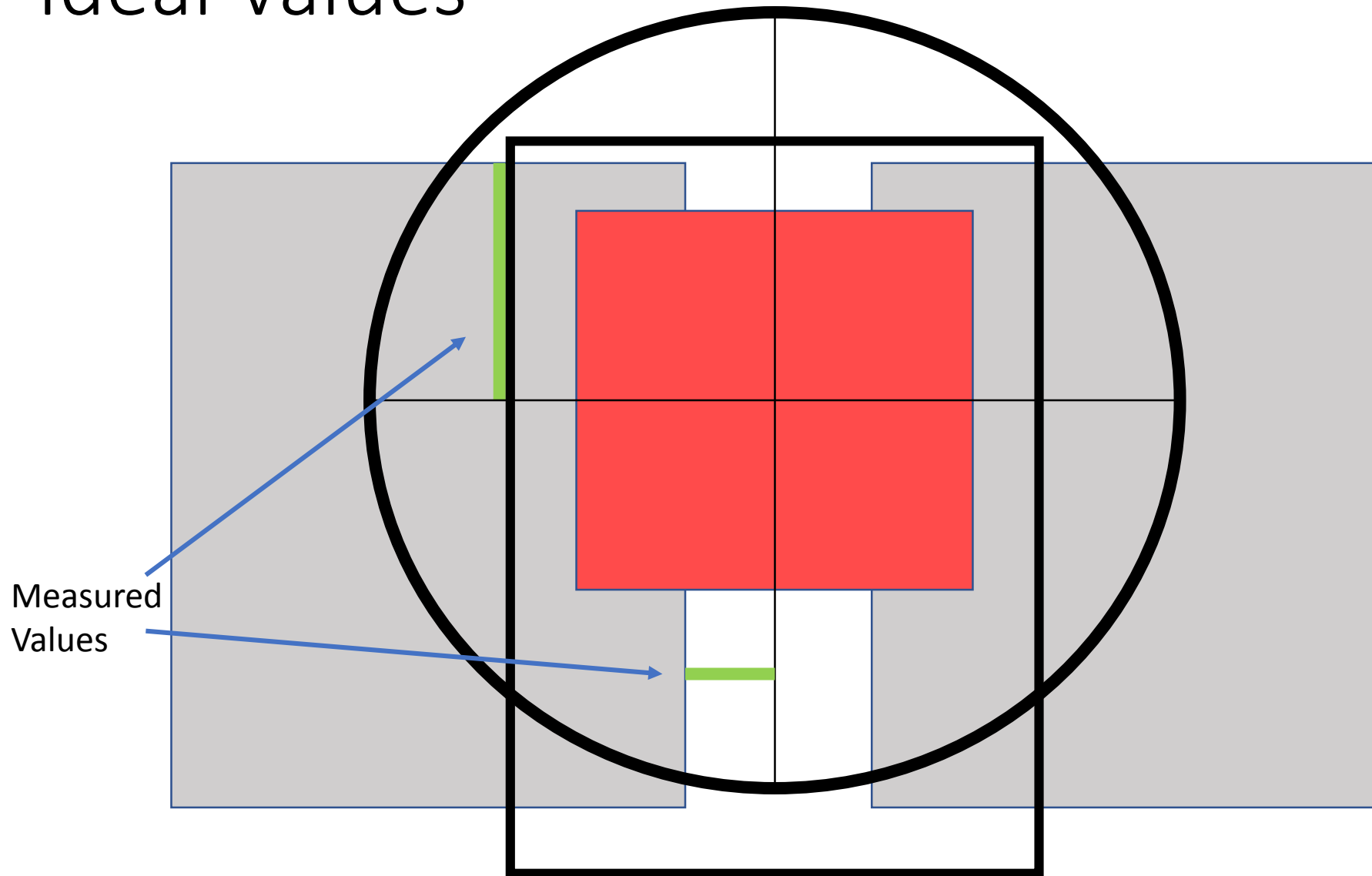


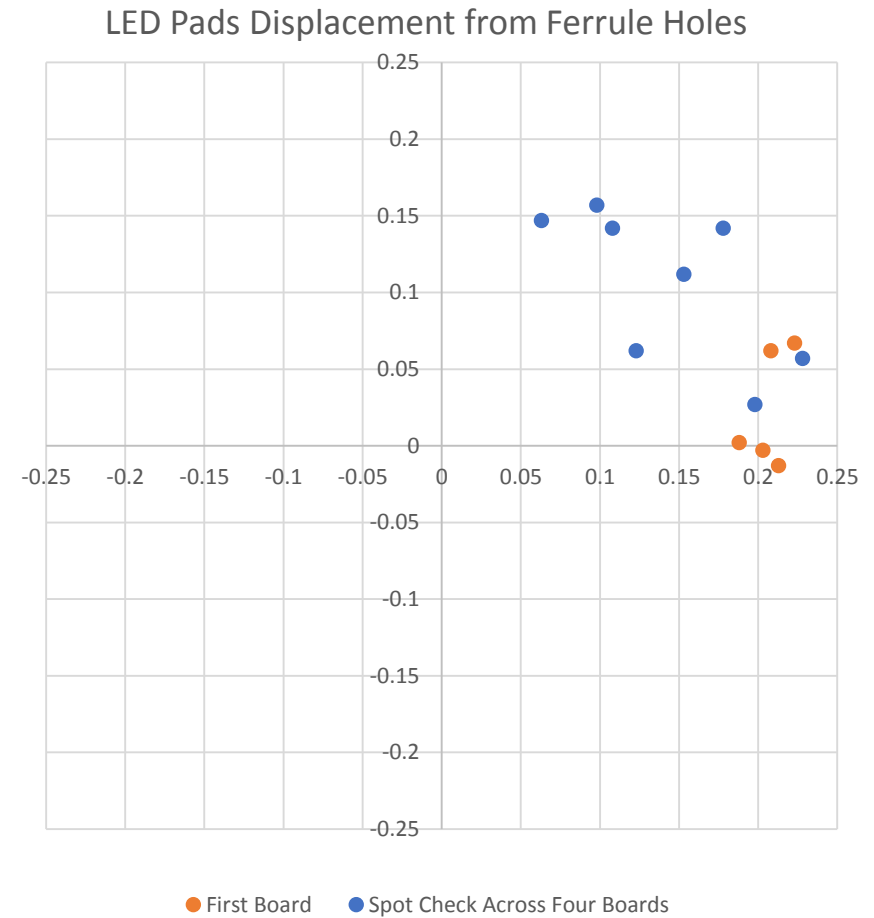
Ideal Values



Pad height: 60mil =
1.524mm
Package height: 170 mm
Distance optical center to
top of package: .63mm
=> Top of pads should be
.542mm from center line
of hole

Space between pads:
12mil = .31mm
=> Either pad should be
.155 mm from center line
of hole

