

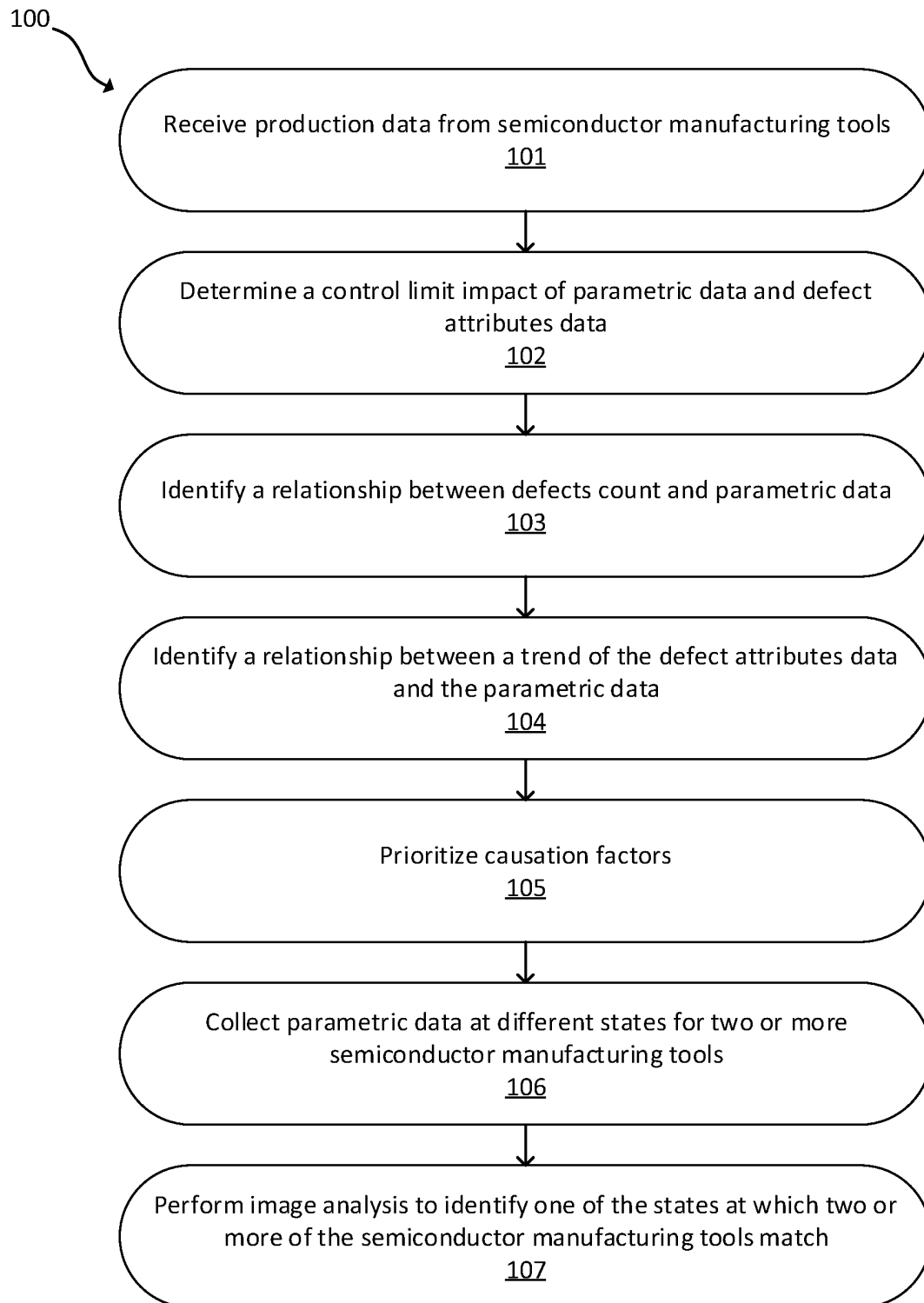


FIG. 1

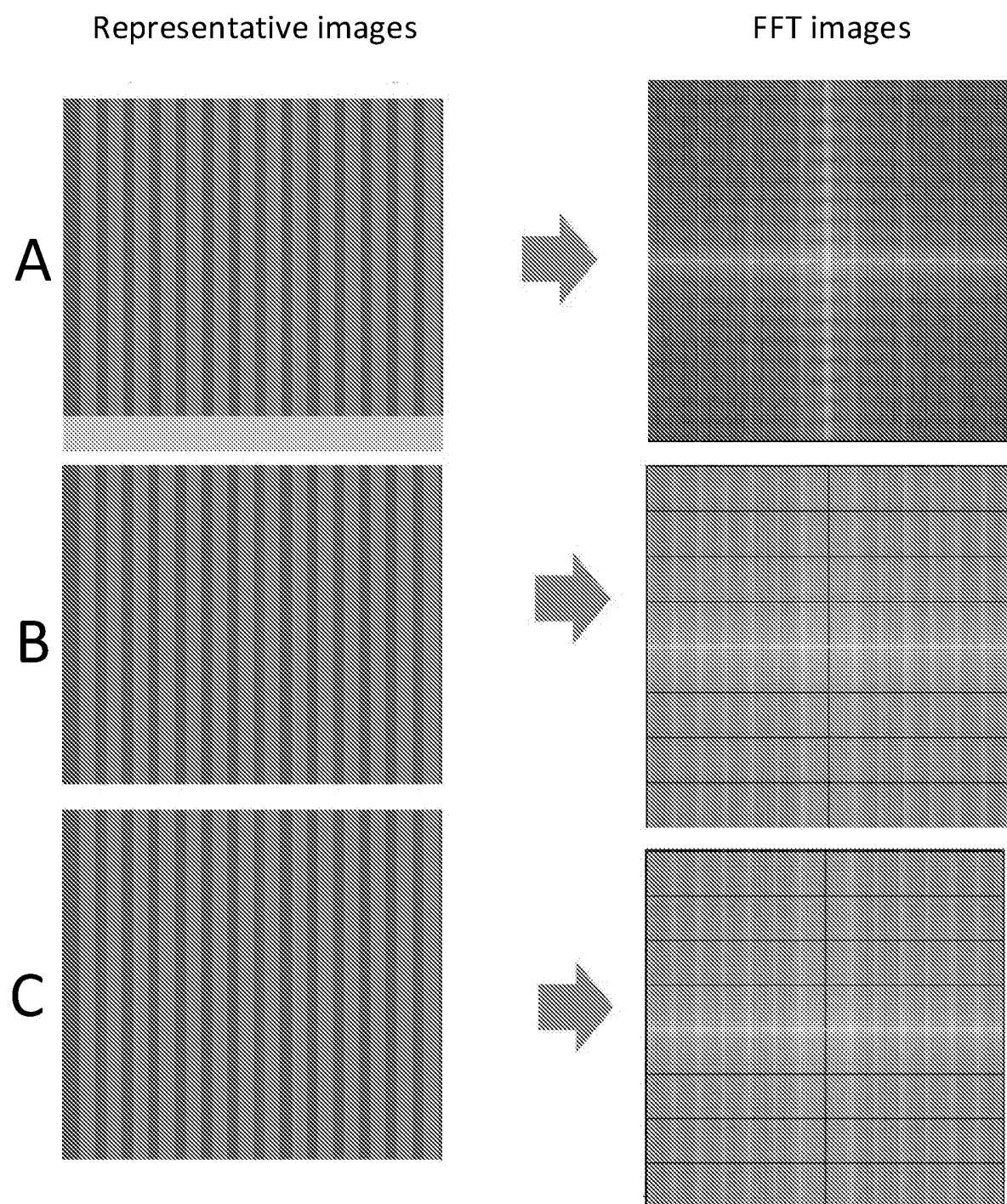


FIG. 2

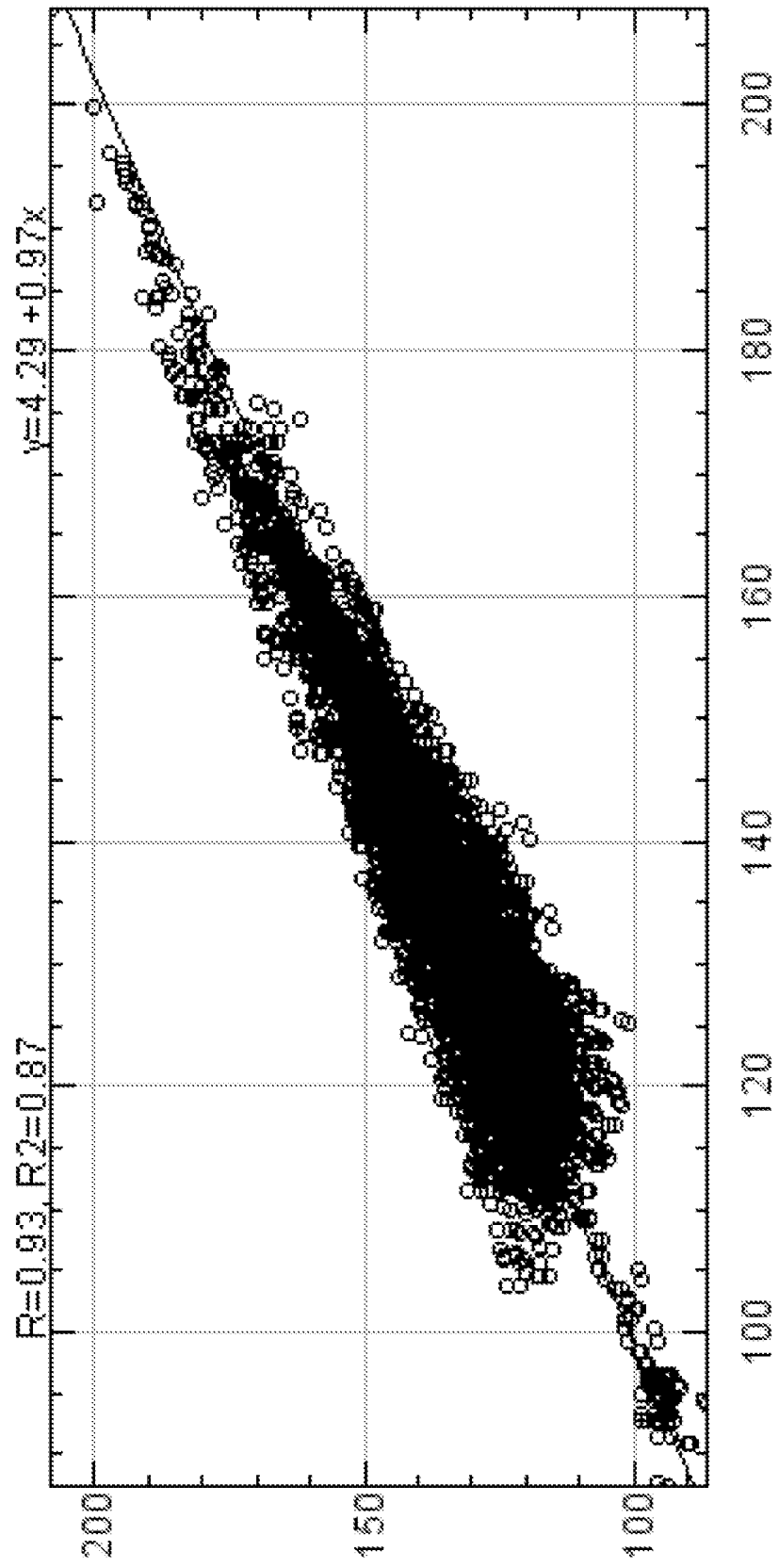


FIG. 3

