|  |  |
| --- | --- |
|  | **Bridge Line Corp.**  **102, Chungwoo-Bldg., 645 Yeongdong-daero,** **Gangnam-gu, Seoul 06085, Korea.**  **TEL:** **(2)517-1893 FAX: (2)517-5954** |

**CERTIFICATE OF COMPLIANCE AND ANALYSIS Page #1 of 2.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CUSTOMER:**  **PO NO.:**  **QUANTITY:**  **PART NO.:** | **SKHynix**  **BRC1602223 #1**  **1pc** | | | | **ASSAY NO.:**  **LOT NO.:**  **DATE of CofA:**  **DATE of ORDER:** | | **GeSbTeSe-160325-O-1**  **GeSbTeSe-160325-O-1**  **04/14/2016**  **02/22/2016** |
| **DESCRIPTION:** | | **99.995% Grade Ge21.1Sb21.1Te47.6Se10.2%at Target 124.5mm OD x5.6mm thick** | | | | | |
| **CUSTOMER SPECIFICATION** | | | | **RESULTS** | | | |
| **Alloy Analysis** | | **Spec** | | **Actual** | | **Source** | |
| **Te**  **Ge**  **Sb**  **Se** | | **47.6**  **21.1**  **21.1**  **10.2** | **atm%**  **atm%**  **atm%**  **atm%** | **48.49% atm**  **20.96% atm**  **20.94% atm**  **9.61% atm** | | **XRF** | |

**Impurity Analysis Impurity GDMS (ppm wt%) Impurity GDMS (ppm wt%)**

**Al Cr**

**Cu Fe**

**Mg Mn**

**Ni Pb**

**Zn W**

**XRF Analysis**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Ge Atm %** | **Sb Atm %** | **Te Atm %** | **Se Atm %** |
| **1** | **20.86** | **20.79** | **48.51** | **9.84** |
| **2** | **20.64** | **21.16** | **48.69** | **9.51** |
| **3** | **21.00** | **21.33** | **47.95** | **9.72** |
| **4** | **21.12** | **20.58** | **48.72** | **9.58** |
| **5** | **20.93** | **21.13** | **48.36** | **9.58** |
| **6** | **20.76** | **20.81** | **48.79** | **9.64** |
| **7** | **21.04** | **20.61** | **48.73** | **9.62** |
| **8** | **21.03** | **20.81** | **48.59** | **9.57** |
| **9** | **21.03** | **21.40** | **47.85** | **9.71** |
| **10** | **21.33** | **20.79** | **48.28** | **9.60** |
| **11** | **20.57** | **20.91** | **48.99** | **9.53** |
| **12** | **21.24** | **20.72** | **48.66** | **9.39** |
| **13** | **20.93** | **21.21** | **48.25** | **9.62** |
| **Average** | **20.96** | **20.94** | **48.49** | **9.61** |

**Page #2 of 2.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dimensional Results** | **Spec** | **Actual** | **Source** | **Weight** | **Density** |
| **GeSbTeSe-160325-O-1** | **124.5mm OD x 5.6mm** | **124.5mm OD x 5.61mm** | **By caliper** | **0.420 kg** | **6.13g/cm3** |

**Page #2 of 2.**

Manufactured in the USA.

This is to certify that this product has been made in accordance with customer P.O. number and material specification listed above.

Authorized Signature:

Date : **04/14/2016**