New Measurements



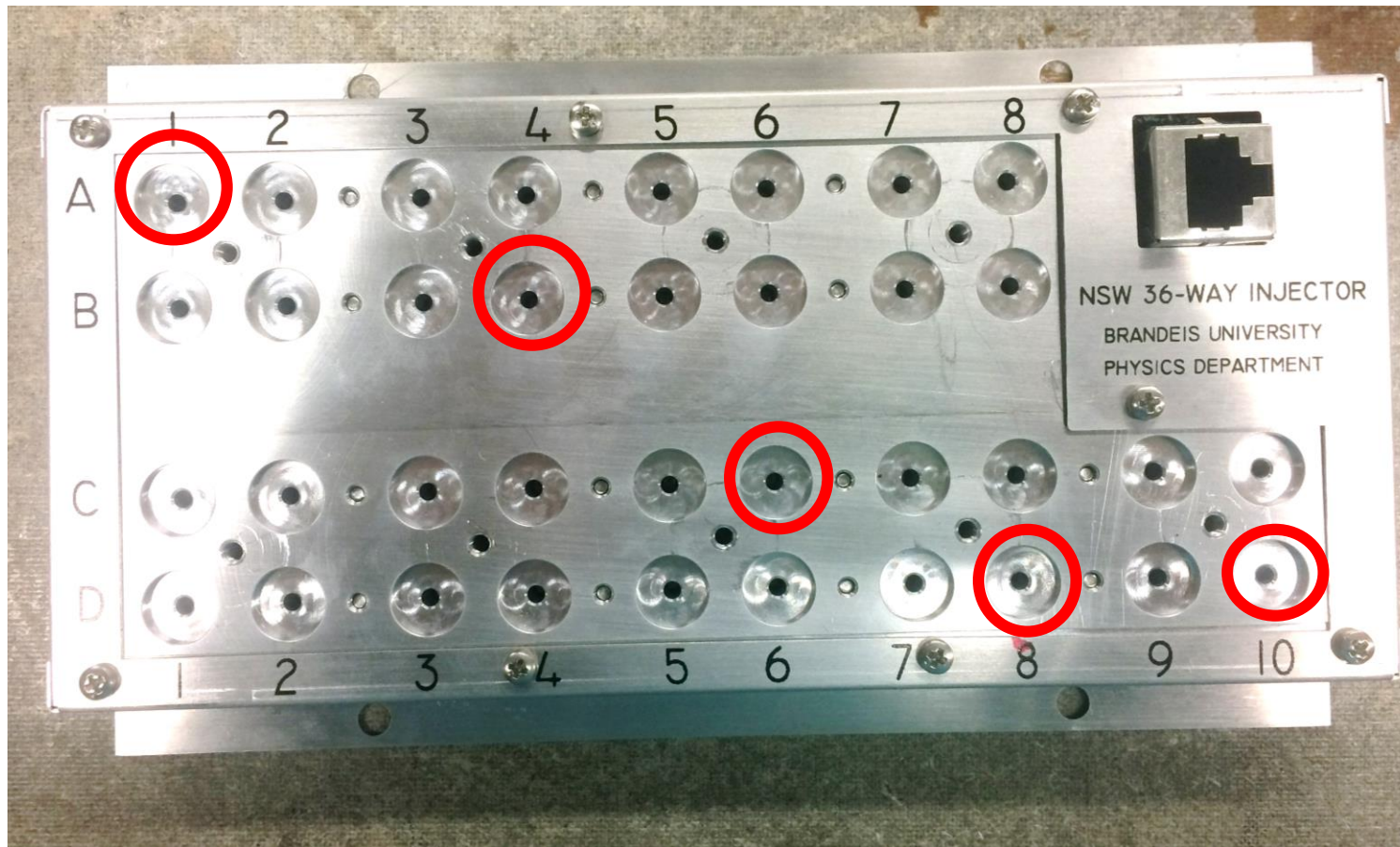
Average Horizontal Distance From Center:

169 μm

Average Vertical Distance From Center:

74 μm

On the previous board, differences in horizontal position due to pitch error. Not seen on new board – error is consistent on all points taken from different regions.



Holes measured on first board.