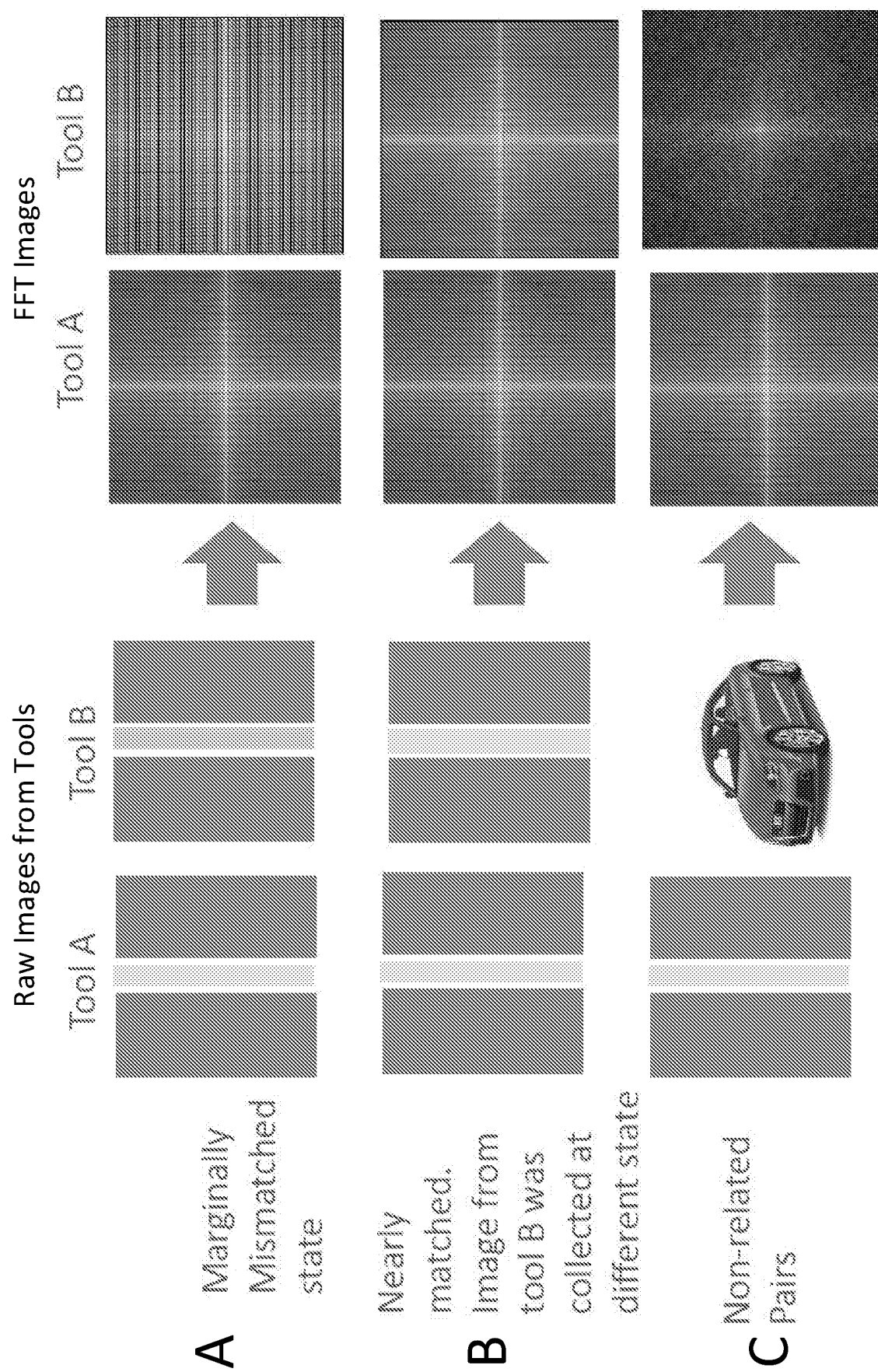


FIG. 4

5/25

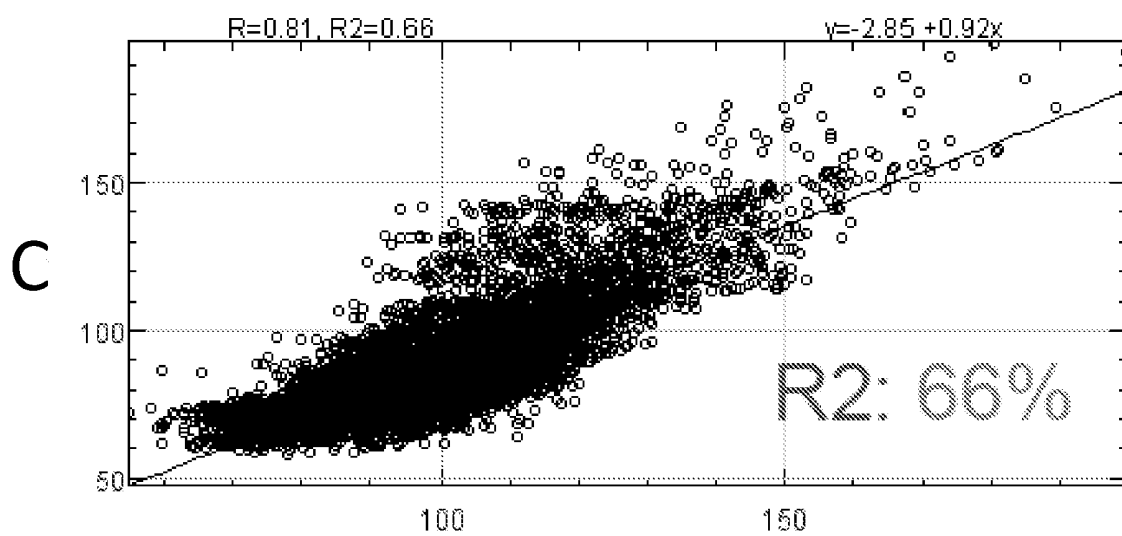
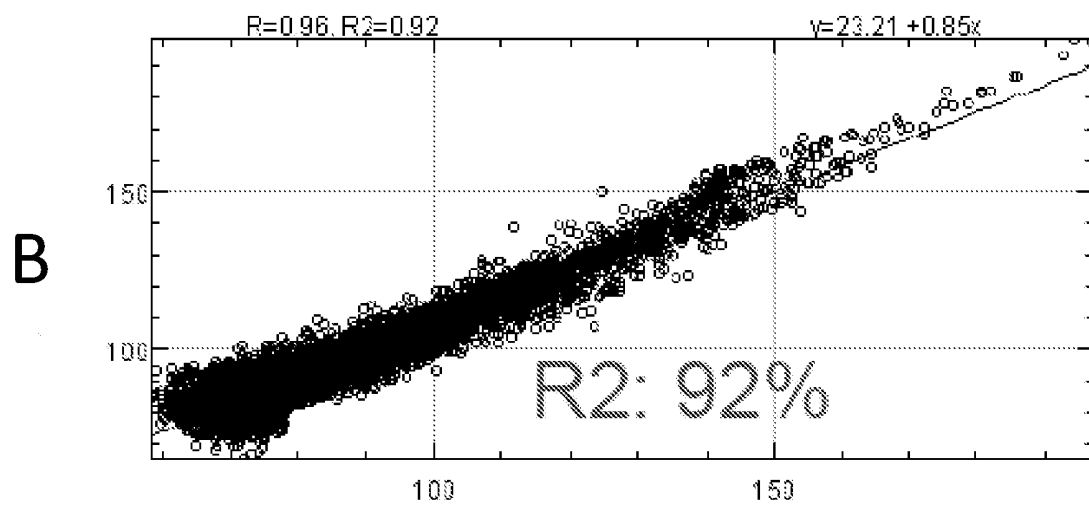
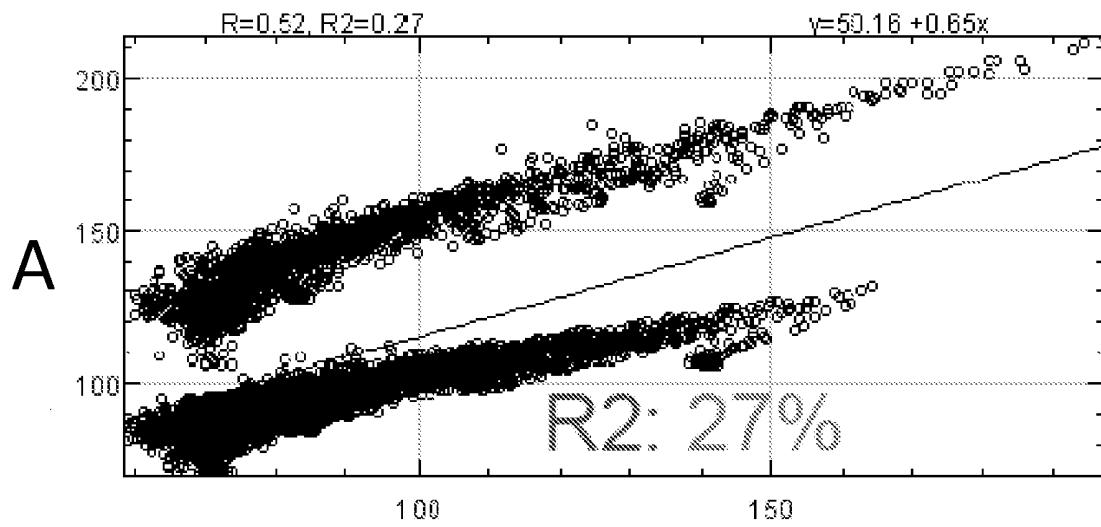


