ADDITIONAL REPORT
OF CUSTOMER CLAIM

Authorized

<table>
<thead>
<tr>
<th>QA Department Manager</th>
<th>QA Manager</th>
<th>QA Engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. T. Yokoyama</td>
<td>Mr. Santi P</td>
<td>Mr. Piti S.</td>
</tr>
</tbody>
</table>

History

Subject : Shutter broken off.

Claim No. : TL0805014
Customer Name : Lipfix
Received Date : May, 29' 2008
Request Name : M/S. Cynthia Pham / TAEC
Reference/QM No. : 61W00991
Product Name : TORX177L(F,T) 4PCs/ TOTX177L(F,T) 2PCs.
Lot No./Lot Code: : 0632= 2 PCs, 0625= 2 PCs.
Sample Receive : Yes : 0610= 1 PC., 0630= 1 PC.

Problem

Lipfix found shutter broken off problem for TORX177L(F,T) = 4 PCs. and TOTX177L(F,T)=2 PCs. product that customer had submitted 6 PCs of the returned samples ( on 2 boxes of digital audio delay ) to TST for investigation.

Analysis Result

- Returned samples are confirmed and checked by TOSHIBA standards.
- The returned samples are confirm and checked by TOSHIBA standards specification.

<table>
<thead>
<tr>
<th>Digital audio delay</th>
<th>Sample No.</th>
<th>Product name</th>
<th>Marking</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sample No.1</td>
<td>TOTX177L</td>
<td>0610</td>
<td>Lead were used.</td>
</tr>
<tr>
<td></td>
<td>Sample No.2</td>
<td>TOTX177L</td>
<td>0632</td>
<td>Lead were used.</td>
</tr>
<tr>
<td></td>
<td>Sample No.3</td>
<td>TOTX177L</td>
<td>0632</td>
<td>Lead were used, No Shutter and spring.</td>
</tr>
<tr>
<td>B</td>
<td>Sample No.4</td>
<td>TOTX177L</td>
<td>0630</td>
<td>Lead were used.</td>
</tr>
<tr>
<td></td>
<td>Sample No.5</td>
<td>TOTX177L</td>
<td>0625</td>
<td>Lead were used, No Shutter and spring bent.</td>
</tr>
<tr>
<td></td>
<td>Sample No.6</td>
<td>TOTX177L</td>
<td>0625</td>
<td>Lead were used, No Shutter and spring bent.</td>
</tr>
<tr>
<td></td>
<td>Shutter No.1</td>
<td>-</td>
<td>-</td>
<td>Shutter axis broken, deform</td>
</tr>
<tr>
<td></td>
<td>Shutter No.2</td>
<td>-</td>
<td>-</td>
<td>Shutter axis broken, deform</td>
</tr>
</tbody>
</table>

Appearance Inspection :
- Found leads were used from the returned samples.
- Found no shutter and spring from the returned sample no.3
- Found no shutter and spring bent from the returned sample no.5,6

History check back
There were no any abnormal from our process for production date " 0610,0632,0630,0625 "

TST
TOSHIBA SEMICONDUCTOR (THAILAND) CO., LTD.
High Microscope Appearance Inspection
From appearance checked, we believed that shutter broken unit came from external force impact to these units

Figure 2: Shutter no 1

Shutter Broken Simulation
We try to simulate defect making as customer returned as the assumption of mechanical strength impact to shutter plate axis. From the figure 3, we simulate by “Push-Pull Strength Gauge” at shutter plate axis by 4 directions.

TST Simulation Result

Figure 3: Lead Pull strength test
After confirmed by scanning electron microscope (SEM), we found the simulated samples is broken the axis as the following result

Top-Down (Red)  Down-Up (Yellow)  Left-Right (Blue)  Right-Left (Green)
From simulation result, we found the Right-Left (Green) direction are made the same failure symptom as returned sample.

<table>
<thead>
<tr>
<th>Shutter No1</th>
<th>Shutter No2</th>
<th>TST Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Shutter No1" /></td>
<td><img src="image2" alt="Shutter No2" /></td>
<td><img src="image3" alt="TST Simulation" /></td>
</tr>
</tbody>
</table>

**Figure 5:** Shutter axis compare between Returned sample and Simulation sample (Right-Left Direction(Green))

**How to make Right-Left (Green) mechanical stress at the axis**

From simulated result, the direction that happen at shutter plate axis in right-left direction (green). From practical operation, we try to simulate to made the similar direction force to that axis and we found only fiber-optic cable release operation (Pull-out after insert) by wrong direction can make the shutter breaking.

![Shutter plate pull back direction that make stress at holder in green direction](image4)

**Figure 6:** How to made Right-Left (Green) mechanical stress at holder.
From figure 6, we try to make the similar failure symptom by provided fiber-optic cable. Cable release out from different direction and we found the non-straight direction have potential to make shutter breaking.

This breaking of shutter based on the understanding that the provided cable is used to test, this fiber optic cable is very tight which may cause a less flexibility once it's pulled-out from receptacle..

* Please see as figure 7 & 8.

Figure 7 : Optical fiber cable release by Straight pull out direction

Figure 8 : Optical fiber cable release by non-Straight pull out direction.

Figure 9 : Non-Straight pull out of Shutter breaking (Holder)

**Cause**

The possible cause of shutter breaking came from mechanical strength impact to shutter axis as same as our simulation we can find the same failure symptom as the return samples.

**Conclusion**

The possible cause of shutter broken may come from external mechanical strength impact to shutter axis. One of possible cause, for non-straight direction pull out may the cause of this problem. Please kindly use our part in your process and if have any further question please feel free to contact us. Your patronage for our part would be appreciated

Your faithfully

TST

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