

IMAGING PERFORMANCE SPECIFICATION

FLIR *FLEA*[®]3 *USB3 Vision*



USB[™]
VISION

Version 4.1
Revised 1/26/2017



FCC Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

Korean EMC Certification

The KCC symbol indicates that this product complies with Korea's Electrical Communication Basic Law regarding EMC testing for electromagnetic interference (EMI) and susceptibility (EMS).

Hardware Warranty

The warranty for the Flea3 USB 3.1 camera is 3 years. For detailed information on how to repair or replace your camera, please see the [terms and conditions on our website](#).

WEEE

The symbol indicates that this product may not be treated as household waste. Please ensure this product is properly disposed as inappropriate waste handling of this product may cause potential hazards to the environment and human health. For more detailed information about recycling of this product, please contact us.



Trademarks

Names and marks appearing on the products herein are either registered trademarks or trademarks of FLIR Systems, Inc. and/or its subsidiaries.

Licensing

To view the licenses of open source packages used in this product please see [What open source packages does firmware use?](#)

1 Specifications

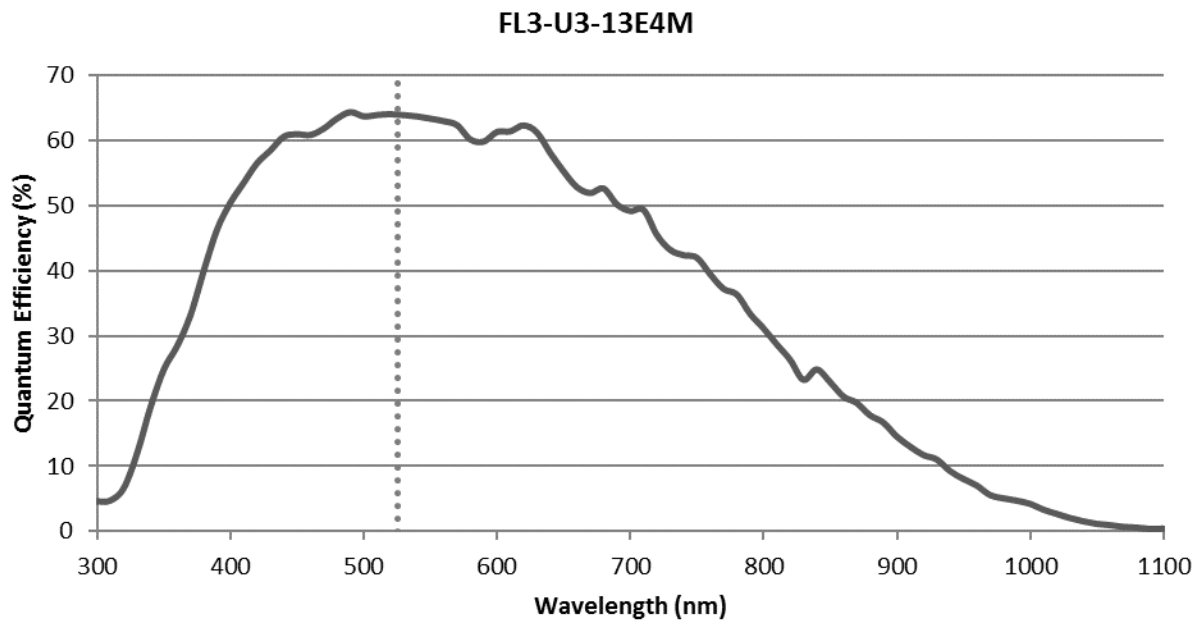
| Model | Sensor | Maximum Resolution | Pixel Size | Firmware | Results |
|-----------------|-------------------------------|--------------------|--------------------|----------|-------------------------|
| FL3-U3-13E4M-C | e2v EV76C560, 1/1.8", Mono | 1280 x 1024 | 5.3 μm | 2.15.3.3 | page 2 |
| FL3-U3-13E4C-C | e2v EV76C560, 1/1.8", Color | 1280 x 1024 | 5.3 μm | 2.15.3.3 | page 3 |
| FL3-U3-13S2M-CS | Sony IMX035, 1/3", Mono | 1328 x 1048 | 3.63 μm | 2.14.3.1 | page 4 |
| FL3-U3-13S2C-CS | Sony IMX035, 1/3", Color | 1328 x 1048 | 3.63 μm | 2.14.3.1 | page 5 |
| FL3-U3-13Y3M-C | On Semi VITA1300, 1/2", Mono | 1280 x 1024 | 4.8 μm | 2.7.3.0 | page 6 |
| FL3-U3-20E4M-C | e2v EV76C5706F, 1/1.8", Mono | 1600 x 1200 | 4.5 μm | 2.17.3.0 | page 7 |
| FL3-U3-20E4C-C | e2v EV76C5706F, 1/1.8", Color | 1600 x 1200 | 4.5 μm | 2.17.3.0 | page 8 |
| FL3-U3-32S2M-CS | Sony IMX036, 1/2.8", Mono | 2080 x 1552 | 2.5 μm | 2.14.3.1 | page 9 |
| FL3-U3-32S2C-CS | Sony IMX036, 1/2.8", Color | 2080 x 1552 | 2.5 μm | 2.14.3.1 | page 10 |
| FL3-U3-120S3C-C | Sony IMX172, 1/2.3", Color | 4000 x 3000 | 1.55 μm | 2.19.3.4 | page 11 |



