



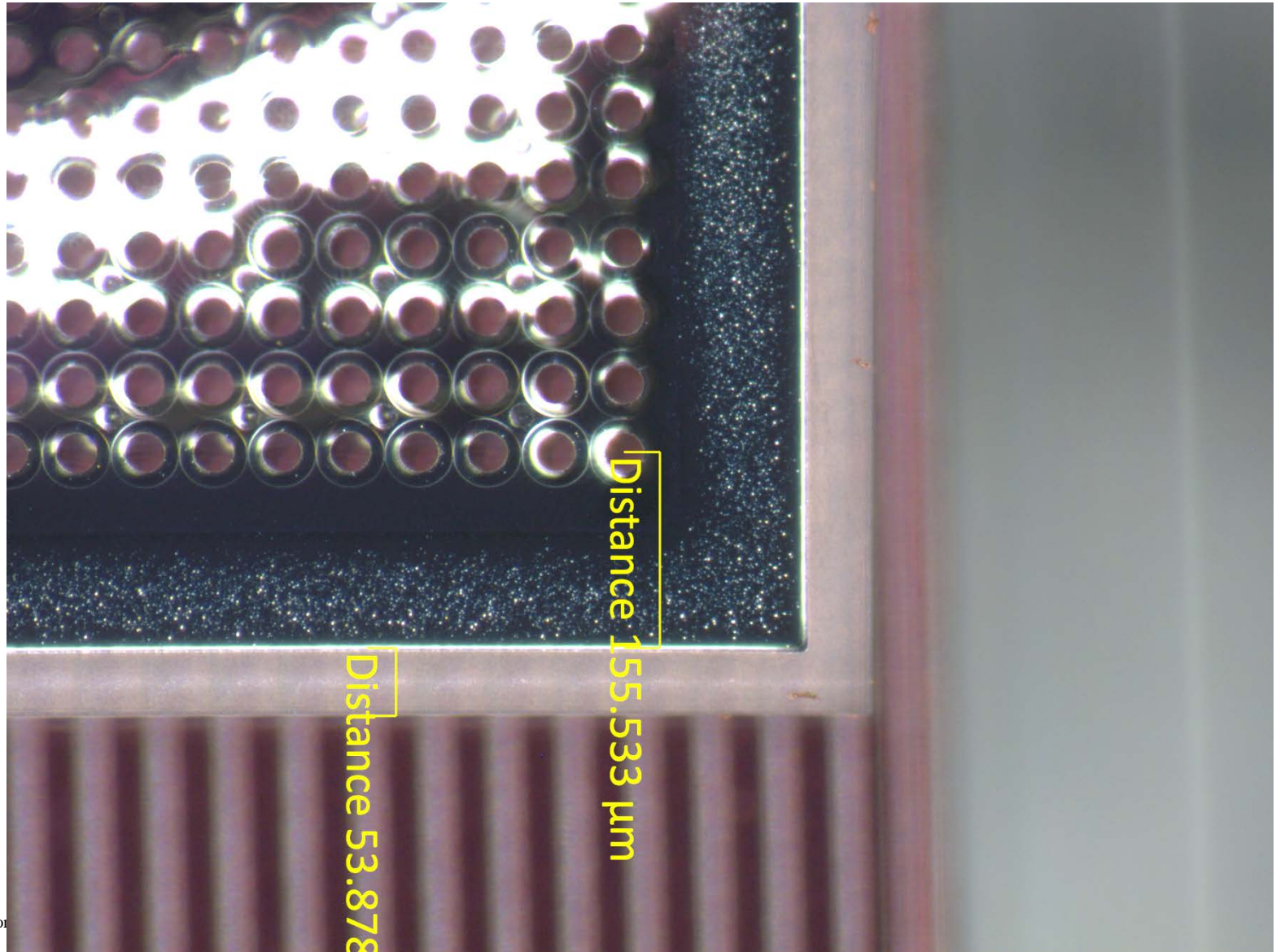
InGrid issues

Fred Hartjes
NIKHEF

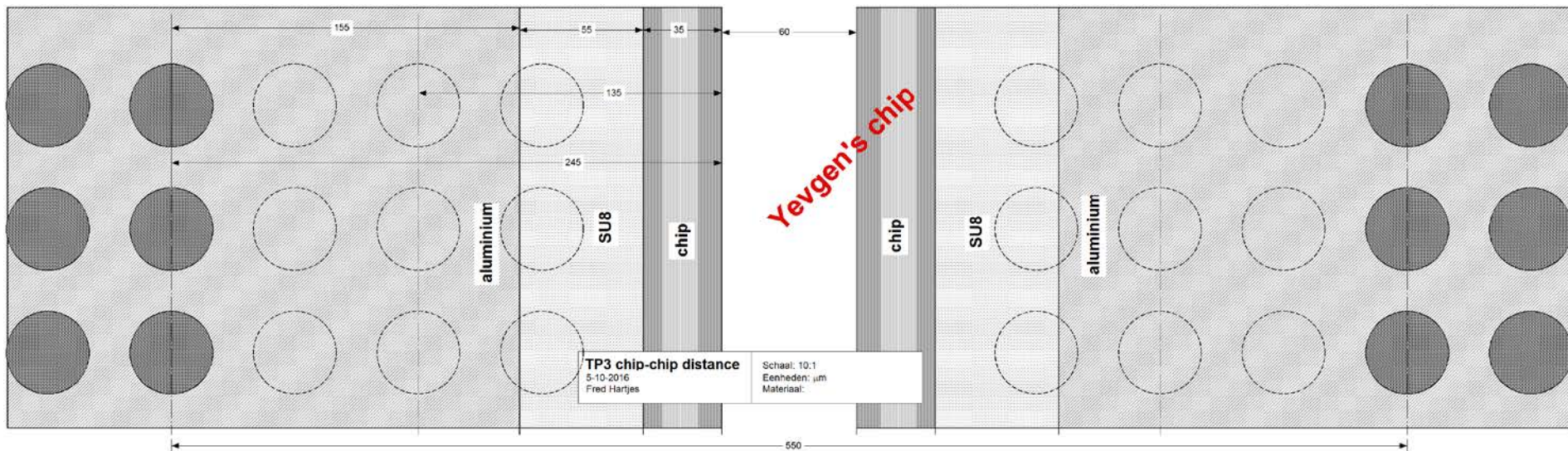
All under discussion