FIG. 5

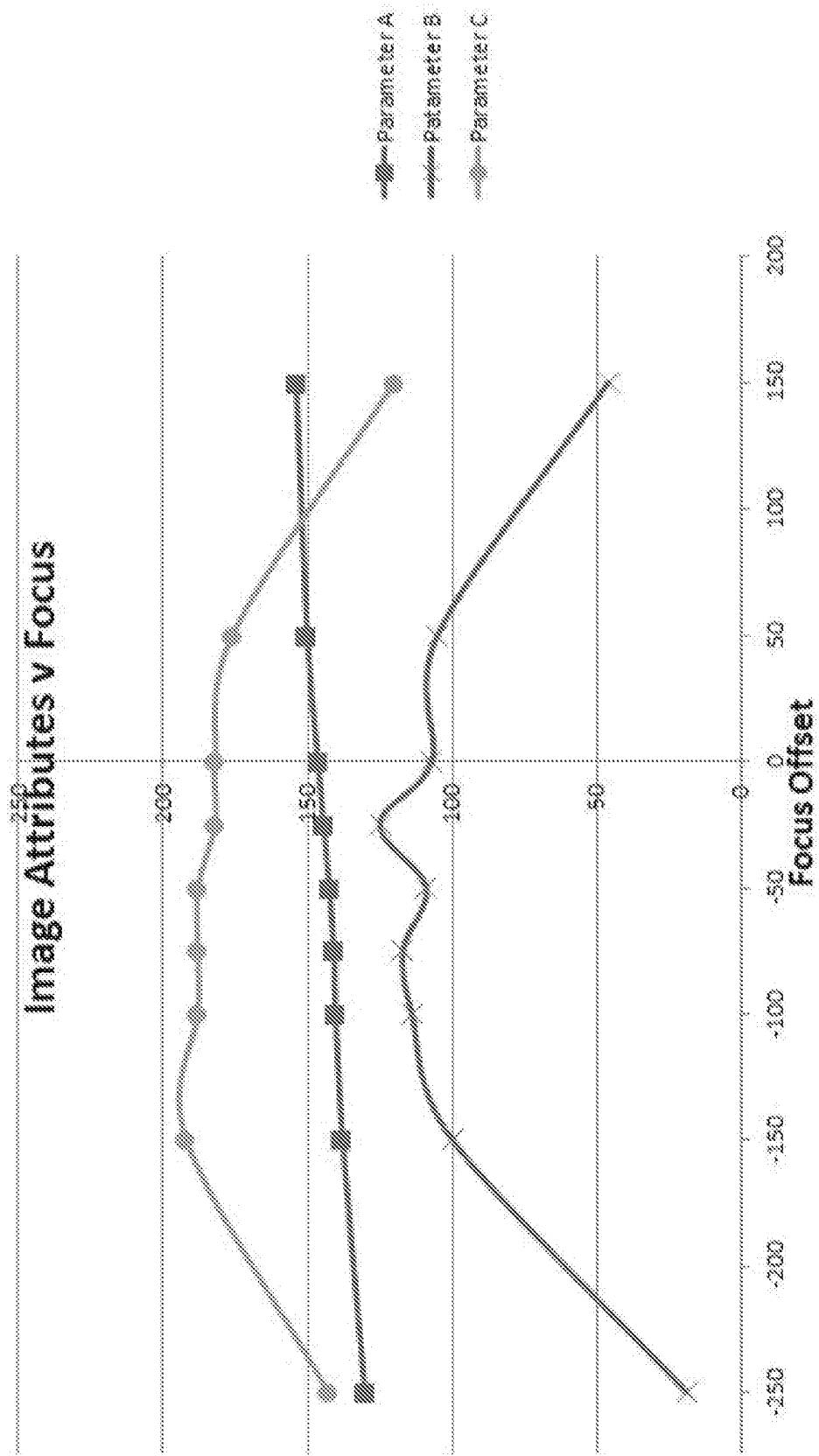


FIG. 6

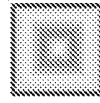
Reference tool

Characterized by the input variable $\mathbf{x}$ and the output variable $\mathbf{y}$

$$\mathbf{x} = \begin{bmatrix} \text{Focus offset} \\ \dots \end{bmatrix}$$

$$\mathbf{y} = \begin{bmatrix} \text{Image contrast} \\ \text{Feature sharpness} \\ \text{MDAT Offset} \\ \dots \end{bmatrix}$$

Patch image from reference tool under condition $\mathbf{x}$



Candidate tool images for different values of variable $\mathbf{x}$

- i) Find best offset vector $\mathbf{v}$ to match the output variable $\mathbf{y}$ on the candidate tool as good as possible to the reference tool

$$\mathbf{y} = f_{\text{ref}}(\mathbf{x}) \approx f_{\text{cand}}(\mathbf{x} + \mathbf{v})$$

- ii) Optimize offset vector $\mathbf{v}$ based on matching of images from the reference and candidate tool

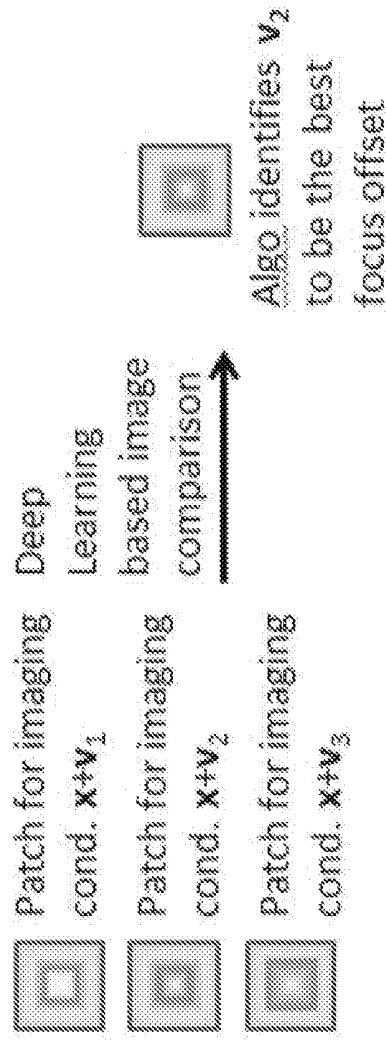
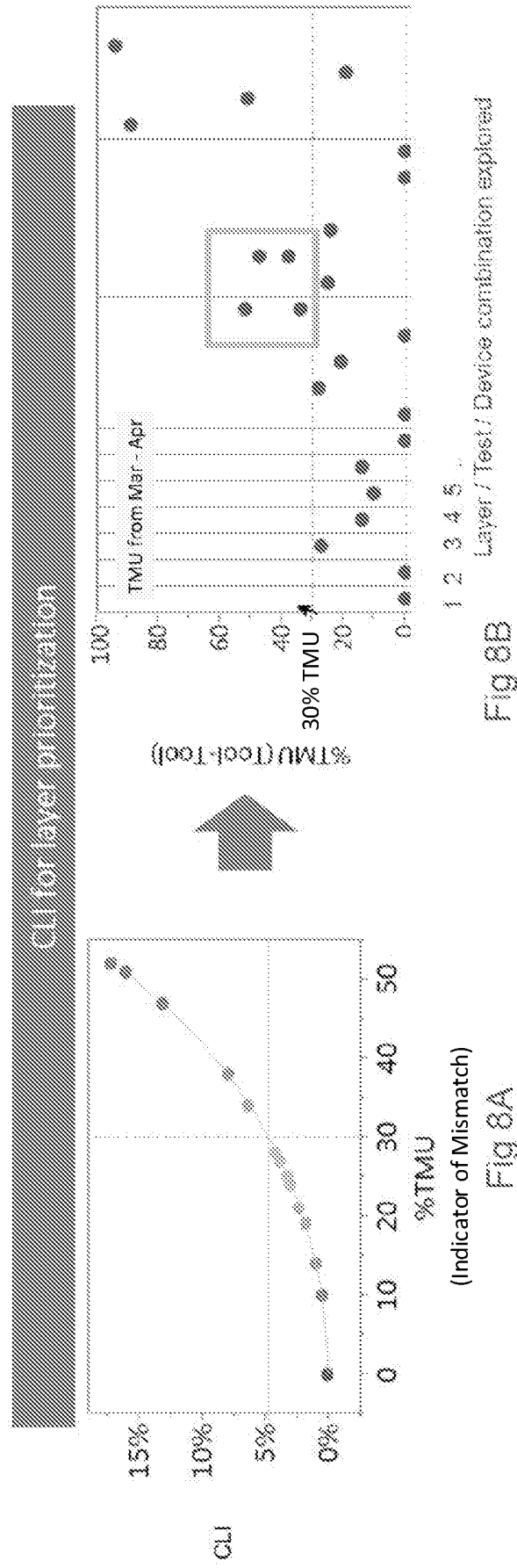