Measurements are taken based on guidelines in the EMVA 1288 standard; the full definition can be found at EMVA.org. Camera settings are at maximum bit depth unless otherwise noted. Temporal Dark Noise is measured at minimum exposure time. The center wavelength is 525 nm unless otherwise noted. The pixel format is Raw 16 or Mono 16 for mono cameras and Raw 16 for color cameras. Results are captured at room temperature (20°C).

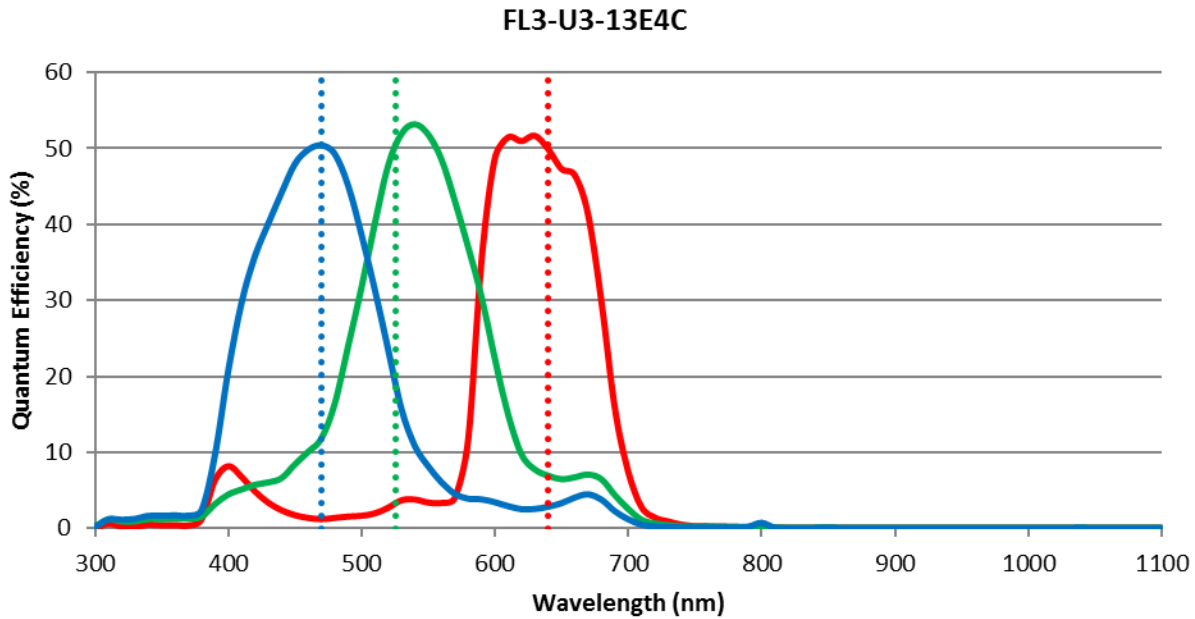
2 FL3-U3-13E4M-C Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|--|--------------|--------------|
| Pixel Clock (MHz) | 114 | 114 |
| ADC (Bits) | 10-bit | 10-bit |
| Quantum Efficiency (% at 525 nm) | 63 | 64.57 |
| Temporal Dark Noise (Read Noise) (e ⁻) | 25.12 | 11.28 |
| Signal to Noise Ratio Maximum (dB) | 39.85 | 39.87 |
| Signal to Noise Ratio Maximum (Bits) | 6.62 | 6.62 |
| Absolute Sensitivity Threshold (γ) | 40.65 | 18.59 |
| Saturation Capacity (Well Depth) (e ⁻) | 9650 | 9701 |
| Dynamic Range (dB) | 51.52 | 58.31 |
| Dynamic Range (Bits) | 8.56 | 9.69 |
| Gain (e ⁻ /ADU) | 0.16 | 0.16 |