Nikhef/Bonn LepCol meeting
Okt 6, 2016

Dyke width at 3 sides

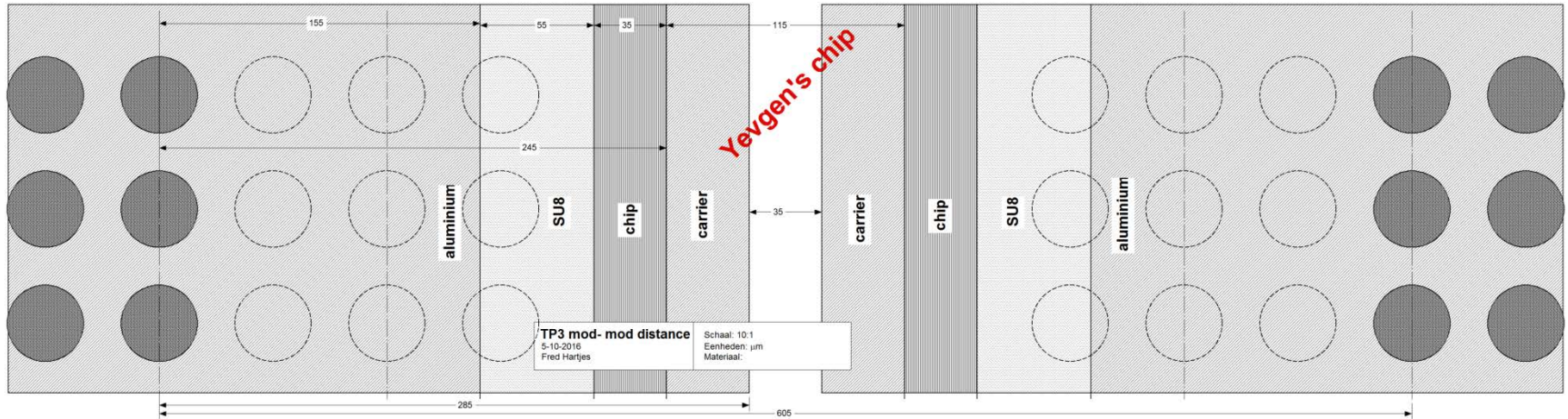


Chip to chip distance for Yevgen's grid



