# FPA Test Report

*QH2-72*
**640x512**

**QmagiQ**

| PARAMETER | VALUE | UNITS | CRITERIA | PASS/FAIL |
|---|---|---|---|---|
| Active array size | 640 x 512 | - | | |
| F/number | 2 | - | | |
| ROIC gain setting | 1.33 | - | | |
| Integration time† | 9.77 | ms | | |
| Frame rate | 16 | Hz | | |
| FPA Temperature | 68 | K | | |
| QWIP bias | 0.8 | V | | |
| Aperture-corrected DC output $\mu$ | 1819.8 | mV | | |
| Aperture-corrected DC output $\sigma$ | 45.1 | mV | | |
| Aperture-corrected DC output $\sigma/\mu$ | 2.5 | % | | |
| Aperture-corrected DC output failures | 225 | - | >± 300 mV | |
| Differential response mean $\mu$ | 40.7 | mV/°C | | |
| Differential response st. dev. $\sigma$ | 0.7 | mV/°C | | |
| Differential response $\sigma/\mu$ | 1.8 | % | < 5 % | PASS |
| Blackbody responsivity‡ | 10.6 | mA/W | @ 1 V bias | |
| Differential response failures | 101 | - | >± 20 % of $\mu$ | |
| Temporal NE$\Delta$T mean $\mu$ | 24.1 | mK | < 30 mK | PASS |
| Temporal NE$\Delta$T std. dev. $\sigma$ | 3.8 | mK | | |
| Temporal NE$\Delta$T $\sigma/\mu$ | 15.7 | % | | |
| Temporal NE$\Delta$T failures | 25 | - | > 70 mK | |
| Spatial NE$\Delta$T mean $\mu$ | 16.5 | mK | < 30 mK | PASS |
| Spatial NE$\Delta$T std. dev. $\sigma$ | 14.0 | mK | | |
| Spatial NE$\Delta$T Failures | 59 | - | > 100 mK | |
| Conversion efficiency mean $\mu$ | 2.21 | % | @ actual bias | |
| Conversion efficiency st. dev. $\sigma$ | 0.04 | - | | |
| Conversion efficiency $\sigma/\mu$ | 1.8 | % | | |
| Post NUC uniformity ($\sigma/\mu$) | 0.095 | % | | |
| ROIC power dissipation | 75.2 | mW | < 90 mW | PASS |
| Composite number of bad pixels | 235 | - | | |
| Composite operability | 99.928 | % | > 99.5 % | PASS |
| Forbidden clustered failures? | No | - | No | PASS |
| **Overall status** | | - | | **PASS** |

† Bias and/or integration time adjusted to fill the well to 75% of total capacity when FPA is exposed to BB source set to 50ºC

‡ Normalized to 1-V bias and unity mux gain.