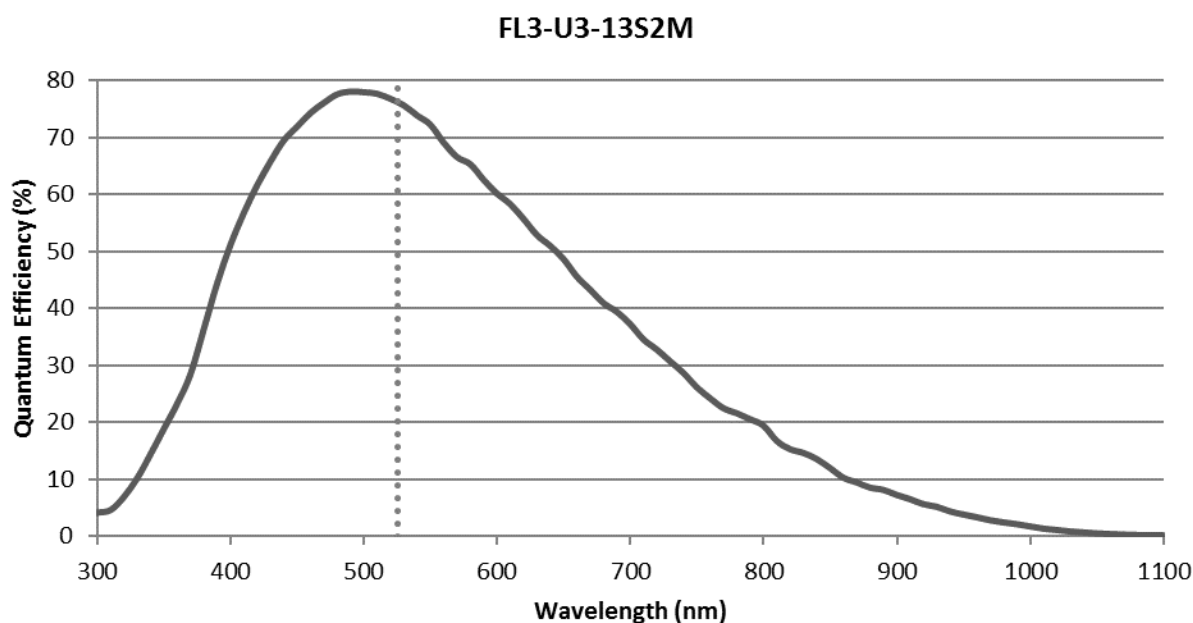
3 FL3-U3-13E4C-C Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|---|--------------|--------------|
| Pixel Clock (MHz) | 114 | 114 |
| ADC (Bits) | 10-bit | 10-bit |
| Quantum Efficiency Blue (% at 470 nm) | 50 | 50 |
| Quantum Efficiency Green (% at 525 nm) | 49 | 49 |
| Quantum Efficiency Red (% at 640 nm) | 49 | 49 |
| Temporal Dark Noise (Read Noise) (e-) | 26.08 | 14.33 |
| Signal to Noise Ratio Maximum (dB) | 40.15 | 40.09 |
| Signal to Noise Ratio Maximum (Bits) | 6.67 | 6.66 |
| Absolute Sensitivity Threshold (γ) | 55.07 | 30.91 |
| Saturation Capacity (Well Depth) (e-) | 10357 | 10197 |
| Dynamic Range (dB) | 51.82 | 56.75 |
| Dynamic Range (Bits) | 8.61 | 9.43 |
| Gain (e-/ADU) | 0.17 | 0.17 |