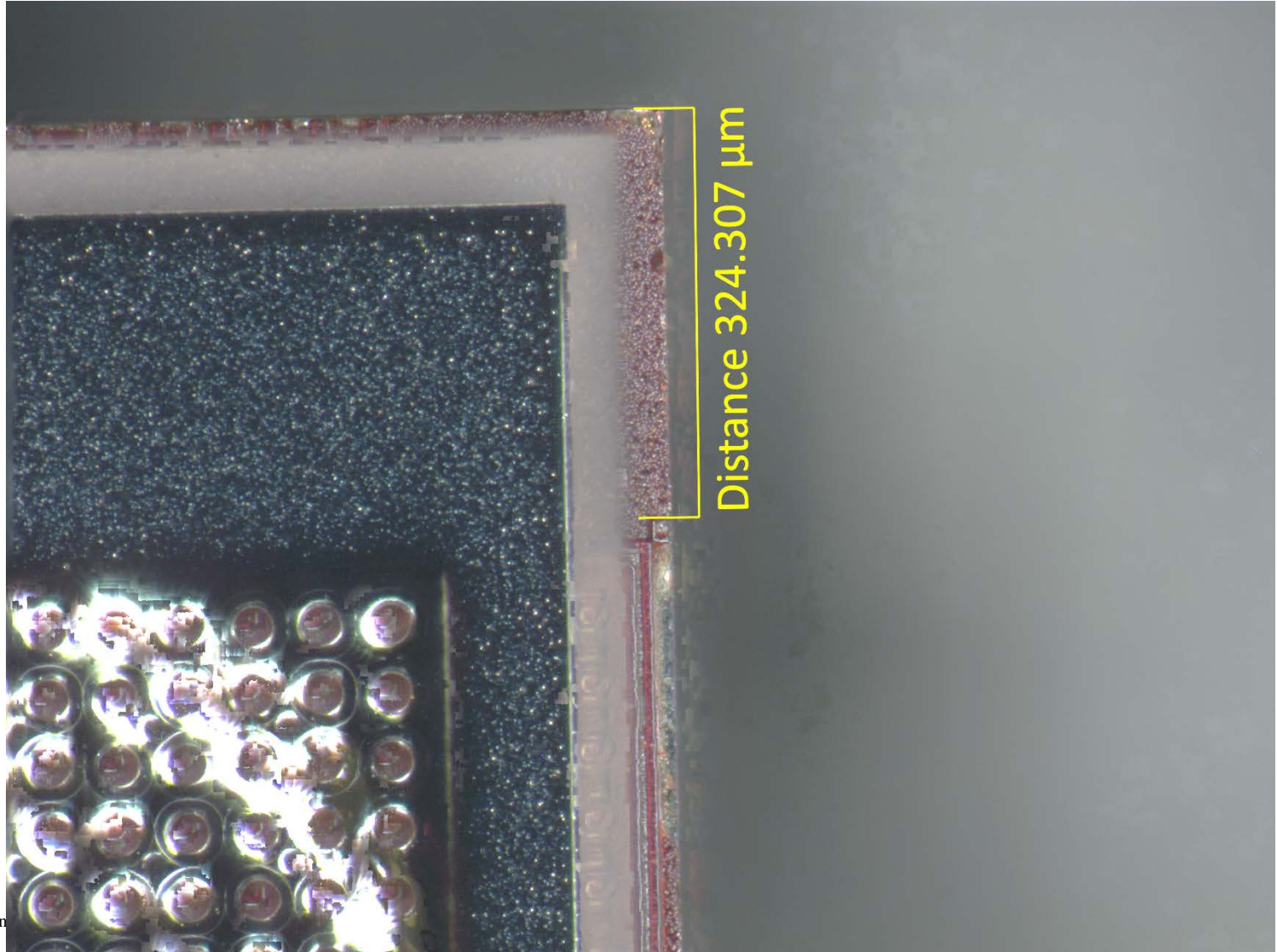
- Chip to chip distance (silicon): 60 µm
- Last active pixel – first active pixel: 550 µm