FIG. 7



Data Preparation Stage-1

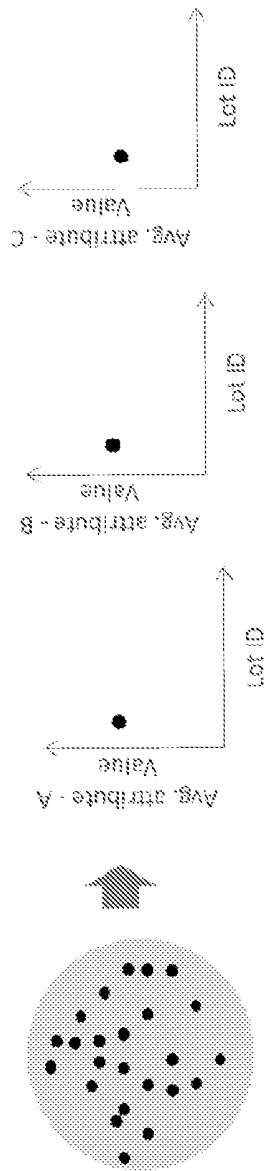


Fig 10A

Data Preparation Stage-2

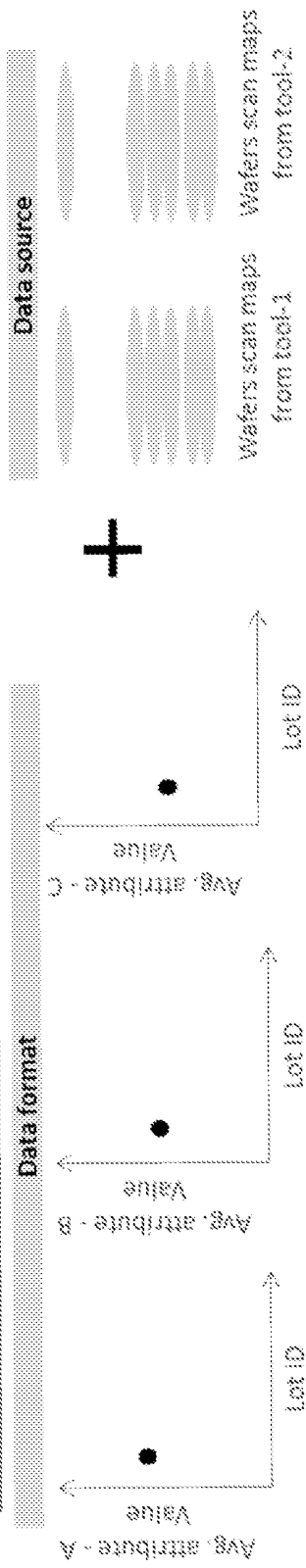


Fig 10B

Assessment / Correlation Technique

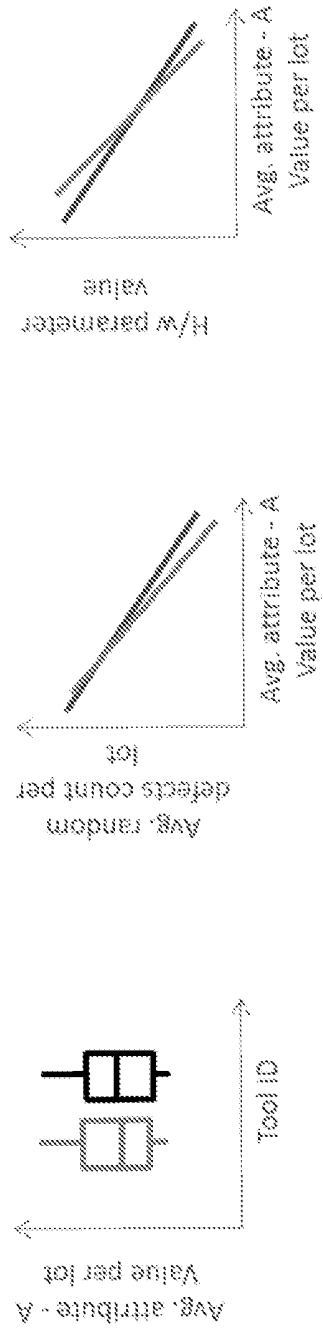


