



XMV-11002 CAMERA BLEMISH SPECIFICATION

| Description | Definition | CL1 Grade | CL2 Grade Color only | CL2 Grade Mono only | Notes | Test |
|-------------------------------------|--|-------------------|----------------------|---------------------|-------|------|
| Major Dark field defective pixels | Defect \geq 239mV | 100 | 200 | 200 | 1,2 | 1 |
| Major Bright field defective pixels | Defect \geq 15% | | | | 1,2 | 2 |
| Minor Dark field defective pixels | Defect \geq 123mV | 1,000 | 2,000 | 2,000 | 1,2 | 1 |
| Cluster defect | A group of 2 to N contiguous major defective pixels, but no more than W adjacent pixels wide | 20 N=10 W=3 | 20 N=10 W=3 | 20 N=12 W=5 | 1,2 | |
| Column defect | A group of more than 10 contiguous major defective pixels along a single column | 0 | 10 | 2 | 1,2 | |

NOTES:

1. There will be at least two non-defective pixels separating any two major defective pixels.
2. Tested at 27 degrees Celsius

TESTS:

1. Dark field defect test

This test is performed under dark field conditions. The sensor is partitioned into 384 sub regions of interest, each of which is 167 by 167 pixels in size. In each region of interest, the median value of all pixels is found. For each region of interest, a pixel is marked defective if it is greater than or equal to the median value of that region of interest plus the defect threshold specified in the "Defect Definitions" section

2. Bright field defect test

This test is performed with the imager illuminated to a level such that the output is at approximately 40,000 electrons. Prior to this test being performed the substrate voltage has been set such that the charge capacity of the sensor is 60,000 electrons. The average signal level of all active pixels is found. The bright and dark thresholds are set as:

Dark defect threshold = Active Area Signal * threshold

Bright defect threshold = Active Area Signal * threshold

The sensor is then partitioned into 384 sub regions of interest, each of which is 167 by 167 pixels in size. In each region of interest, the average value of all pixels is found. For each region of interest, a pixel is marked defective if it is greater than or equal to the median value of that region of interest plus the bright threshold specified or if it is less than or equal to the median value of that region of interest minus the dark threshold specified.

Example for major bright field defective pixels:

- Average value of all active pixels is found to be 520 mV (40,000 electrons).
- Dark defect threshold: $520\text{mV} * 15\% = 78 \text{ mV}$
- Bright defect threshold: $520\text{mV} * 15\% = 78 \text{ mV}$
- Region of interest #1 selected. This region of interest is pixels 1,1 to pixels 167,167.
- Median of this region of interest is found to be 520 mV.
- Any pixel in this region of interest that is $\geq (520+78 \text{ mV})$ 598 mV in intensity will be marked defective.
- Any pixel in this region of interest that is $\leq (520-78 \text{ mV})$ 442 mV in intensity will be marked defective.
- All remaining 384 sub regions of interest are analyzed for defective pixels in the same manner.