Carrier width for Yevgen's grid



- Carrier to carrier distance : 35 µm
- Last active pixel – carrier edge: 285 µm
- Total carrier width: $285 + 249 \cdot 55 + 550 + 249 \cdot 55 + 285 = 28510$ µm

Wide dyke opposite wire bonds



- We have for Yevgen's grid 250 x 256 active pixels
 - More than anticipated
 - 2 x 3 x 256 pixels obscured by dyke
- But chip dimensions are bit bigger
- With now fixed at 28.51 mm
- Length of chip still to be measured (microscope)

SPARE

- In progress/ under discussion
- Going from one chip to another on same carrier
 - 3 pixels sacrificed
- Going from one chip to another on neighbouring carrier
 - 4 pixels sacrificed
 - 28.6 => 28.435

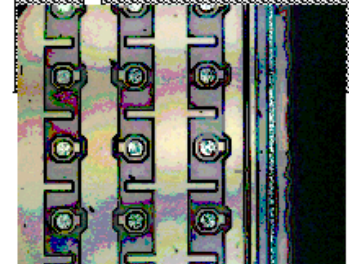
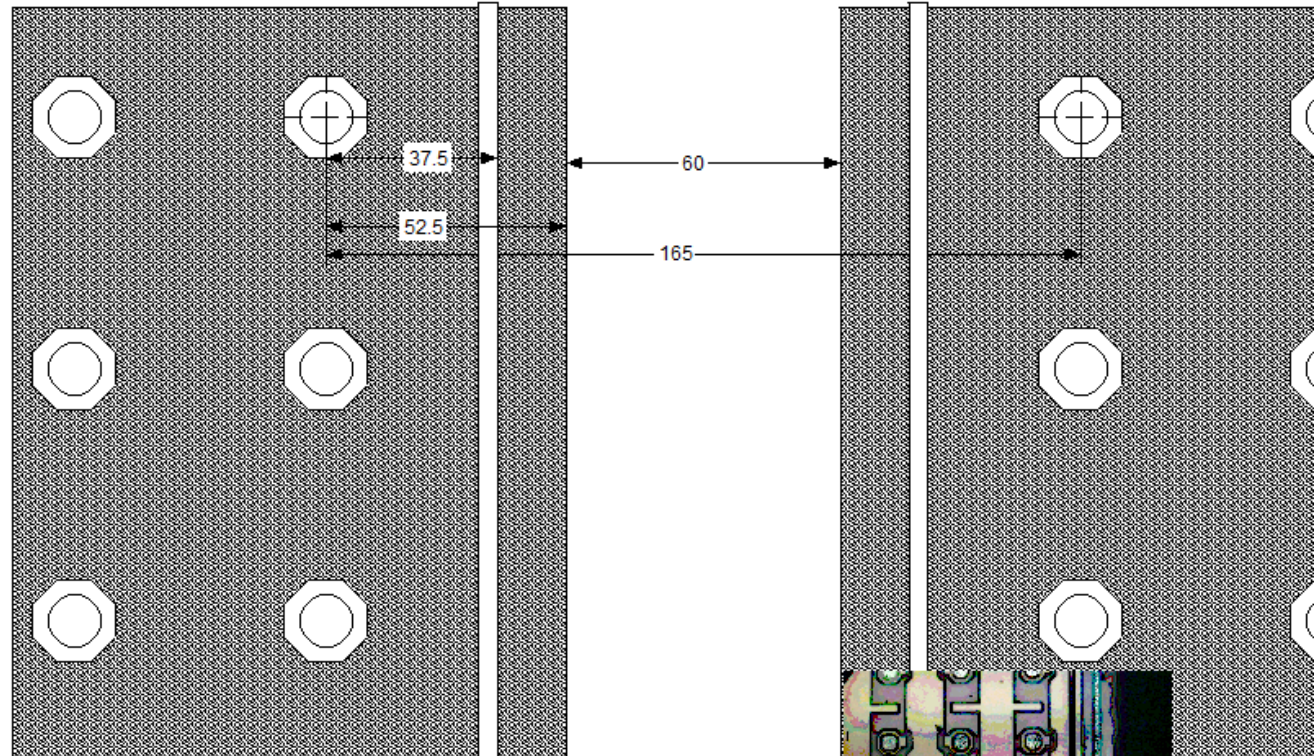
List of parameters