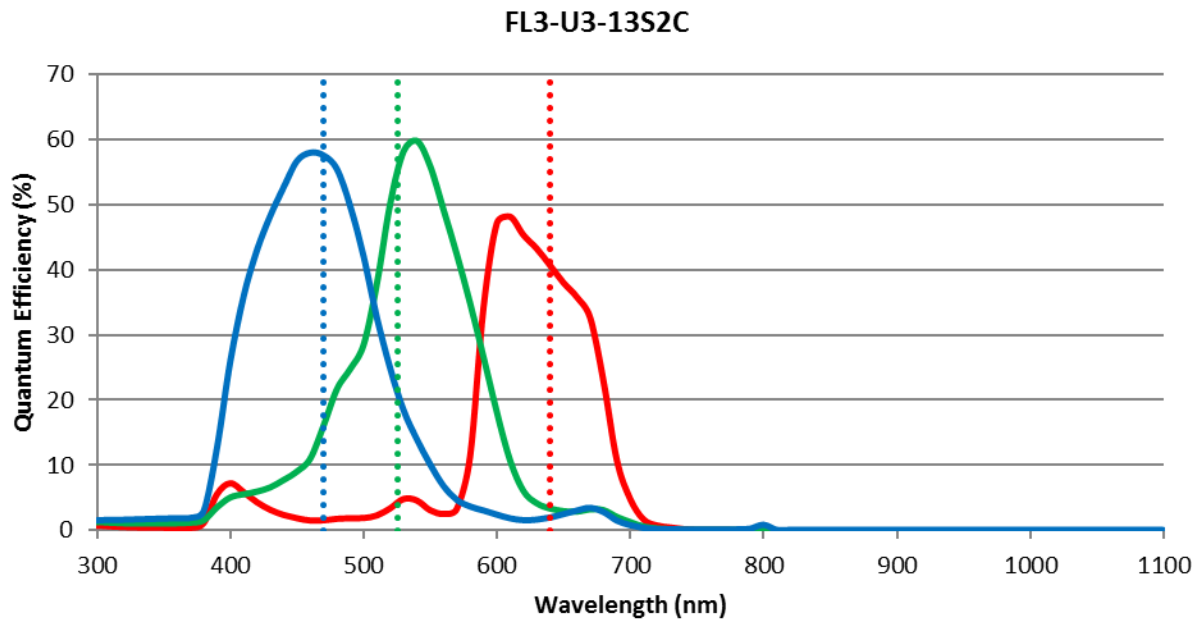
4 FL3-U3-13S2M-CS Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|--|--------------|--------------|
| Pixel Clock (MHz) | 216 | 108 |
| ADC (Bits) | 12-bit | 12-bit |
| Quantum Efficiency (% at 525 nm) | 76 | 75 |
| Temporal Dark Noise (Read Noise) (e ⁻) | 8.94 | 6.31 |
| Signal to Noise Ratio Maximum (dB) | 42.07 | 42.07 |
| Signal to Noise Ratio Maximum (Bits) | 6.99 | 6.99 |
| Absolute Sensitivity Threshold (γ) | 12.78 | 9.23 |
| Saturation Capacity (Well Depth) (e ⁻) | 16090 | 16092 |
| Dynamic Range (dB) | 64.64 | 67.47 |
| Dynamic Range (Bits) | 10.74 | 11.21 |
| Gain (e ⁻ /ADU) | 0.27 | 0.27 |