Fig 10C

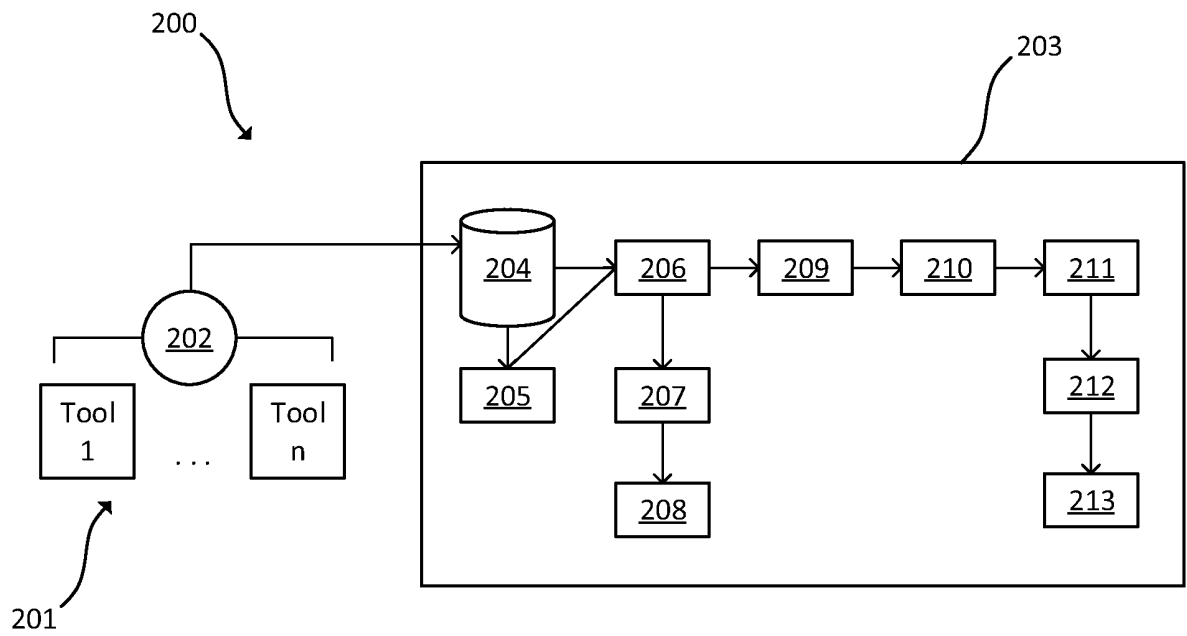


FIG. 11

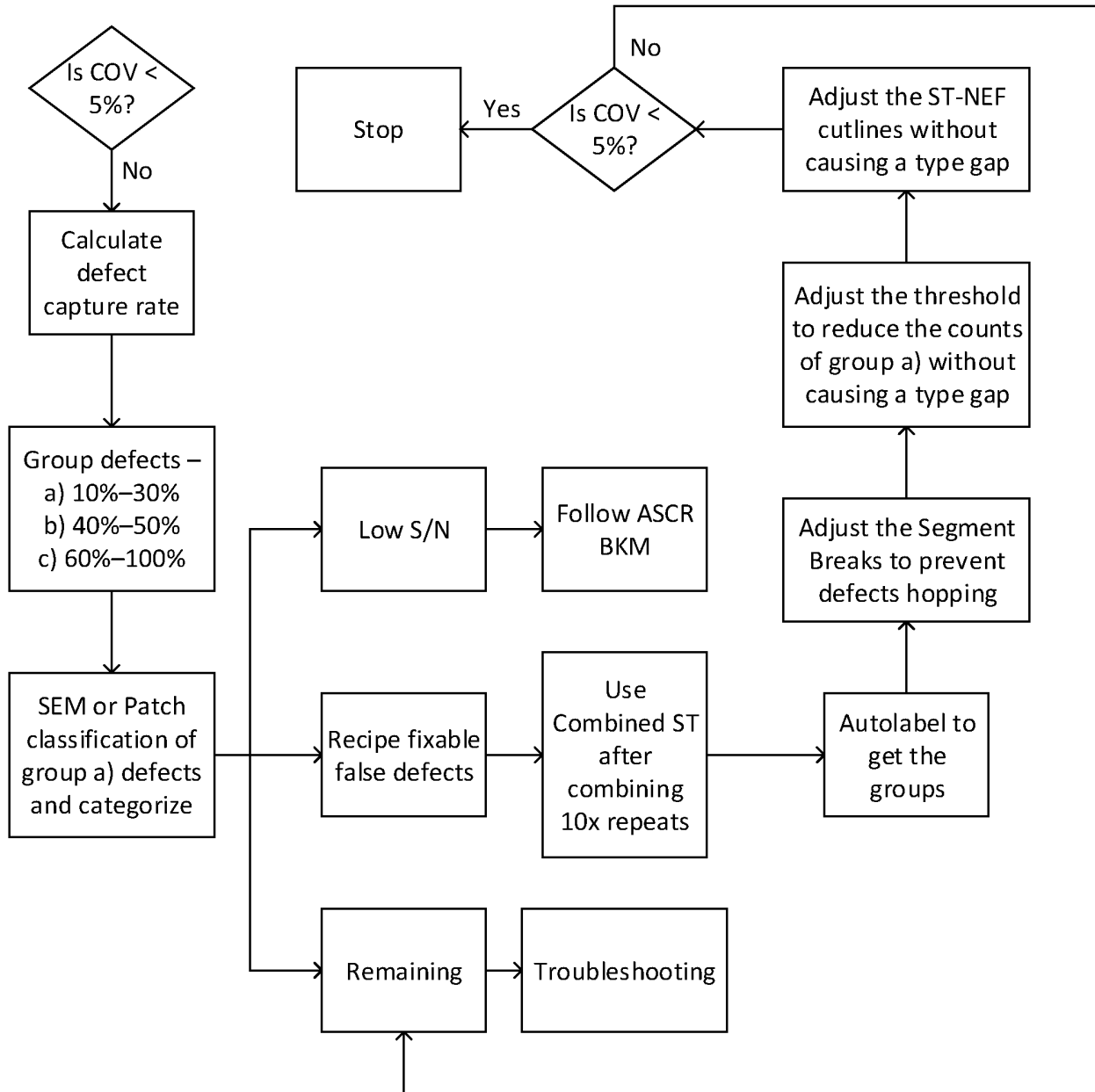


FIG. 12

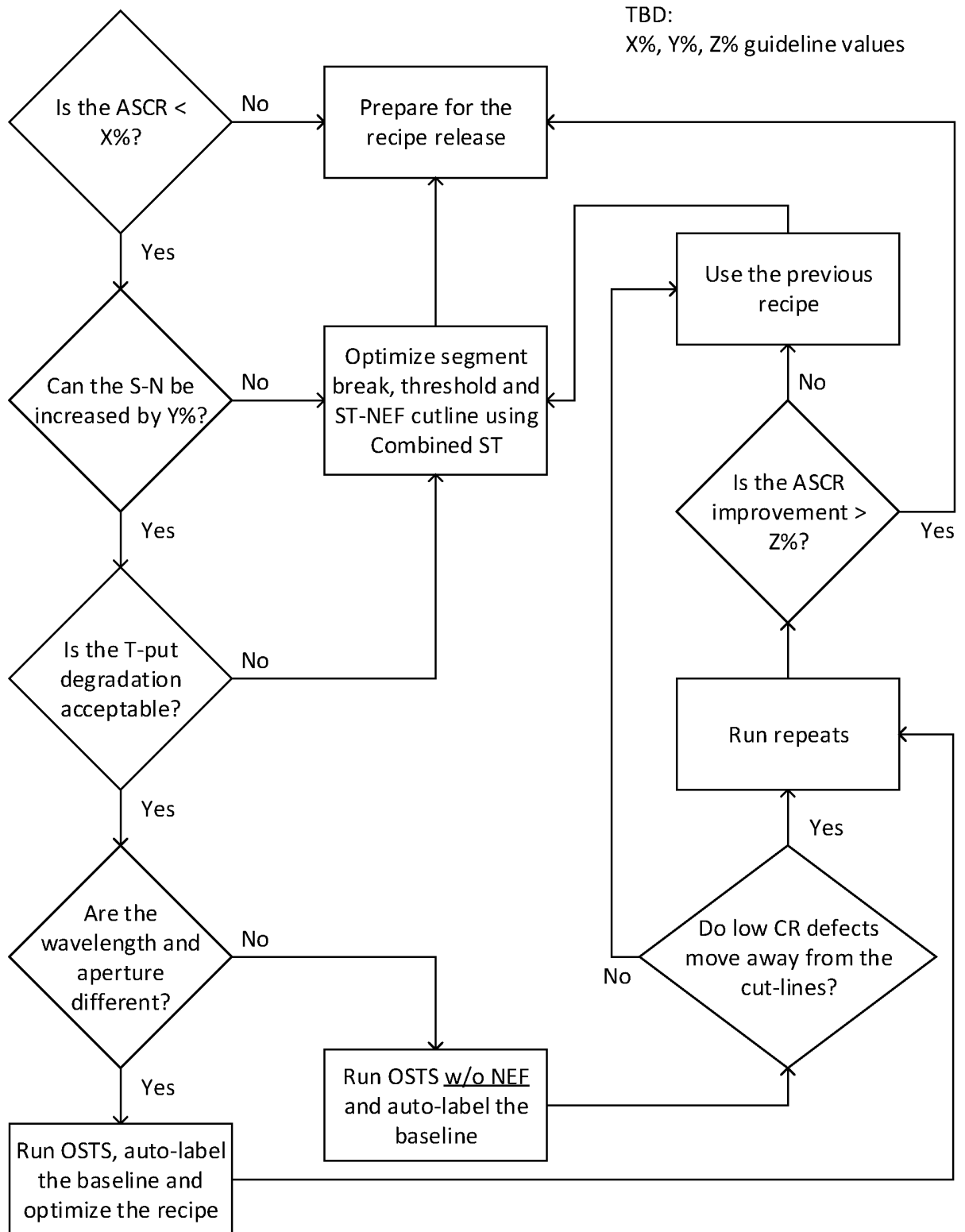
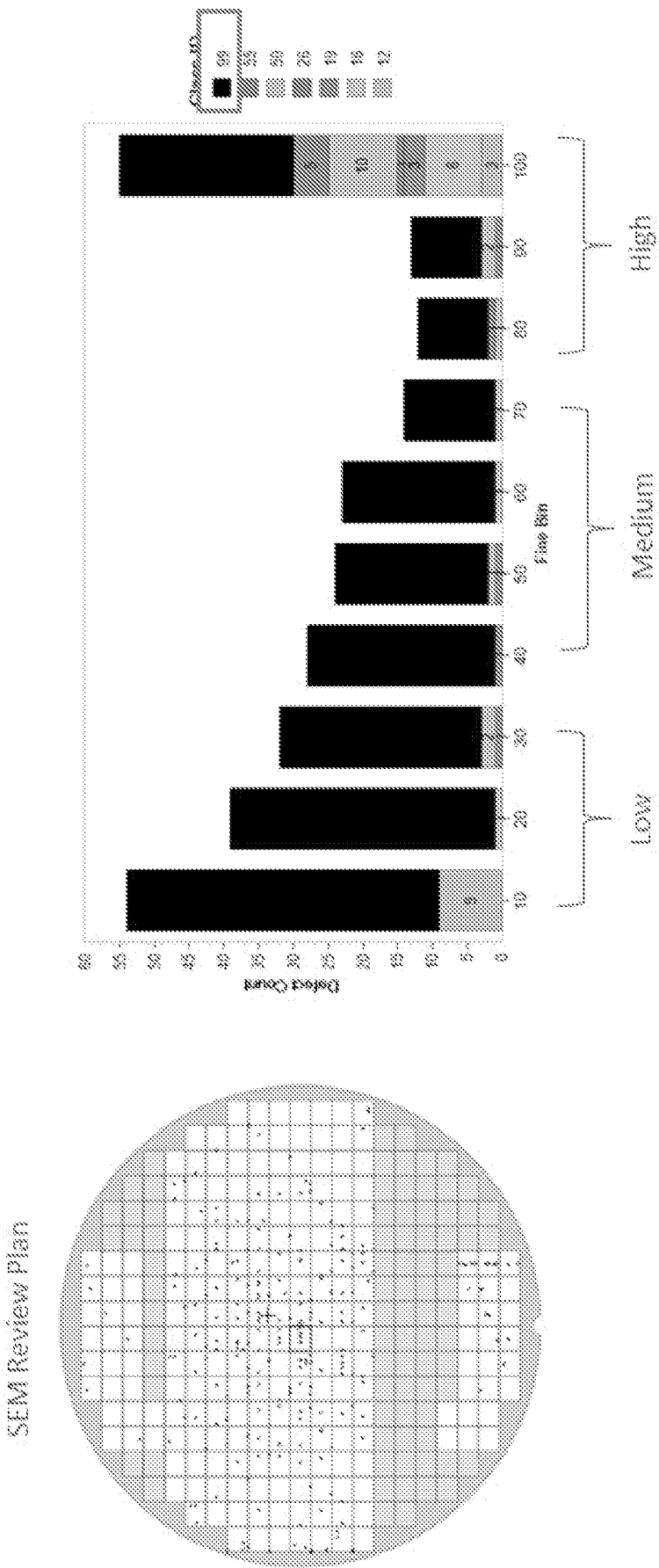
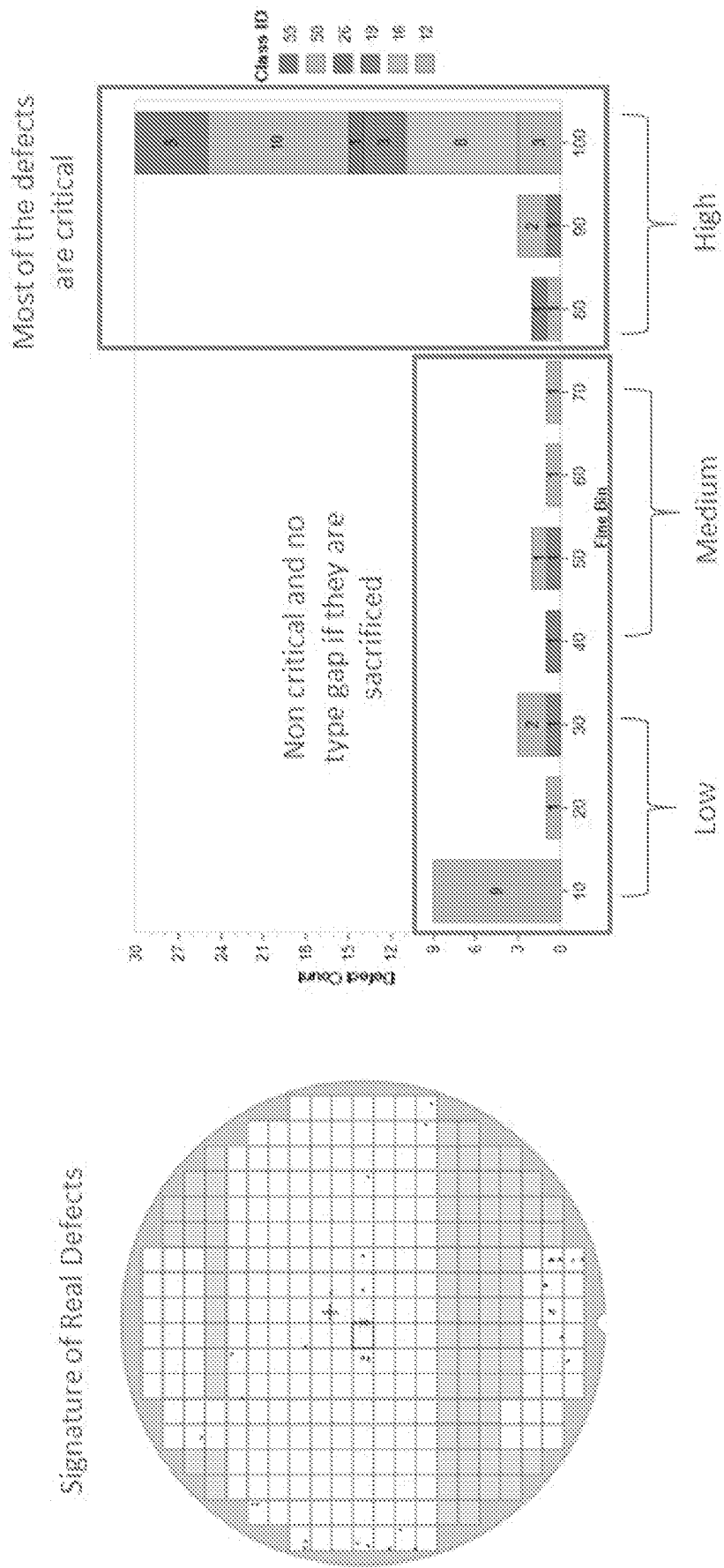