**COMMENTS:**

# *QH2-72*

## Uncorrected DC Offset Output @ 30°C
### Dark current + photocurrent at 30-C scene temperature
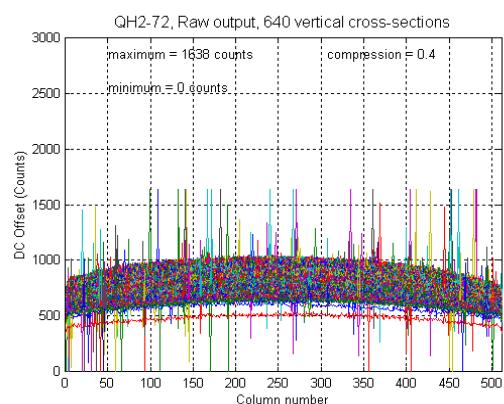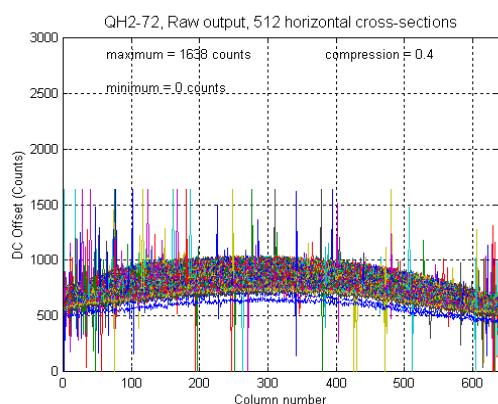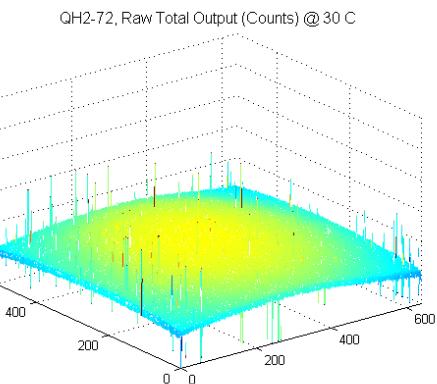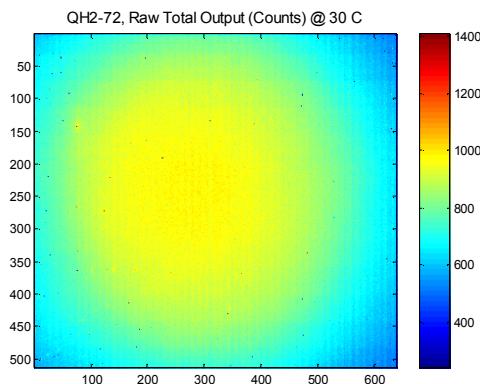
# QH2-72

## Aperture-corrected DC Output @ 30°C
### Dark current + photocurrent at 30-C scene temperature



QH2-72, Total Output (mV)

Slope @ 25 C = 40.7 mV/C



QH2-72, Corrected output, 512 horizontal cross-sections



QH2-72, Corrected Total Output (mV) at 30 C

$\mu = 1819.8$

$\sigma = 45.1$

$\sigma/\mu = 2.5\%$



QH2-72, Map of bad pixels for corrected output @ 25 C (+/-3e+002μ) - 225 failures
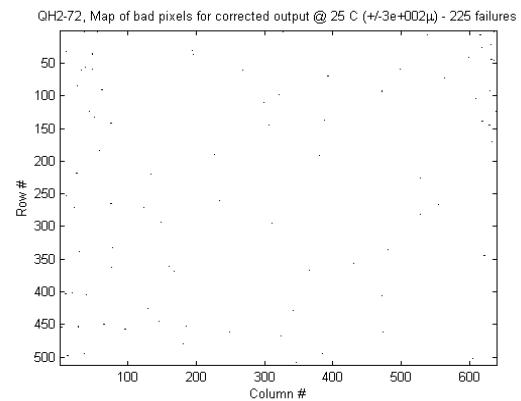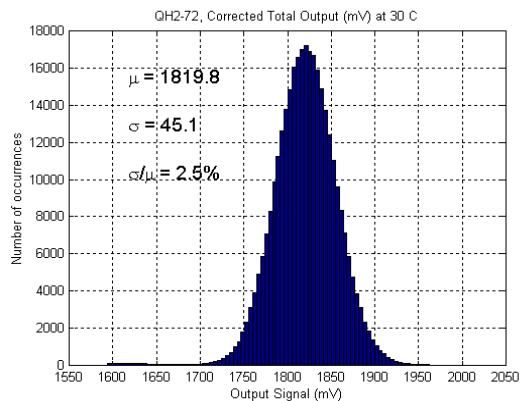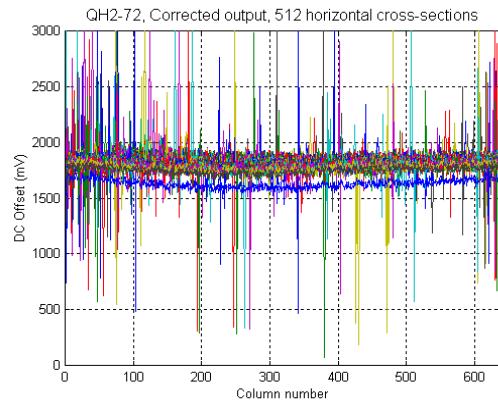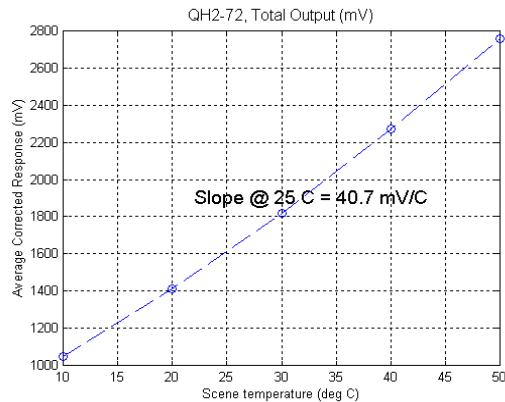
# QH2-72