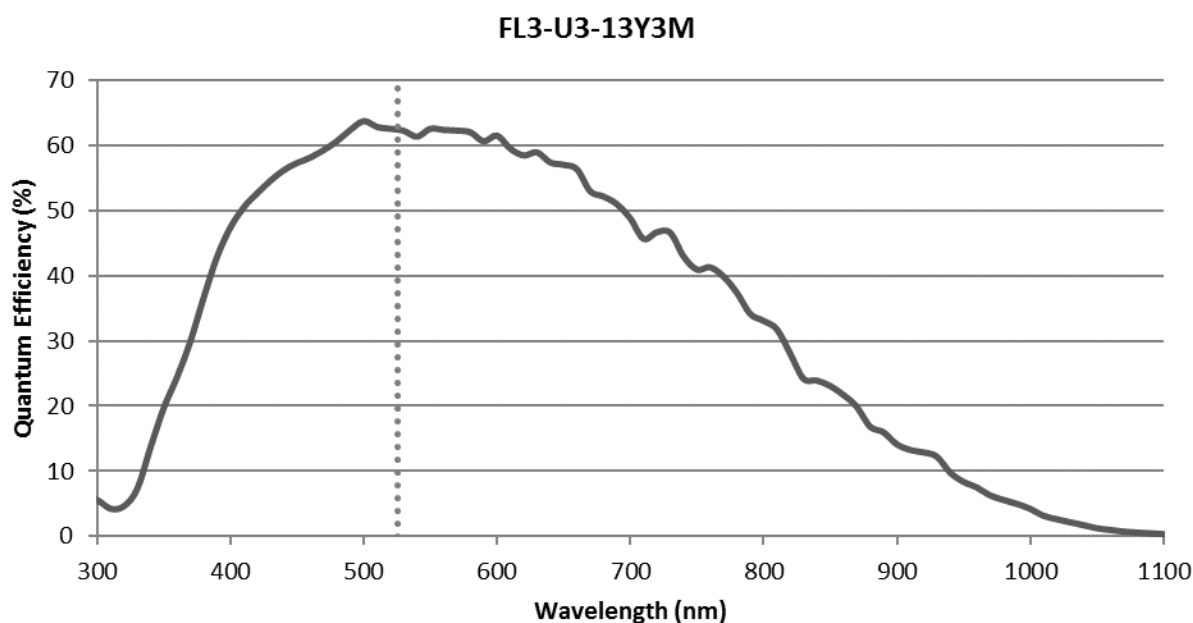
5 FL3-U3-13S2C-CS Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|---|--------------|--------------|
| Pixel Clock (MHz) | 216 | 216 |
| ADC (Bits) | 12-bit | 12-bit |
| Quantum Efficiency Blue (% at 470 nm) | 57 | 57 |
| Quantum Efficiency Green (% at 525 nm) | 54 | 58 |
| Quantum Efficiency Red (% at 640 nm) | 40 | 40 |
| Temporal Dark Noise (Read Noise) (e-) | 9.03 | 5.23 |
| Signal to Noise Ratio Maximum (dB) | 41.86 | 41.74 |
| Signal to Noise Ratio Maximum (Bits) | 6.95 | 6.93 |
| Absolute Sensitivity Threshold (γ) | 18.44 | 11.17 |
| Saturation Capacity (Well Depth) (e-) | 15344 | 14919 |
| Dynamic Range (dB) | 64.14 | 68.31 |
| Dynamic Range (Bits) | 10.65 | 11.35 |
| Gain (e-/ADU) | 0.26 | 0.26 |