FIG. 13



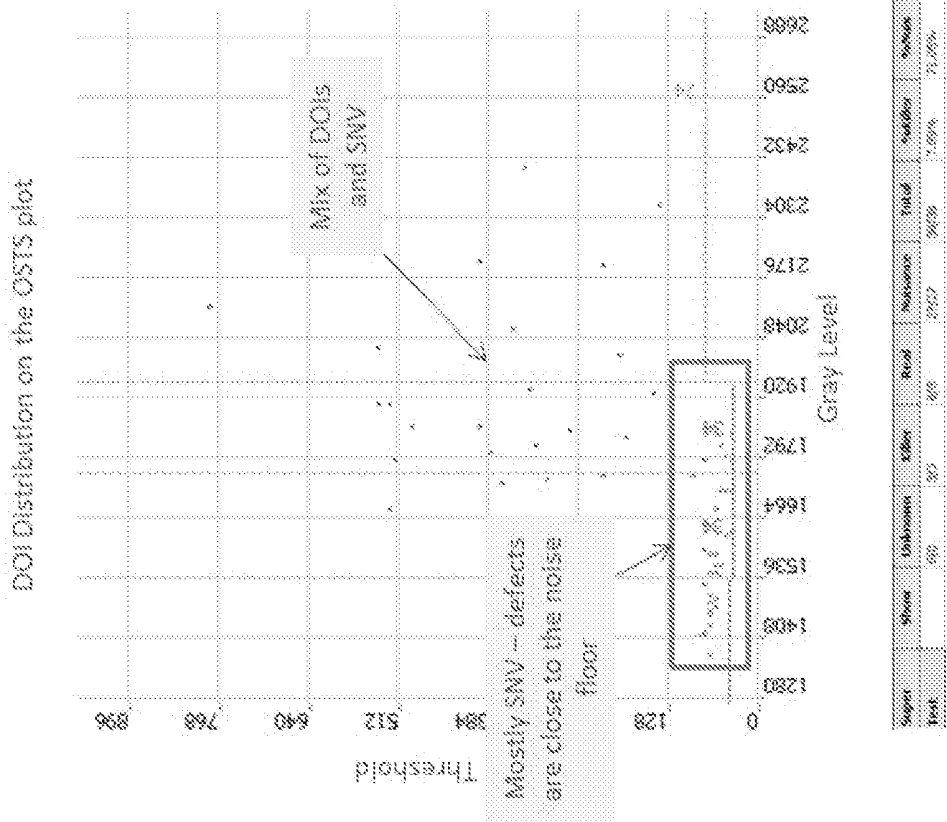
Most of the defects are SNV

FIG. 14



Sacrificing Low CR Defects Will Not Cause A Type Gap

FIG. 15



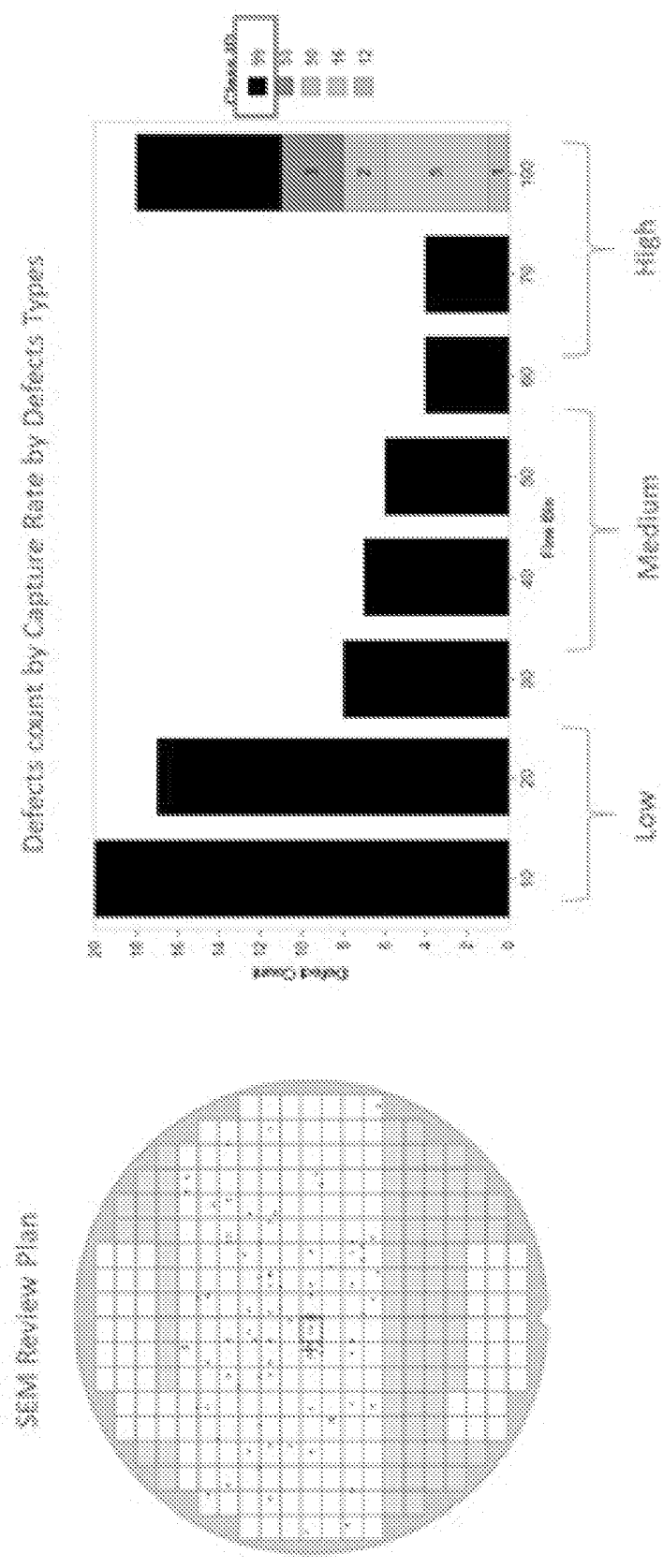
Super Grouping of Manual Class and Capture Rate

Super Class	Manual Class Values
Unknown	90
Eden	90, 90, 90, 90, 90
Real	90, 90, 90, 90, 90, 90
Median	90, 90, 90, 90
Score	90

High False Rate Can Be Reduced by Increasing Threshold Offset

FIG. 16

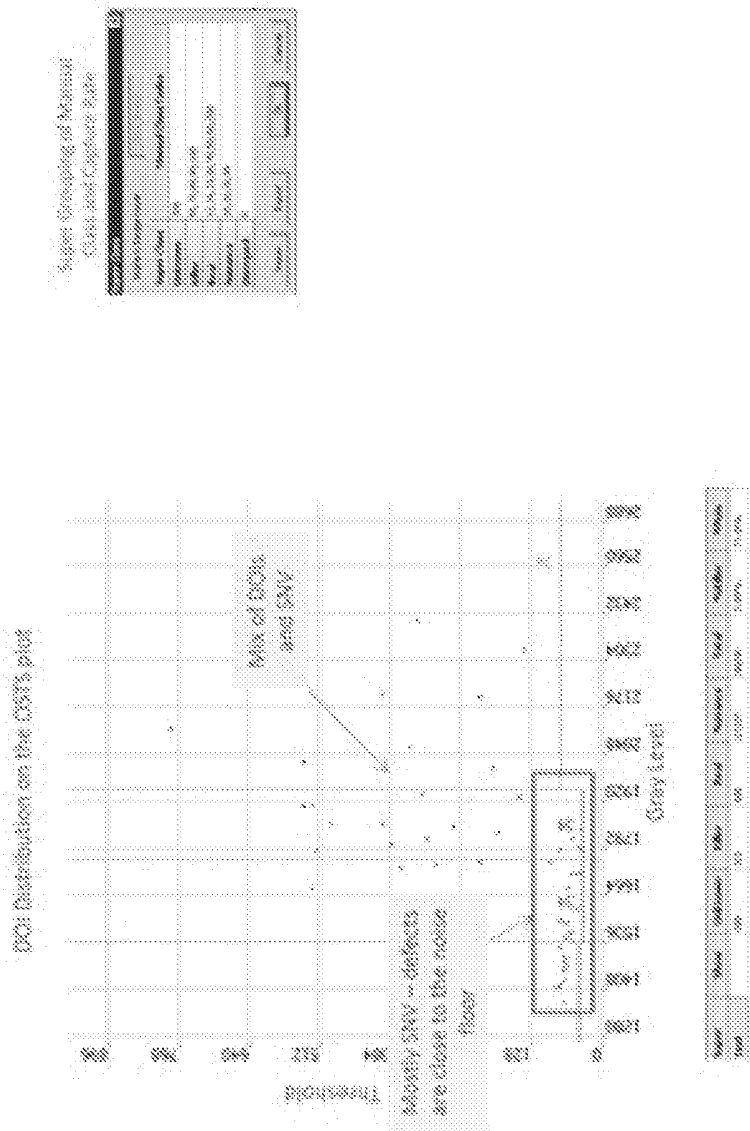
Problem formulation by categorization



High Population of Low Capture Rate Defects

FIG. 17A

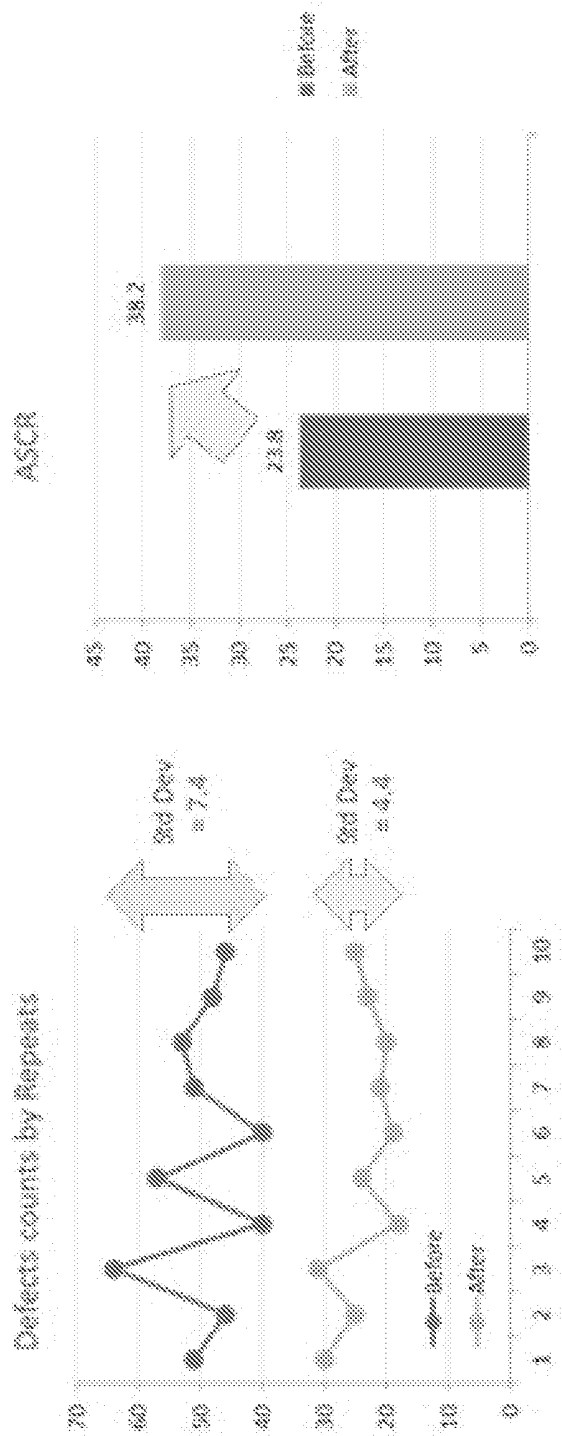
Decision Making in the Case of Recipe Adjustment



