassed.
### Step 3: Submit the 8D Report

<table>
<thead>
<tr>
<th>Steps</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>After complete 8D Review with Keysight Sub Case Owner and Master Case Owner, submit ESC by clicking “Attach Documents” to attach 8D report, related files and meeting minutes.</td>
</tr>
<tr>
<td>2.</td>
<td>Provide a brief summary of Root Cause, Corrective Action and Verification Action done in “Response Summary”.</td>
</tr>
<tr>
<td>3.</td>
<td>Click “Save” then click “Submit” once completed.</td>
</tr>
</tbody>
</table>
Step 3: Submit the 8D Report

Email Notification

External Sub Case 41428-SCA-2336-ESC-41429 has been completed

TO: <SCA Owner>
CC: <ESC Owner> <ESC Approver>

External Sub Case 41428-SCA-2336-ESC-41429 has been completed by <ESC Owner> <SCA Owner> please review and approve.

As Keysight user please click here for case details and as external user click here.

Response Summary: test

External Sub Case No.: 41428-SCA-2336-ESC-41429
Supplier Name: Malaysia-Penang
Part Number(s) Returned:
Commodity (ICAT):
Part Description:
Component Quality Alert Number:
Part Info Arrival Date: 2021-04-29
RMA:
Quantity Returned:
Additional Part Information:
Sub Case Action No. 41428-SCA-2336

Master Case Record No.: 41428
Source of Failure: Other
Service Request Number:
Product Line:
Product Serial Number:
Part Number:
Assigned By: <SCA Owner>
Step 4: Verify Corrective Action Effectiveness

Now you are here

Depending on the workflow, stages with * might be by passed.
# Step 4: Verify Corrective Action Effectiveness

**External Sub Case 40849-SCA-2258-ESC-40854** has been approved by all approvers. Please complete verification of effectiveness by 2021-06-30.

To monitor the next 3 lots starting from Date code 2103. To attach incoming Inspection report with no reject reported.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>To:</td>
<td>ESC Owner</td>
</tr>
<tr>
<td>cc:</td>
<td>SCA Owner</td>
</tr>
</tbody>
</table>

### Steps

1. The following email will be sent to the Supplier (ESC Owner), copying the SCA Owner and other recipients in the Distribution List.

2. Once the monitoring is completed, click “here” to assess the ESC.

---

**External Sub Case No.:** 40849-SCA-2258-ESC-40854  
**Supplier:** ADLINK  
**Part Number:**  
**Commodity (ICAT):**  
**Part Description:**  
**Component Quality Alert Number:**  
**Part Info Arrival Date:** 2021-03-10  
**RMA #:**  
**Quantity Returned:**  
**Additional Part Information:**  
**Sub Case Action No.:** 40849-SCA-2258  
**Master Case Record No.:** 40849  
**Source of Failure:** Other Field Failure  
**Service Request Number:**  
**Product Line:**  
**Product Serial Number:**  
**Part Number:**  
**Assigned By:** Kar Yee Ho
Step 4: Verify the Corrective Action Effectiveness

1. Click “Edit” at the top of the page & Click “Attach Documents” to attach verification data.

2. Under Effectiveness Details, select “Yes” or “No” and provide summary of CA effectiveness verification.

3. Click “Complete” at the top of page. The process is complete.
Thank You!