**First approach, to be updated
Put this on a Nikhef server with
read access to everybody (incl Bonn)**

Mechanical									
Item	Values (um)			Angle (mrad)		Reference			remarks
	X	Y	Z	hor. Plane	vert. plane	X	Y	Z	
position InGrid of chips	± 20	± 20	± 20	1	1	PCB ref marks	PCB ref marks	foot T	
chip to chip distance		60							
last pixel Ch1 1st pixel CH2		165							
chip to chip distance mod 1 to mod 2		115							
last pixel mod1 to 1st pixel mod 2		220							
module to module pitch		28435							
position PCB ref marks	± 20	± 20	± 100	1	1	carrier edge	carrier edge	carrier foot	
Top guard electrode	± 50	± 50	500± 20	10	1	carrier edge	carrier edge	chip dyke	
chip edge to PBC			100						
chip dimension edge to edge			14130						
Electrical									
	Value								
Grid potential Vgrid (V)	~-400± 4								
Grid supply resistor (Ω)	100M								each chip
drift field E (V/cm)	-100								
Guard potential (V)	Vgrid + E*Zguard								
Guard supply resistor (Ω)	100M								

Inter chip distance on same carrier

- Wafer cutting at IZM is very precise
- => We may position the chips very close to another
 - Going from one chip to another only **two** pixels are missing
 - => 165 μm distance between centre last pixel to first pixel
 - 60 μm edge to edge (nominal)