High False Rate Can Be Reduced by Increasing Threshold

FIG. 17B

Results



40% Reduction in Standard Deviation and 14% Increase in ASCR

FIG. 17C

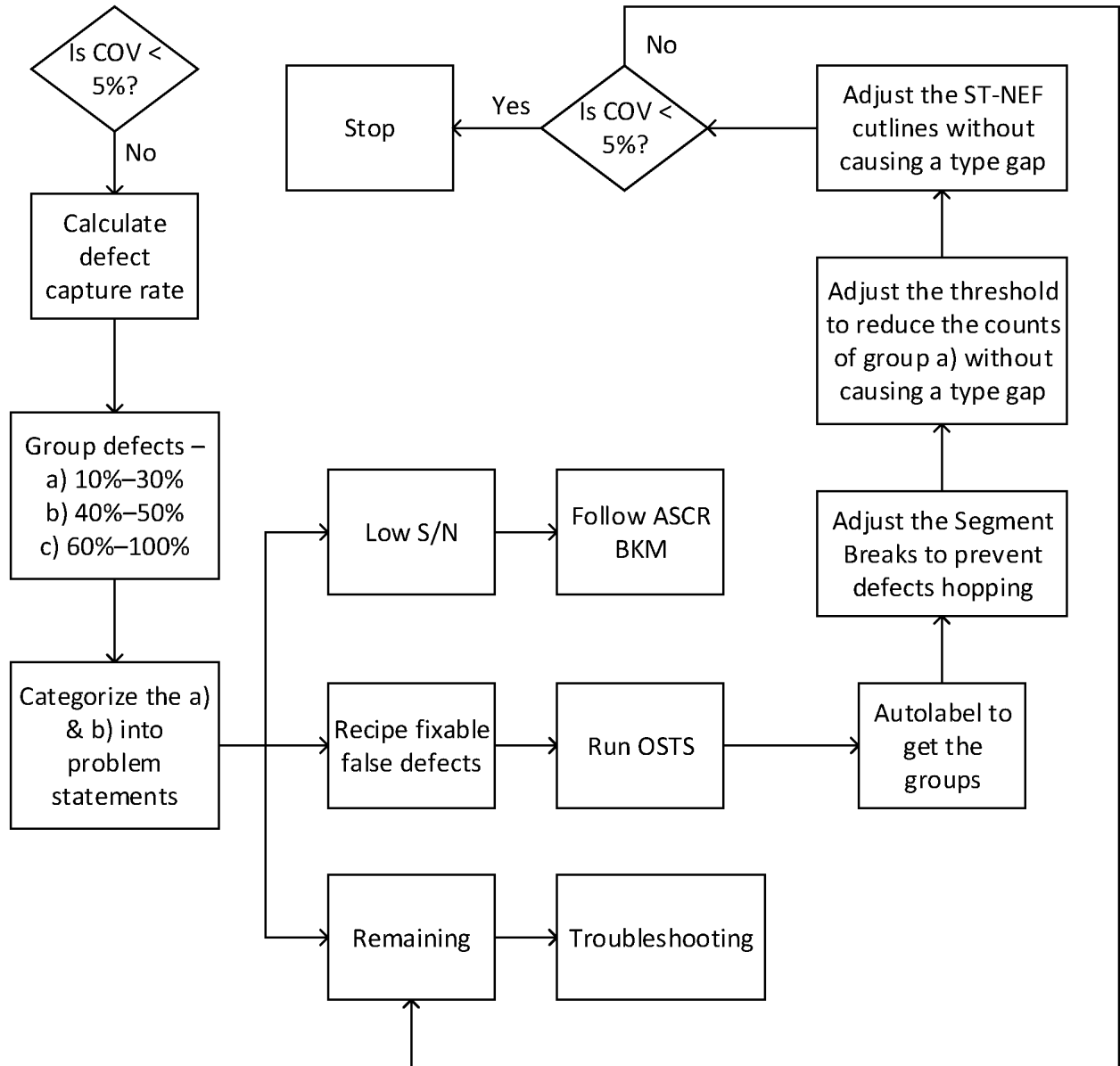


FIG. 18

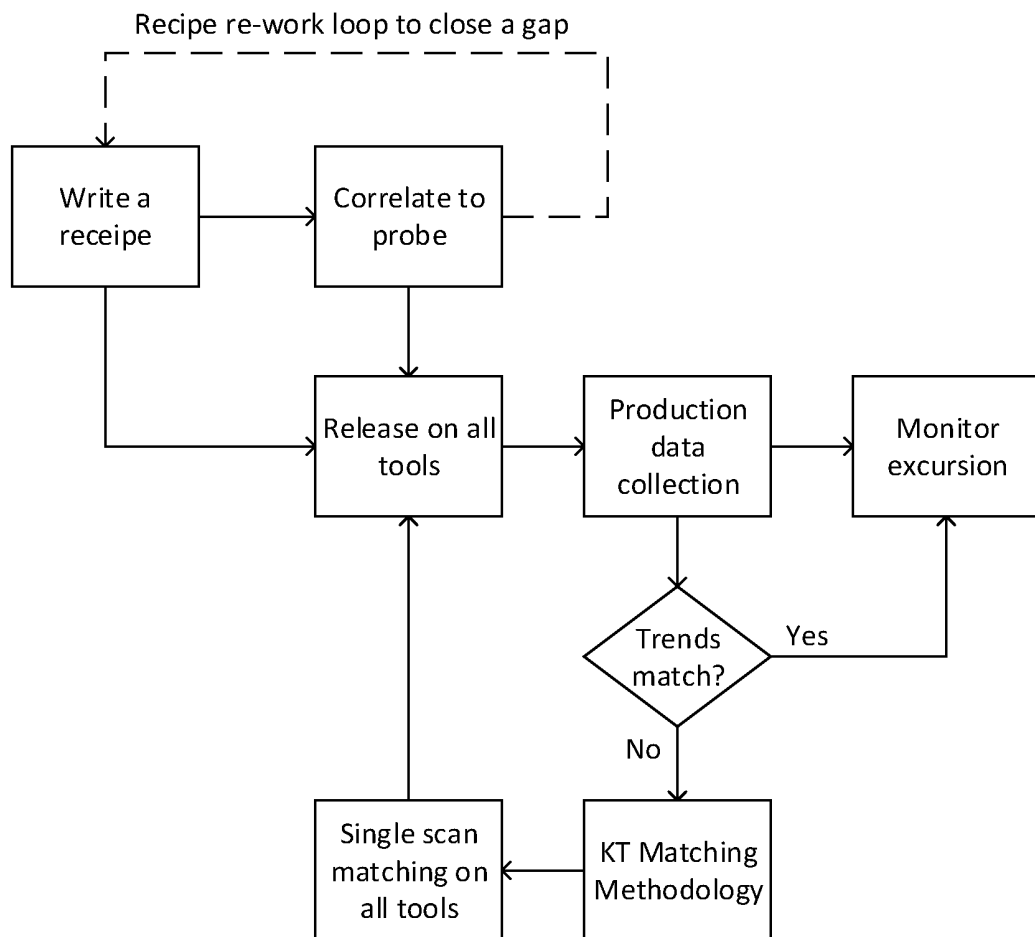


FIG. 19

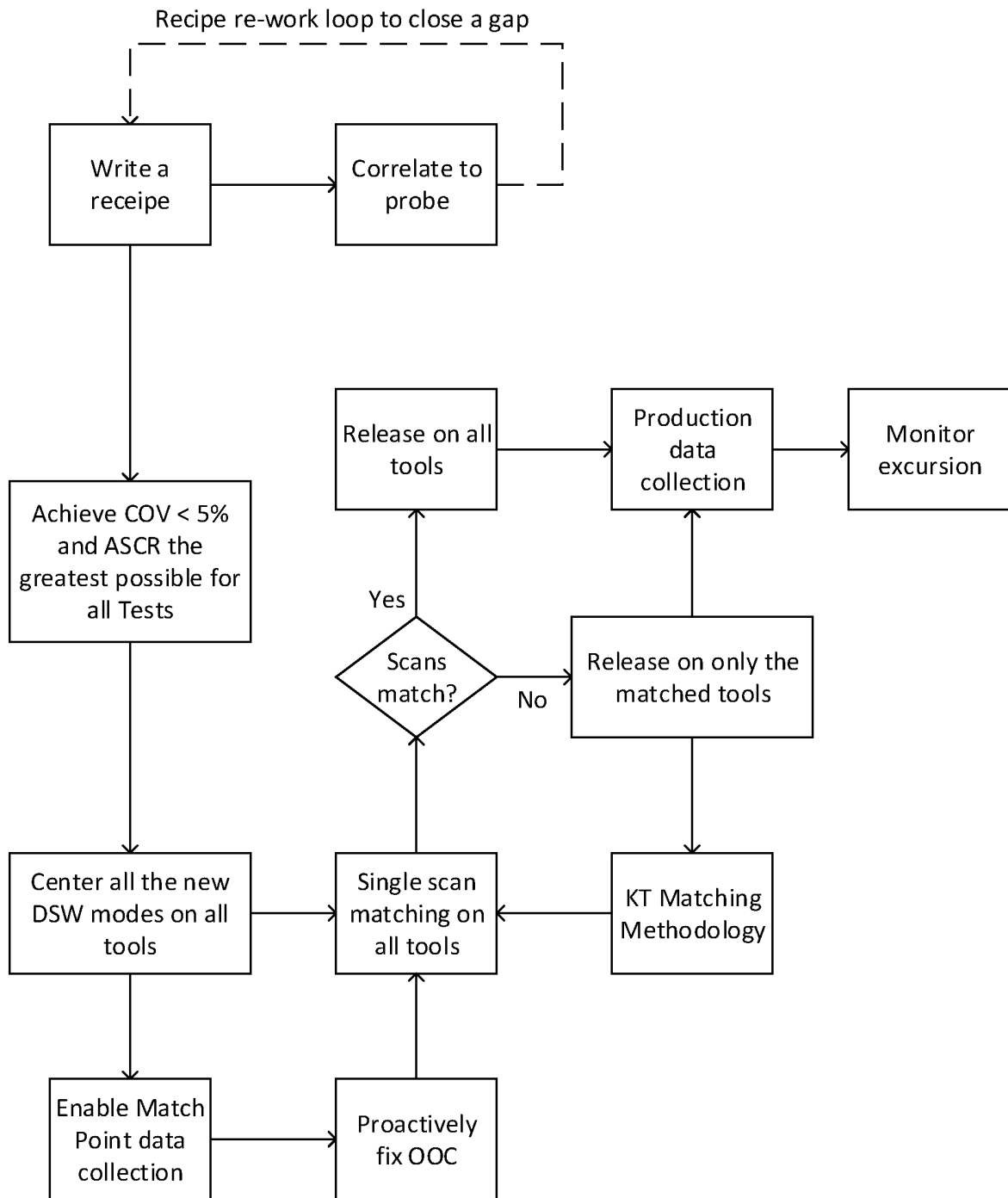
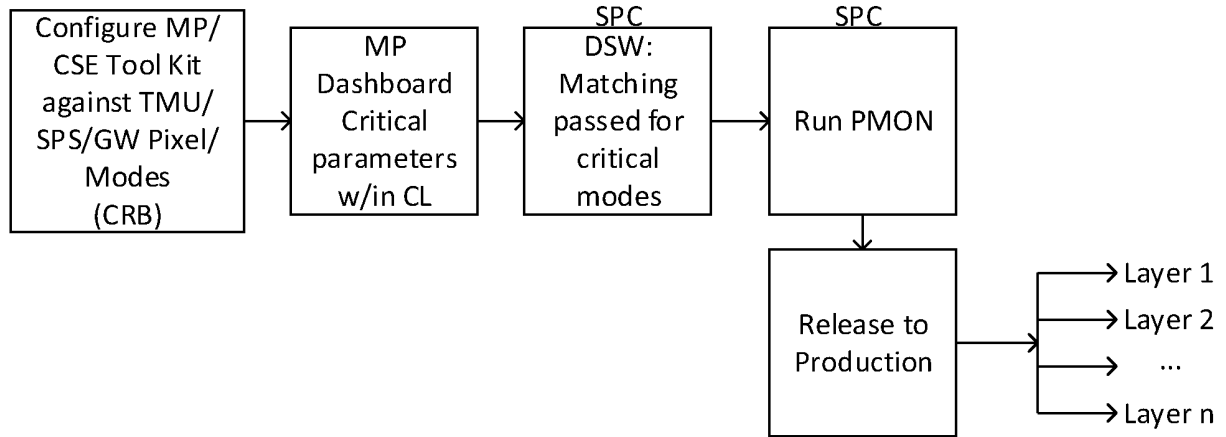