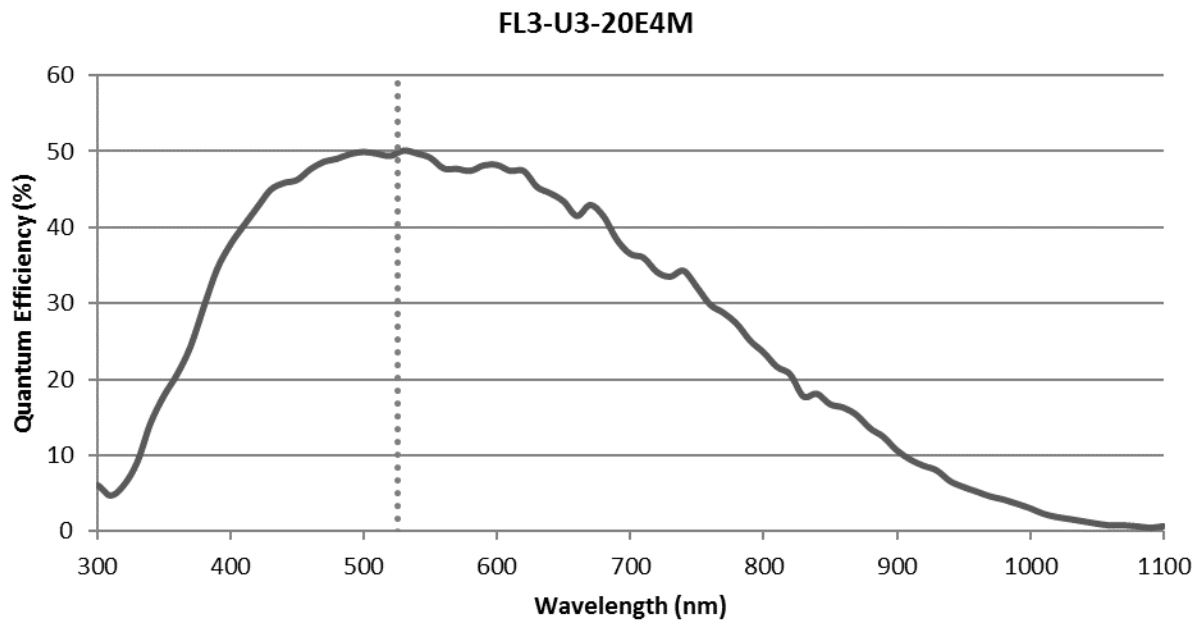
6 FL3-U3-13Y3M-C Imaging Performance

| Measurement | Video Mode 0 |
|---|--------------|
| Pixel Clock (MHz) | 248 |
| ADC (Bits) | 10-bit |
| Quantum Efficiency (% at 525 nm) | 62 |
| Temporal Dark Noise (Read Noise) (e-) | 33.51 |
| Signal to Noise Ratio Maximum (dB) | 40.27 |
| Signal to Noise Ratio Maximum (Bits) | 6.69 |
| Absolute Sensitivity Threshold (γ) | 55.46 |
| Saturation Capacity (Well Depth) (e-) | 10651 |
| Dynamic Range (dB) | 49.91 |
| Dynamic Range (Bits) | 8.29 |
| Gain (e-/ADU) | 0.22 |



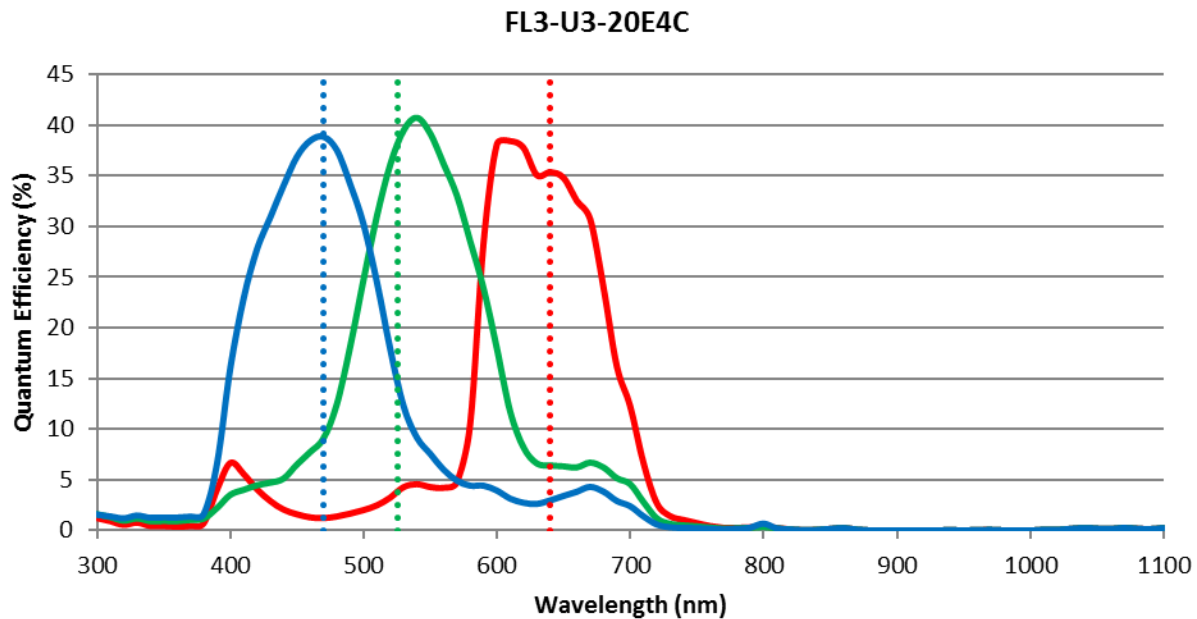
7 FL3-U3-20E4M-C Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|--|--------------|--------------|
| Pixel Clock (MHz) | 120 | 120 |
| ADC (Bits) | 10-bit | 10-bit |
| Quantum Efficiency (% at 525 nm) | 49 | 52 |
| Temporal Dark Noise (Read Noise) (e ⁻) | 21.53 | 8.4 |
| Signal to Noise Ratio Maximum (dB) | 37.80 | 39.89 |
| Signal to Noise Ratio Maximum (Bits) | 6.28 | 6.63 |
| Absolute Sensitivity Threshold (γ) | 45.28 | 16.99 |
| Saturation Capacity (Well Depth) (e ⁻) | 6018 | 9759 |
| Dynamic Range (dB) | 48.73 | 60.80 |
| Dynamic Range (Bits) | 8.09 | 10.10 |
| Gain (e ⁻ /ADU) | 0.11 | 0.17 |