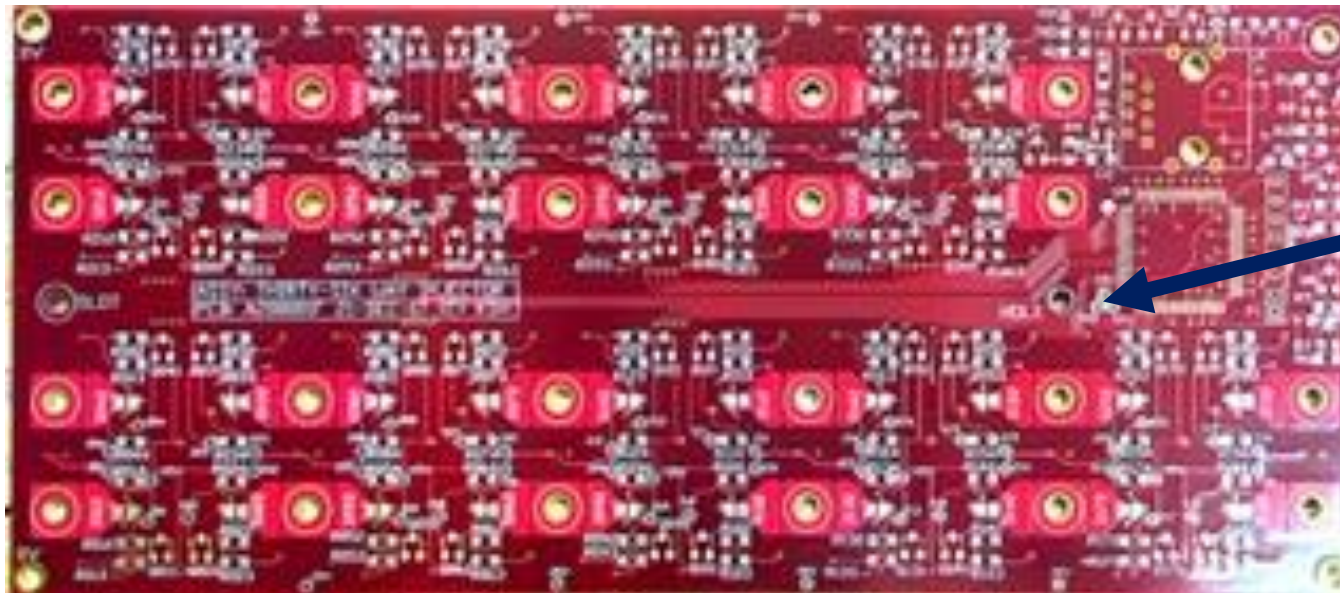
2 holes randomly chosen on each of 4 other boards for spot check.

New Problem: Mounting Holes

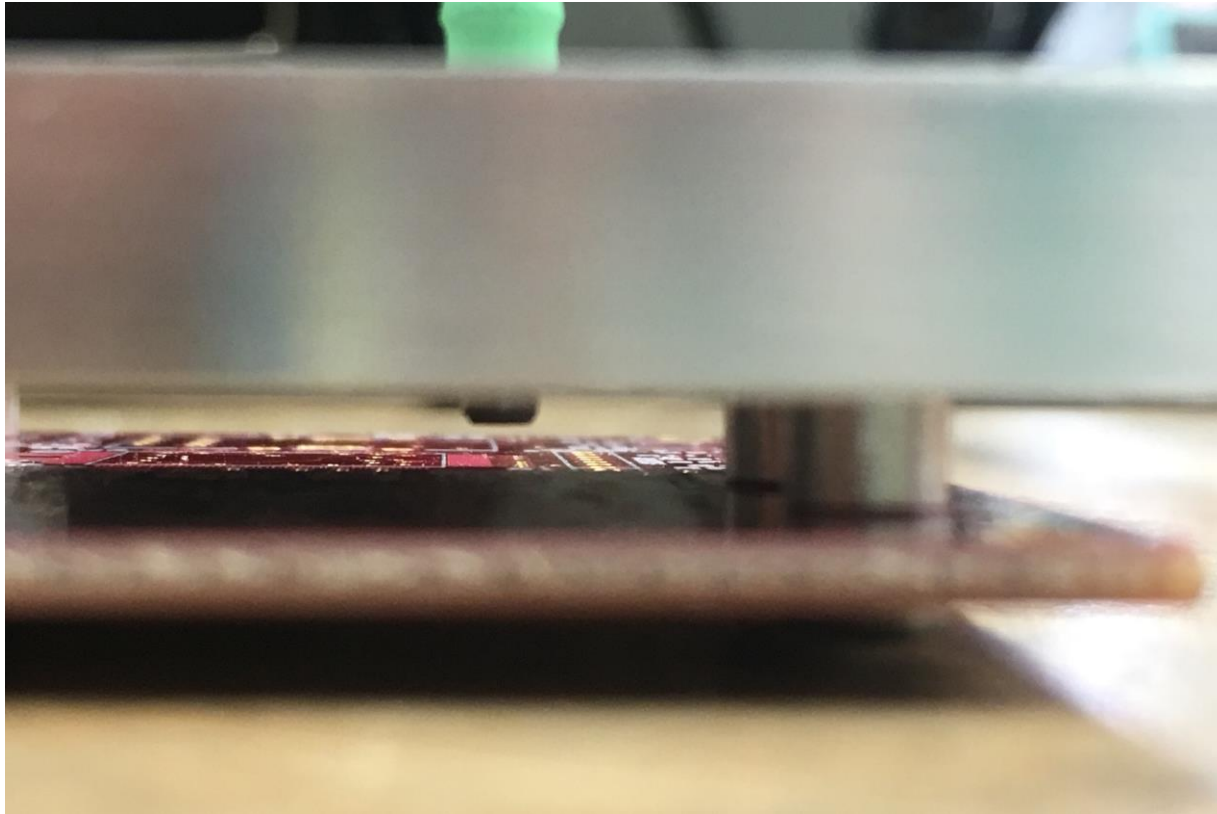
Mounting hole on previous board drilled 140um too far left

