Testing GBDriver RS4 Data Randomizer Effectiveness

**RELATED PRODUCTS**
- GBDriver RS4 (SATA SSD Controller)
- SDG4A Series (2.5" SATA 3Gbps SSD)
- SHG4A Series (SATA 3Gbps Half Slim SSD)

**TESTED DATE**
2013/9/4 10:20 ~ 2013/9/27 11:30

**TESTED BY**
TDK Corp, Flash Memory Applied Business, ESS BU [ H. Kamata ]

**TEST PROCEDURE**

1. Executed 1,000 times Read to the following flash memory chips, logged bit error.
   - No.1: Program/Erase (P/E) Cycle 0
   - No.2: P/E Cycle 1
   - No.3: P/E Cycle 1000
   - No.4: P/E Cycle 2000
   - No.5: P/E Cycle 3000

2. Executed 10 million times Read to No.5 chip, logged bit error.

**SAMPLES**

- Type: multi-level cell
- Process: 1xn
- Page size: 16KB/Page

**RESULTS**

**READ**

<table>
<thead>
<tr>
<th>READ</th>
<th>P/E</th>
<th>RANDOMIZER ON</th>
<th>RANDOMIZER OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>28, 29, 29, 33, 43, 44</td>
<td>43, 44, 44, 44, 44, 44</td>
</tr>
</tbody>
</table>

**READ TIMES**

- Required ECC 40bit/1024byte
- Red line: Randomizer OFF
- Blue line: Randomizer ON

**TESTED & REPORTED:**
Hiroshi KAMATA
2013/9/25 FAE

**APPROVED:**
Shunichi HANAFUSA
2013/9/27 FAE