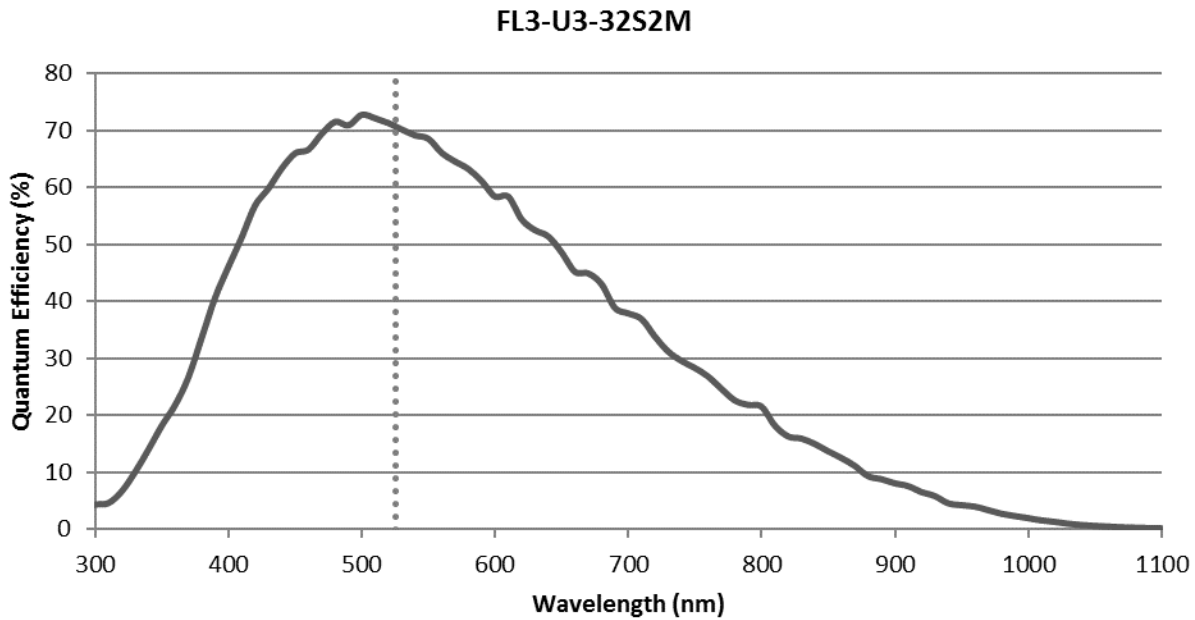
8 FL3-U3-20E4C-C Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|---|--------------|--------------|
| Pixel Clock (MHz) | 120 | 120 |
| ADC (Bits) | 10-bit | 10-bit |
| Quantum Efficiency Blue (% at 470 nm) | 38 | 40 |
| Quantum Efficiency Green (% at 525 nm) | 37 | 40 |
| Quantum Efficiency Red (% at 640 nm) | 35 | 36 |
| Temporal Dark Noise (Read Noise) (e-) | 20.84 | 7.87 |
| Signal to Noise Ratio Maximum (dB) | 37.67 | 39.86 |
| Signal to Noise Ratio Maximum (Bits) | 6.26 | 6.62 |
| Absolute Sensitivity Threshold (γ) | 58.99 | 21.51 |
| Saturation Capacity (Well Depth) (e-) | 5853 | 9676 |
| Dynamic Range (dB) | 46.76 | 61.26 |
| Dynamic Range (Bits) | 8.10 | 10.17 |
| Gain (e-/ADU) | 0.10 | 0.16 |