FIG. 20

Tool Monitoring Method Using MP/CSE Tool Kit

Tool Release Flow



Troubleshooting Flow

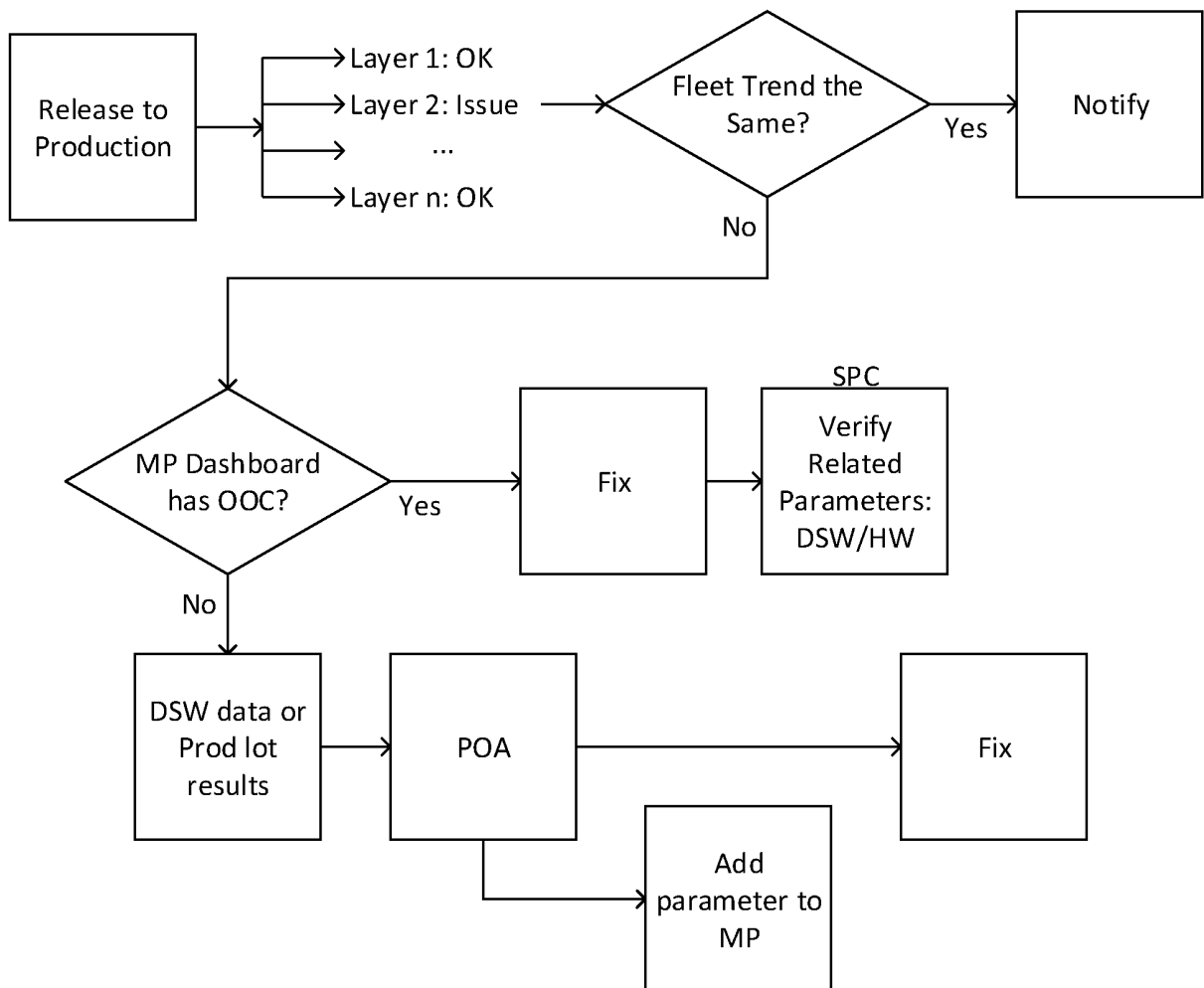


FIG. 21

Tool Monitoring Method Using MP

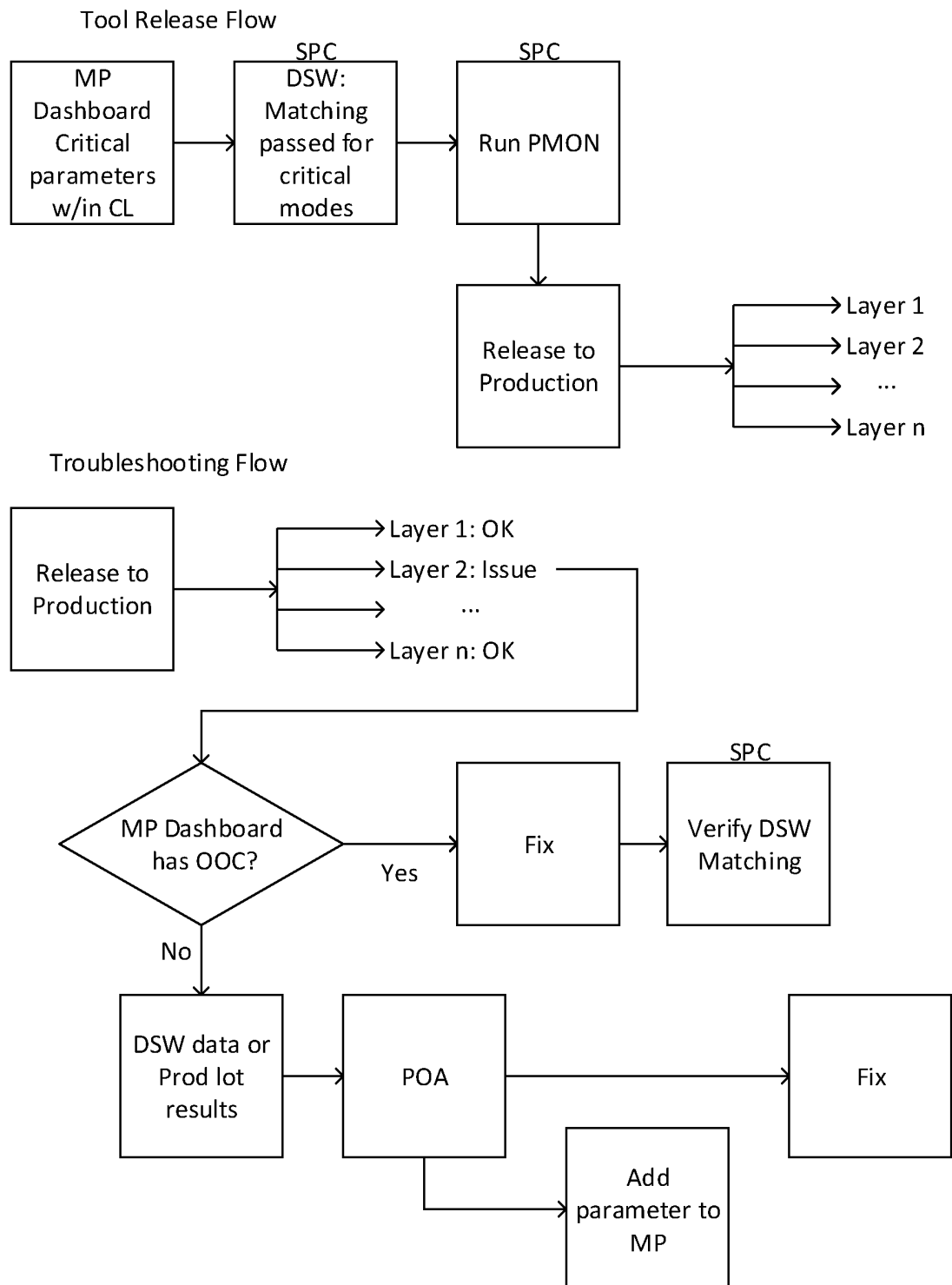


FIG. 22

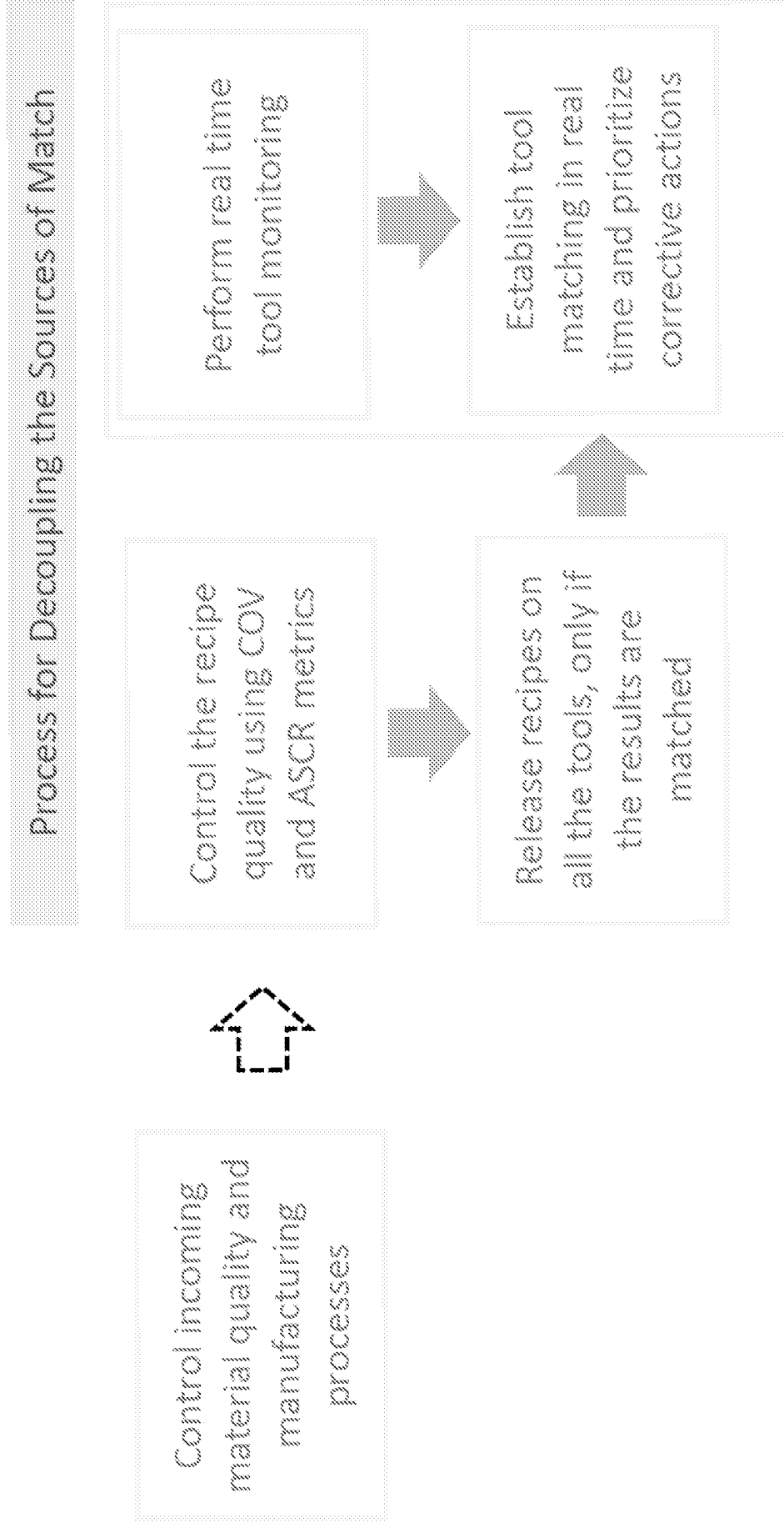


FIG. 23