## Aperture-Corrected Differential Response @ 25°C
### Photocurrent only (difference signal between 2 scene temperatures)



QH2-72, Corrected Differential Response(mV/C) @ 25 C



QH2-72, Corrected Response, 512 horizontal cross-sections



QH2-72, Corrected Differential Response (mV/C) at 25 C

Norm. resp. = 10.6 mA/W

$\mu = 40.7$

$\sigma = 0.7$

$\sigma/\mu = 1.8\%$



QH2-72, Map of bad pixels for response (+/-0.2μ) - 101 failures
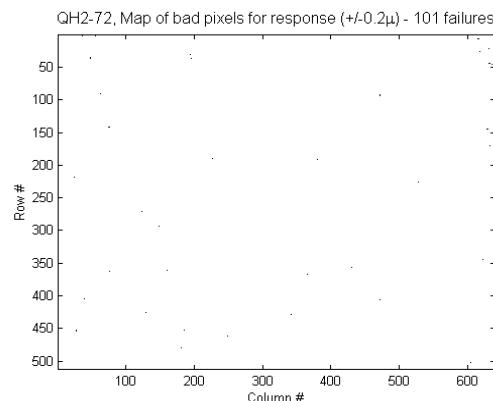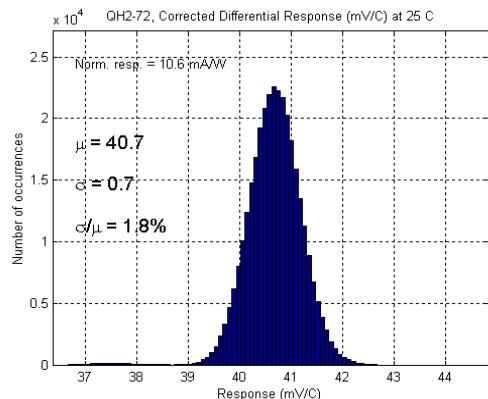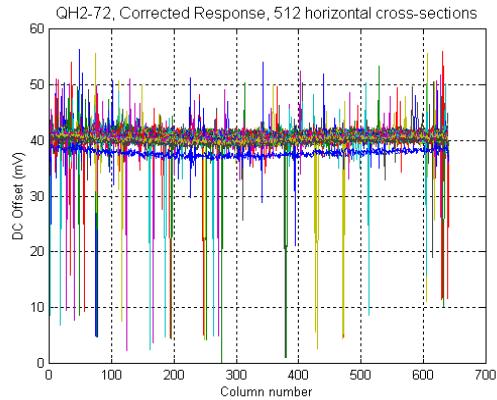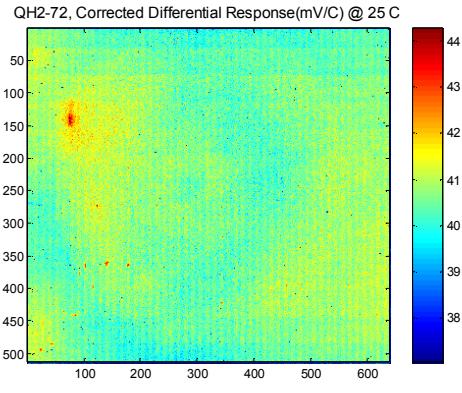
## QH2-72