- Info from Martin van Beuzekom

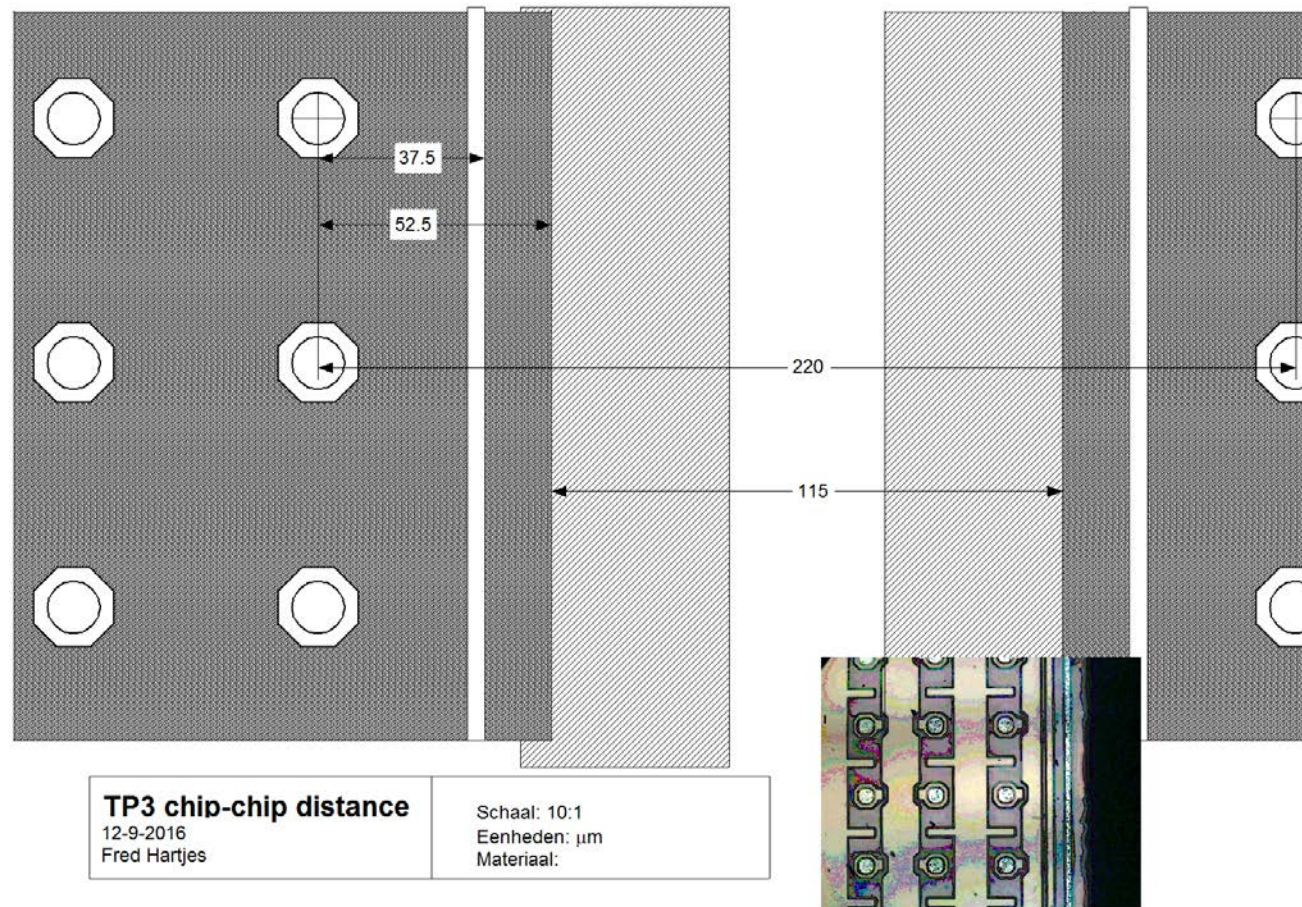
TP3 chip-chip distance

8-7-2016
Fred Hartjes

Schaal: 10:1
Eenheden: mm
Materiaal:

Inter chip distance to another carrier

- Going from one chip to another **three** pixels are sacrificed
- \Rightarrow 220 μm distance between centre last pixel to first pixel
- 115 μm edge to edge (nominal)



Assembly / alignment method

- Mount PCB on carrier
 - Refer to two carrier edges using jig with reference marks
 - AND refer to reference marks on PCB
- Mount chips on carrier
 - 2 chips on one side simultaneously
 - XY: refer to grid hole pattern
 - rough alignment using bonding pads ($N \times 55 \mu\text{m}$)
 - AND refer to reference marks on PCB
 - Z: refer to grid (fixed height of alignment jig)
- Mount guard electrode
 - XY: refer edges to reference marks on PCB (tolerance $100 \mu\text{m}$)
 - Provide a 1 mm hole at the PCB reference marks
 - Z: let sides of the guard rest on dykes
 - Guard should be fabricated bit hollow
- Module to module
 - XY: refer to PCB reference marks

- Sides
 - 2 x 3 pixels lost
- Top
 - No pixels lost
- Bottom
 - No pixels lost

dykes