Previous hole precision: +/-125um

New precision: +/- 25 um



LED to Ferrule Tip Distance Calculation



Full width of ferrule plate mounted to injector board = 12.83 mm

Thickness of ferrule plate = 8.04 mm

Thickness of circuit board = 1.64 mm

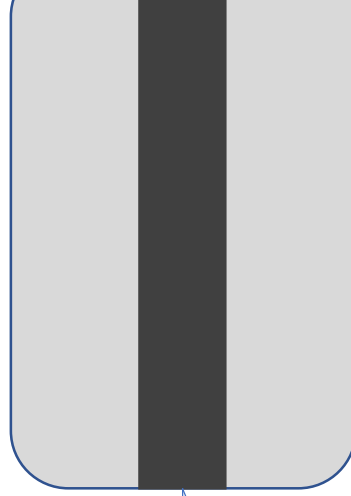
Protrusion of ferrule from plate = 1.45 mm

Thickness of Luxeon Z, as given in product brief = .69 mm

Industry standard height of package mounted off circuit board = ~.100 mm

Subtract all others from 12.83 mm to find distance ferrule tip to light emitting surface = ~.890 mm

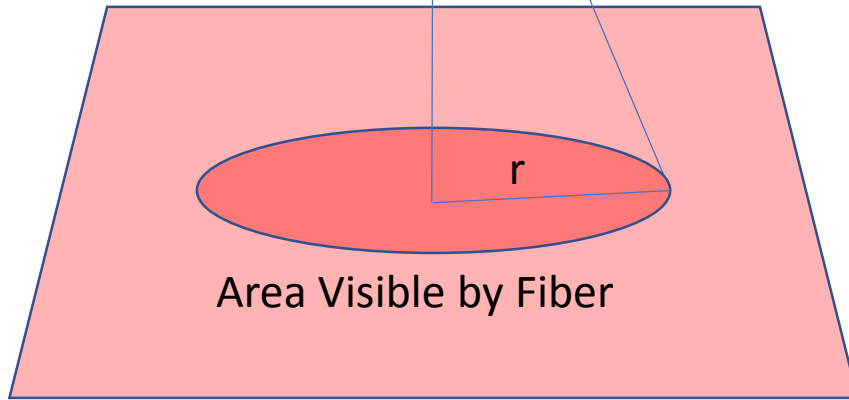
Ferrule Tip



h

θ

Light Emitting
Surface



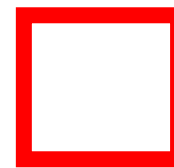
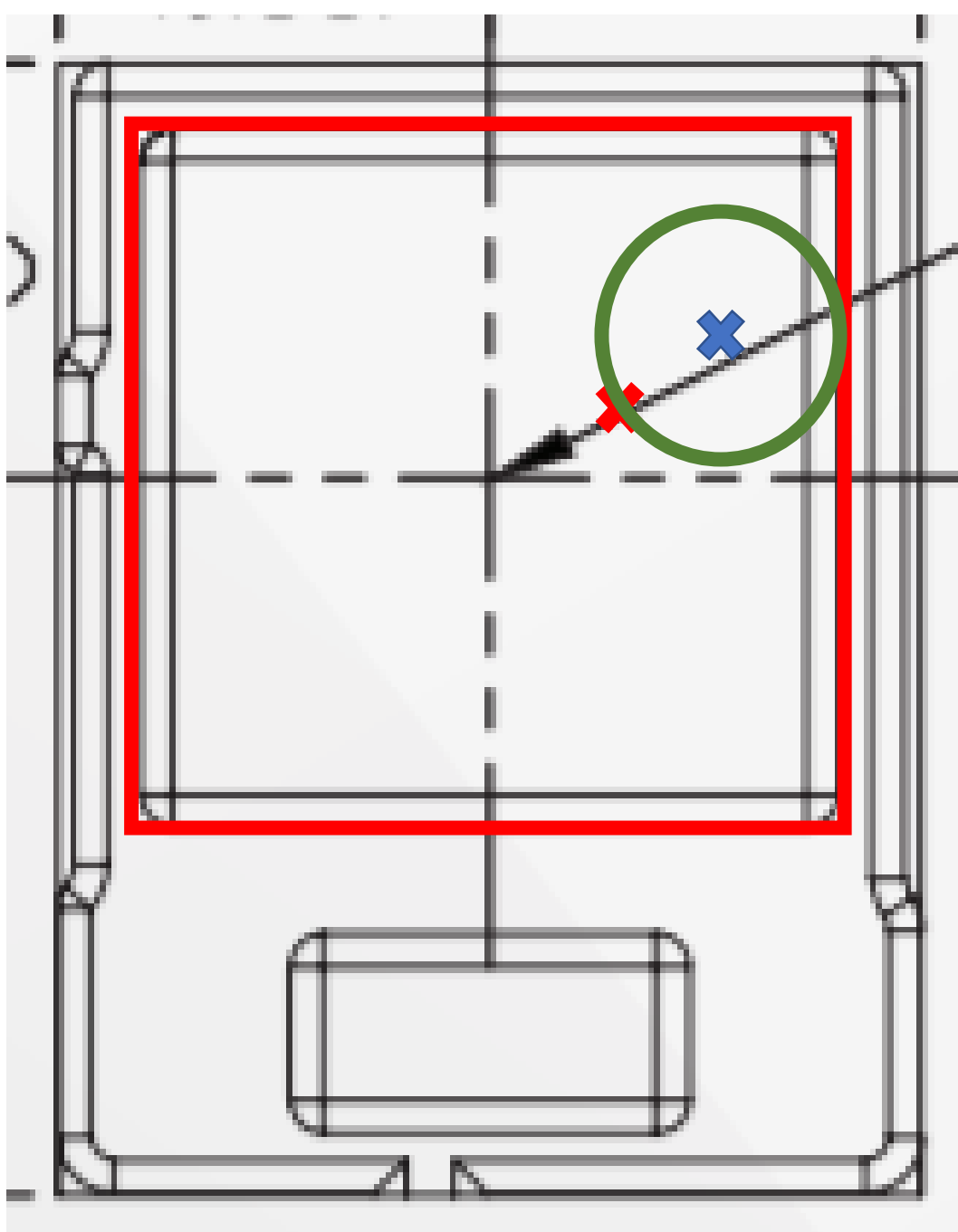
Area Visible by Fiber

Field of View

θ for our 62.5 μm fibers =
.22rad (12.7 $^\circ$)

h in our setup = 890 μm

$\Rightarrow r = h * \sin(\theta) = 195 \mu\text{m}$



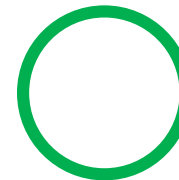
Light emitting surface area
 = 1mm^2 , 500 μm from
 center to edge