# Temporal NEΔT @ 25°C

### QH2-72, Noise Data

### QH2-72, Temporal NEdT (mK) @ 30 C

### QH2-72, Temporal NEdT (mK) for 30-C Scene Temperature

$\mu$ = 24.1

$\sigma$ = 3.8

$\sigma/\mu$ = 15.7%

### QH2-72, Map of bad pixels for NEdT at 30 C (>70µ) - 25 failures
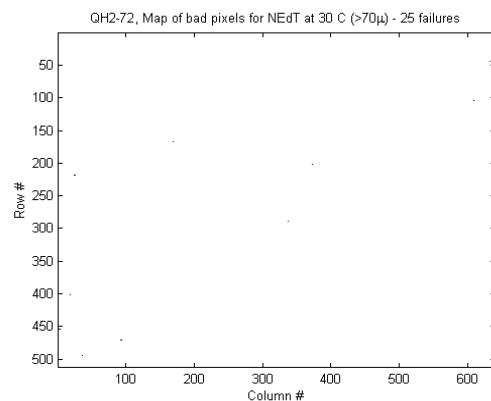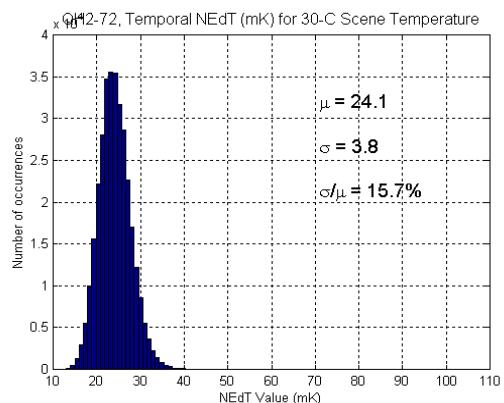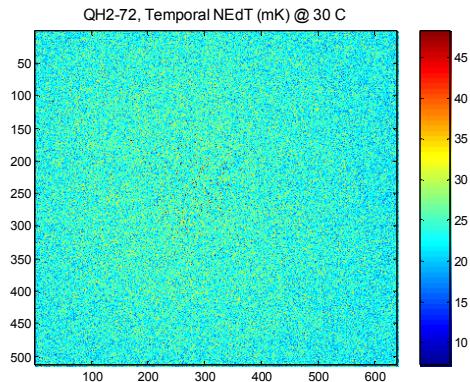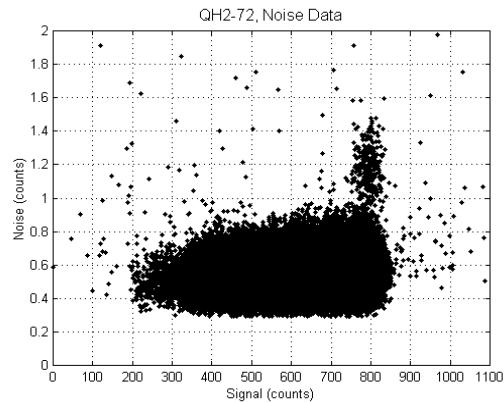
## QH2-72

# Two-point NUC of Raw Output



QH2-72, NUC Gain Map



QH2-72, NUC Offset Map



QH2-72, Post-NUC residual relative spatial noise



QH2-72, post-NUC signal (mV)