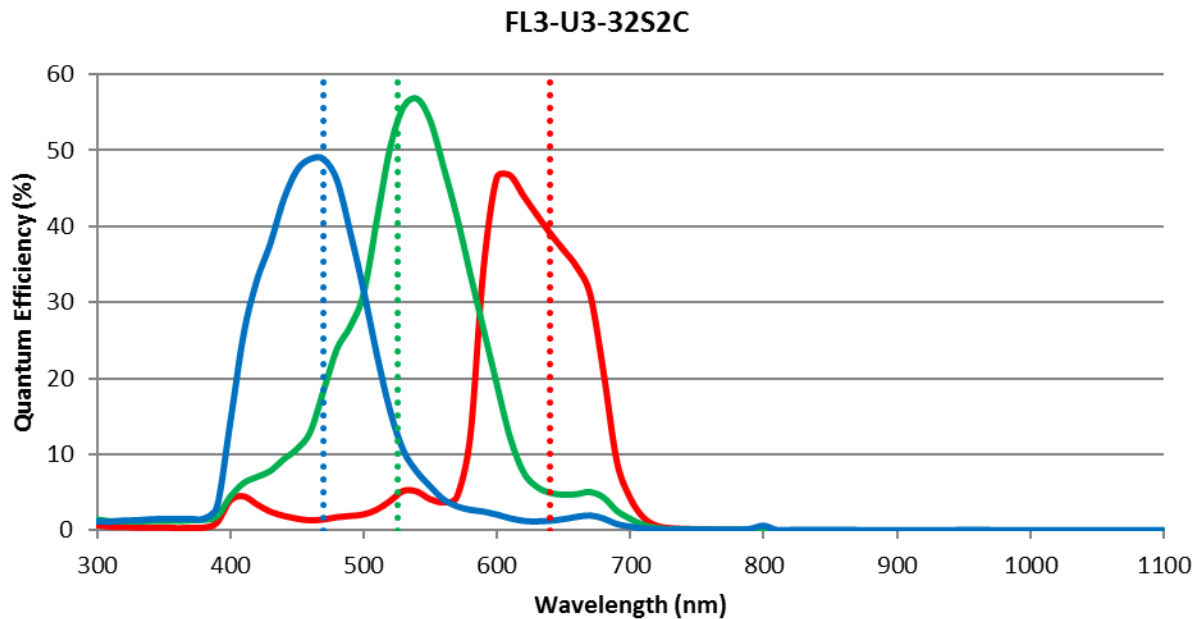
9 FL3-U3-32S2M-CS Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|---|--------------|--------------|
| Pixel Clock (MHz) | 216 | 54 |
| ADC (Bits) | 12-bit | 12-bit |
| Quantum Efficiency (% at 525 nm) | 70 | 71 |
| Temporal Dark Noise (Read Noise) (e-) | 8.31 | 4.90 |
| Signal to Noise Ratio Maximum (dB) | 40.25 | 40.42 |
| Signal to Noise Ratio Maximum (Bits) | 6.69 | 6.71 |
| Absolute Sensitivity Threshold (γ) | 12.73 | 7.69 |
| Saturation Capacity (Well Depth) (e-) | 10601 | 11011 |
| Dynamic Range (dB) | 61.61 | 66.19 |
| Dynamic Range (Bits) | 10.23 | 10.99 |
| Gain (e-/ADU) | 0.19 | 0.19 |



10 FL3-U3-32S2C-CS Imaging Performance

| Measurement | Video Mode 0 | Video Mode 7 |
|--|--------------|--------------|
| Pixel Clock (MHz) | 216 | 216 |
| ADC (Bits) | 12-bit | 12-bit |
| Quantum Efficiency Blue (% at 470 nm) | 48 | 49 |
| Quantum Efficiency Green (% at 525 nm) | 53 | 53 |
| Quantum Efficiency Red (% at 640 nm) | 39 | 39 |
| Temporal Dark Noise (Read Noise) (e ⁻) | 9.16 | 5.31 |
| Signal to Noise Ratio Maximum (dB) | 40.22 | 40.26 |
| Signal to Noise Ratio Maximum (Bits) | 6.68 | 6.69 |
| Absolute Sensitivity Threshold (γ) | 19.17 | 11.43 |
| Saturation Capacity (Well Depth) (e ⁻) | 10515 | 10604 |
| Dynamic Range (dB) | 60.74 | 65.23 |
| Dynamic Range (Bits) | 10.09 | 10.83 |
| Gain (e ⁻ /ADU) | 0.19 | 0.19 |



11 FL3-U3-120S3C-C Imaging Performance

| Measurement | Video Mode 0 |
|--|--------------|
| ADC (Bits) | 12-bit |
| Quantum Efficiency Blue (% at 470 nm) | 60 |
| Quantum Efficiency Green (% at 525 nm) | 72 |
| Quantum Efficiency Red (% at 640 nm) | 51 |
| Temporal Dark Noise (Read Noise) (e ⁻) | 3.00 |
| Signal to Noise Ratio Maximum (dB) | 38.67 |
| Signal to Noise Ratio Maximum (Bits) | 6.42 |
| Absolute Sensitivity Threshold (γ) | 4.86 |
| Saturation Capacity (Well Depth) (e ⁻) | 7363 |
| Dynamic Range (dB) | 66.46 |
| Dynamic Range (Bits) | 11.04 |
| Gain (e ⁻ /ADU) | 0.14 |