Average error from mounting
 hole accuracy: 169 μm right, 74
 μm up



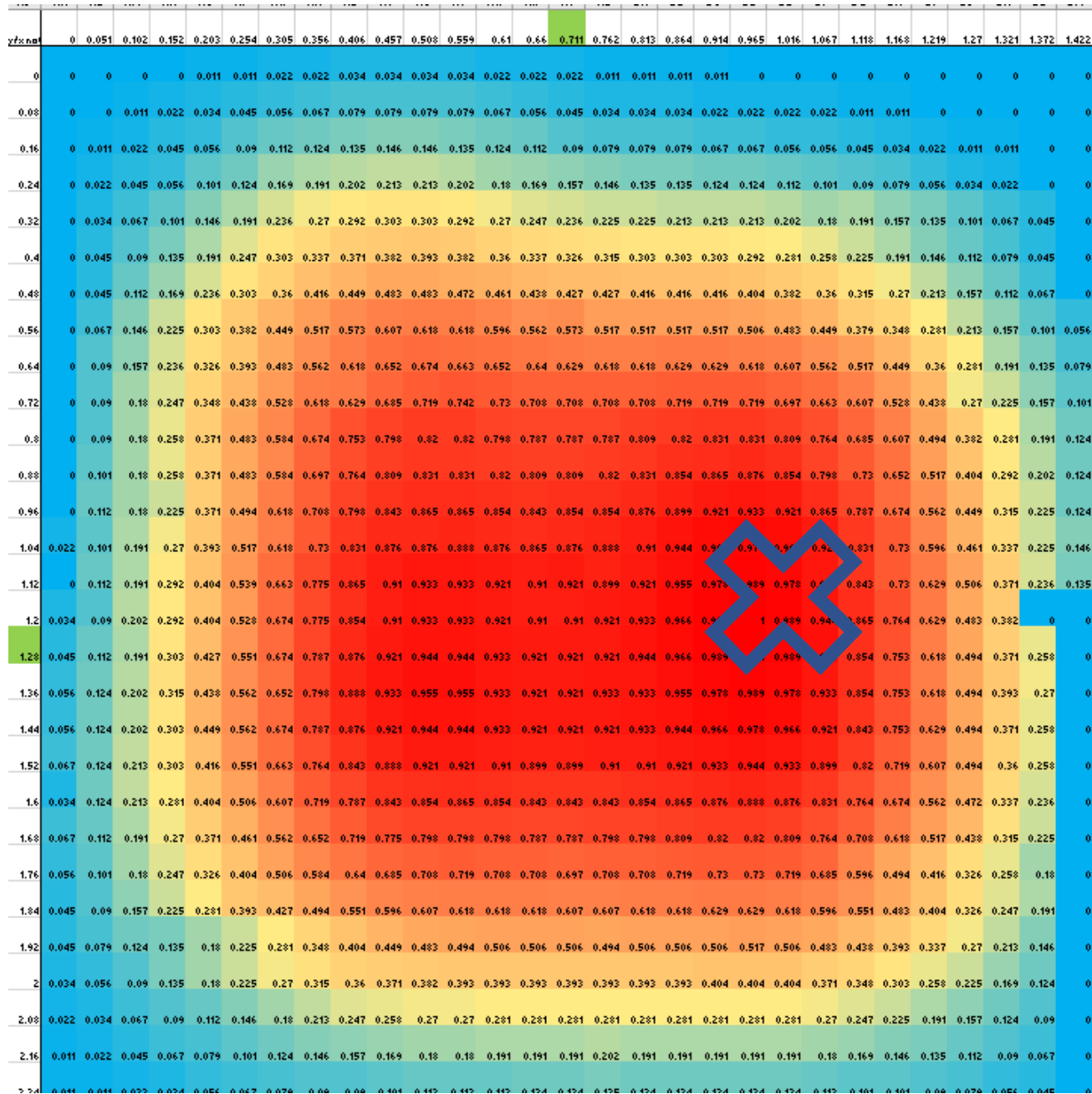
Error in Horizontal Distance of LEDs
 to center of pads when placed by
 machines: up to 135 μm horizontal,
 up to 105 μm vertical



Field of view of ferrule:
 195 μm radius when
 .890mm from ferrule to
 LED

⇒ Total maximum horizontal
 distance from center seen
 by ferrule: 499 μm .

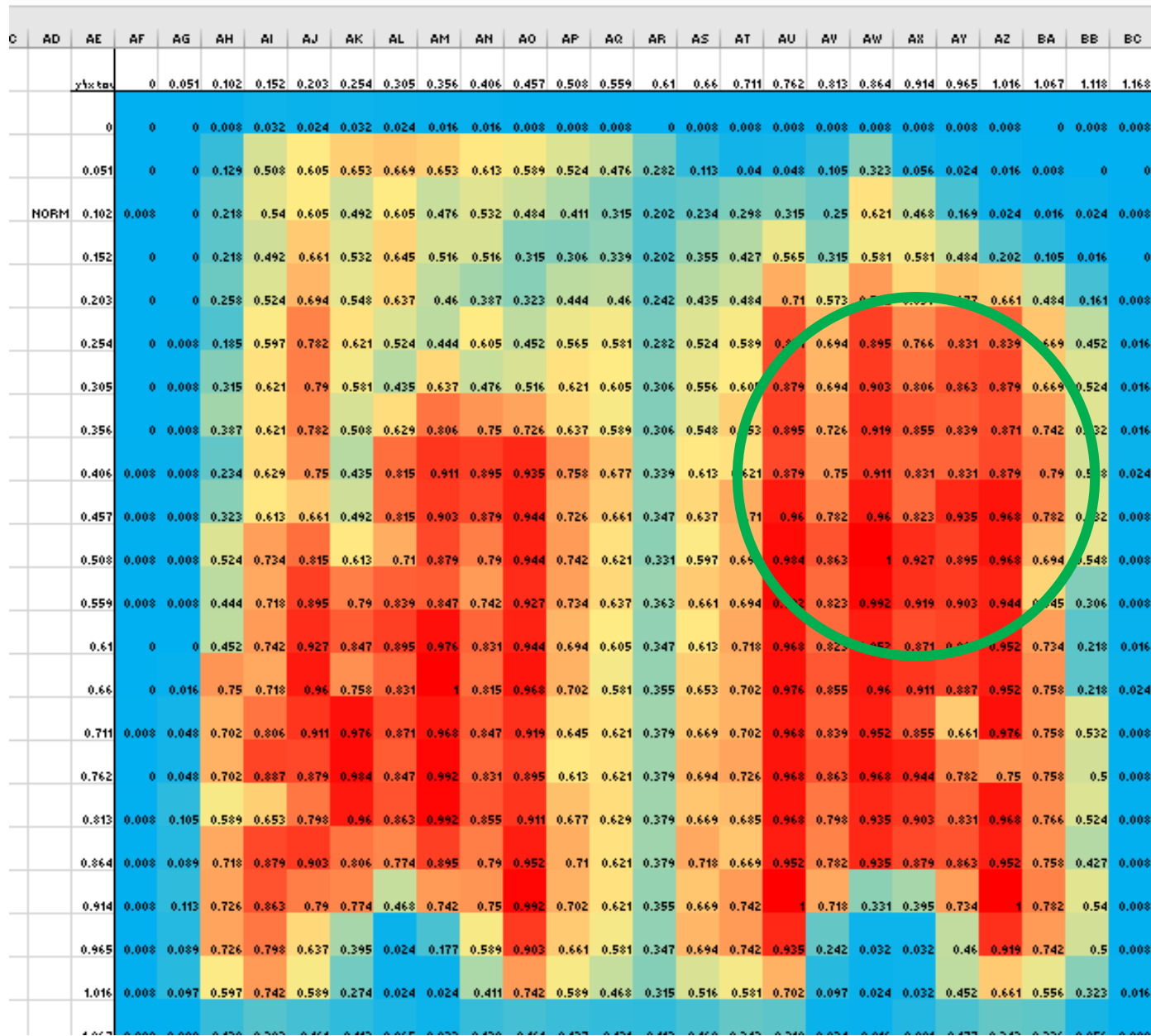
⇒ Total maximum vertical
 distance from center seen:
 374 μm .



Intensity from LED as seen by ferrule 1mm away from surface

Intensity is still ~95% of maximum possible at this distance

Intensity loss minimized by ferrule distance from LED



Intensity map
when ferrule
pressed
against LED
surface