$\mu = 1493.7$

$\sigma = 1.4$

$\sigma/\mu = 0.0949\%$

## Spatial NEΔT @ 25°C

QH2-72, Spatial NEdT @ 30 C



QH2-72, Spatial NEdT (mK) @ 30 C



μ=16.5

σ=14

QH2-72, Map of bad pixels for spatial NEdT at 30 C (>100 mK) - 59 failures
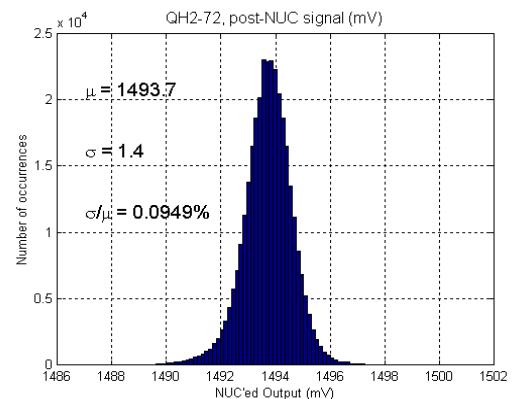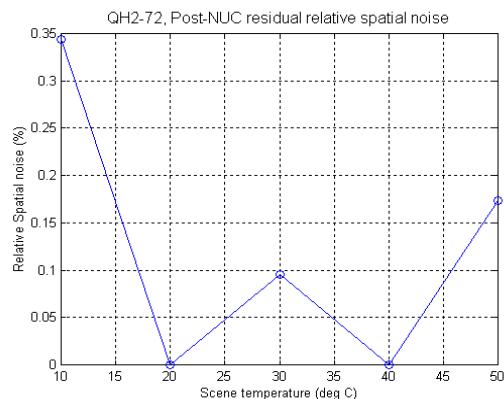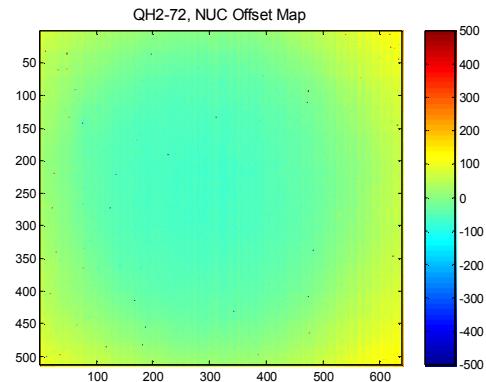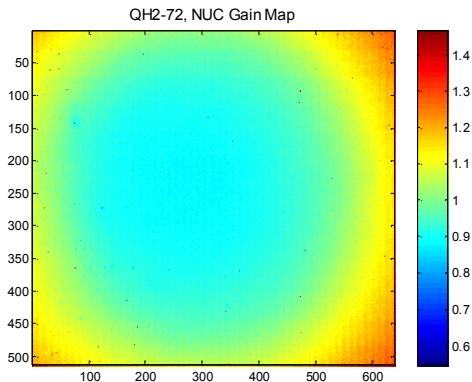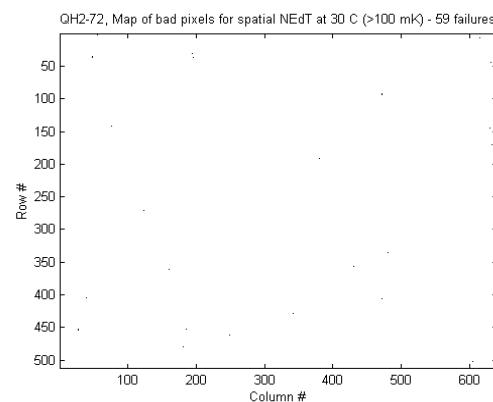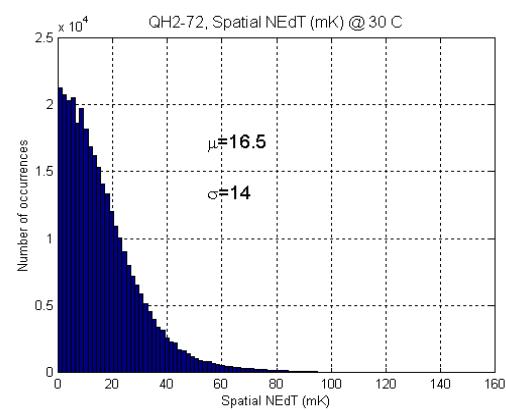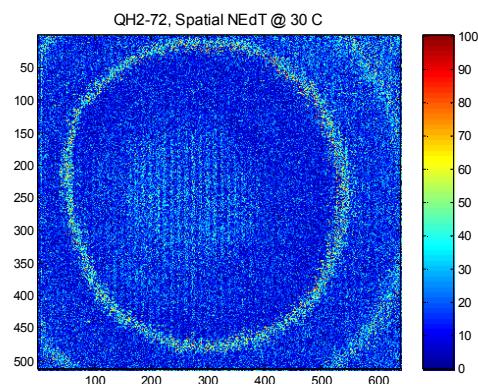
## Overall Operability

QH2-72, Composite Defective Pixels Map - 235 failures
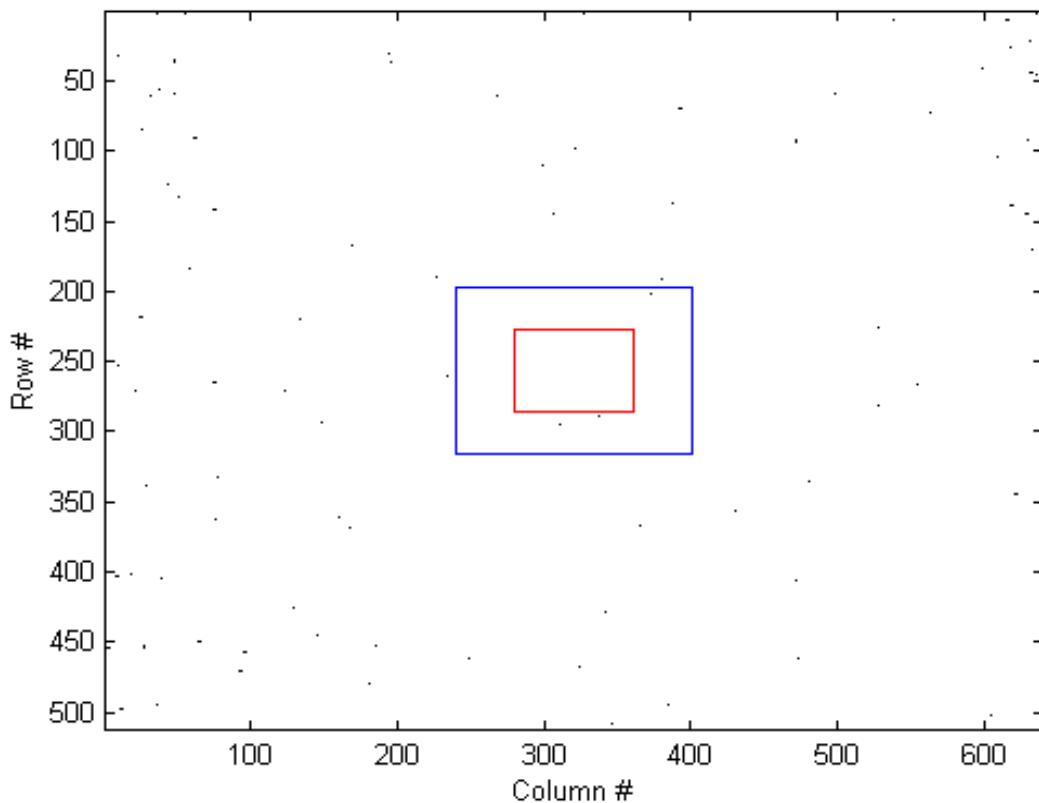


| | ZONE | | | | | |
|---|---|---|---|---|---|---|
| | A (Center) | | B (Middle) | | C (Outer) | |
| | # | ≤ | # | ≤ | # | ≤ |
| Isolated outages | 1 | - | 5 | - | 92 | - |
| Clusters of 2 | 0 | 2 | 0 | - | 66 | - |
| Clusters of 3 | 0 | 1 | 0 | - | 0 | - |
| Clusters of 4 to 5 | 0 | 0 | 0 | 1 | 1 | - |
| Clusters of 6 to 7 | 0 | 0 | 0 | 0 | 0 | - |
| Clusters of 8 to 11 | 0 | 0 | 0 | 0 | 0 | 2 |
| Clusters of > 11 | 0 | 0 | 0 | 0 | 0 | 0 |

| Overall Clusters | |
|---|---|
| Size | How many? |
| 1 | 98 |
| 2 | 66 |
| 5 | 1 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |