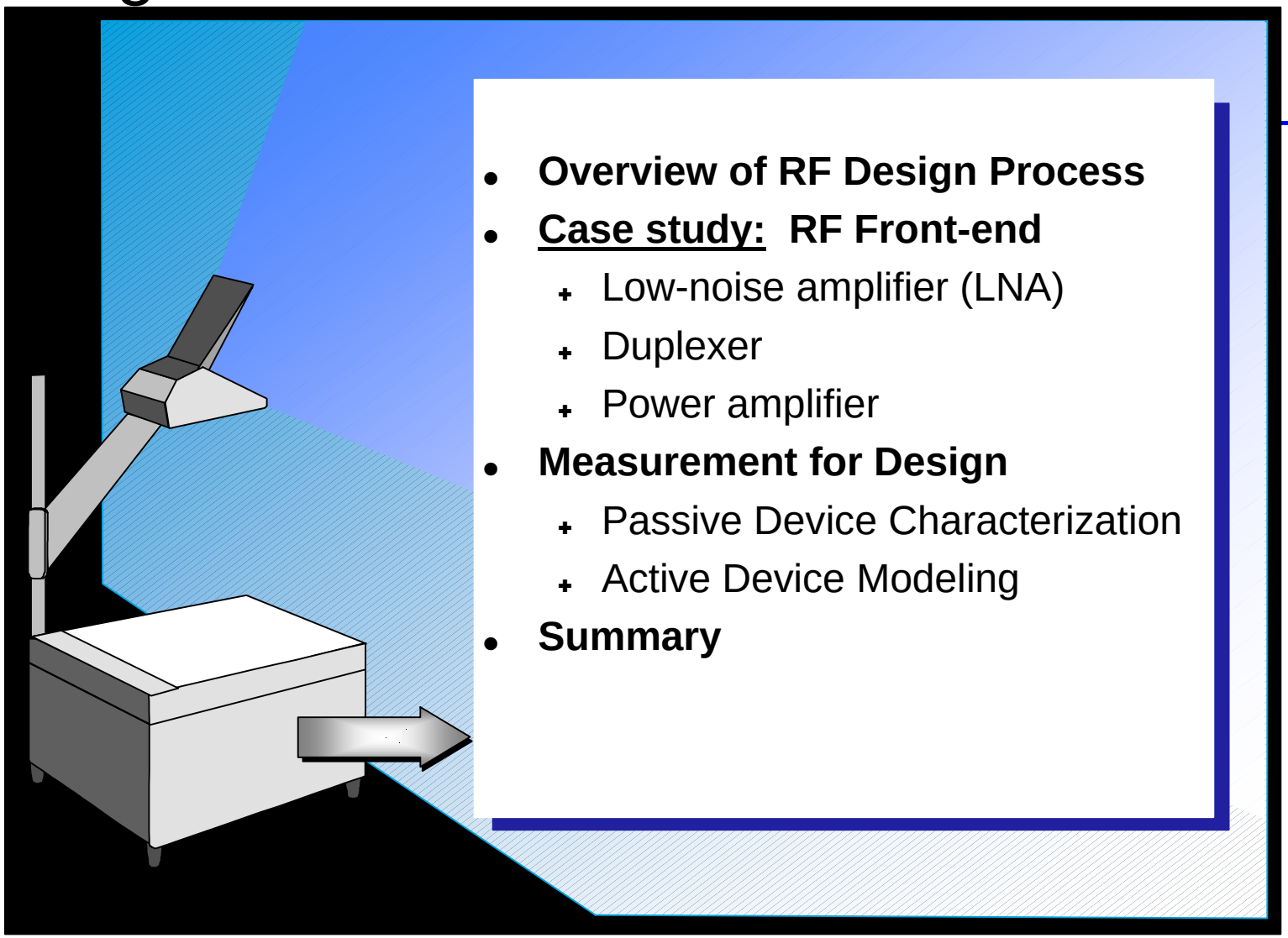
Agenda



- **Overview of RF Design Process**
- **<u>Case study:</u> RF Front-end**
  - Low-noise amplifier (LNA)
  - Duplexer
  - Power amplifier
- **Measurement for Design**
  - Passive Device Characterization
  - Active Device Modeling
- **Summary**

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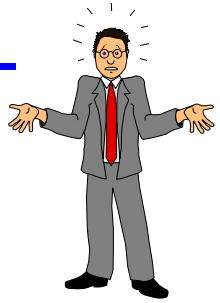
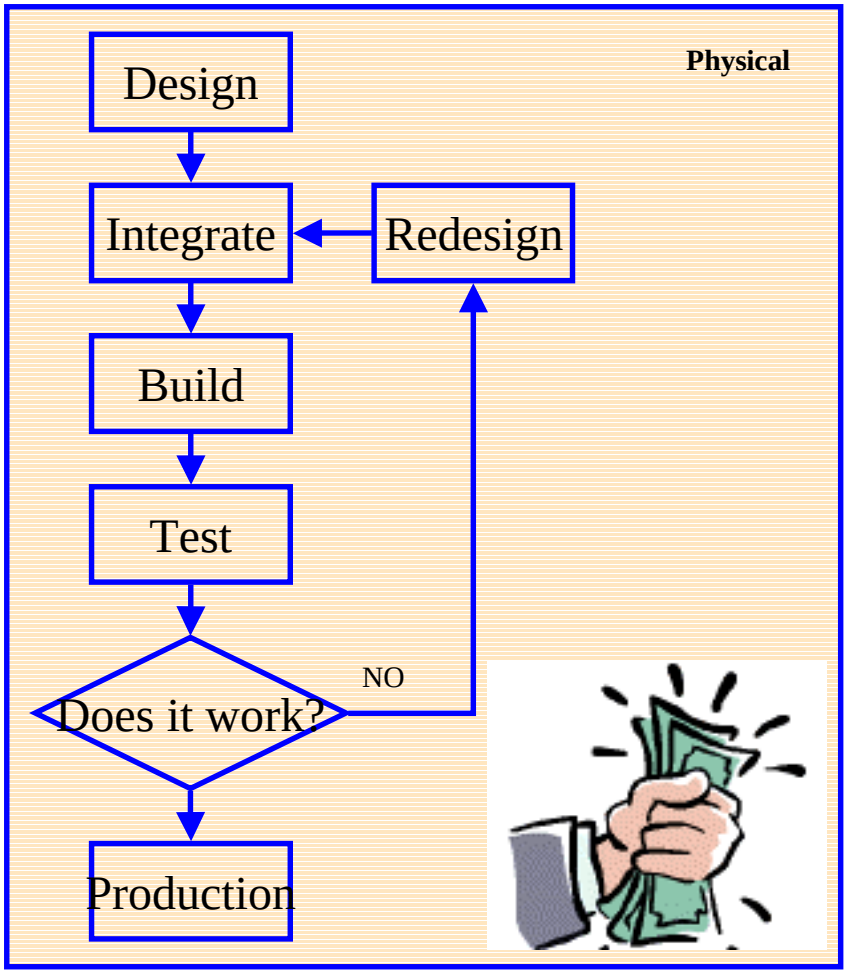
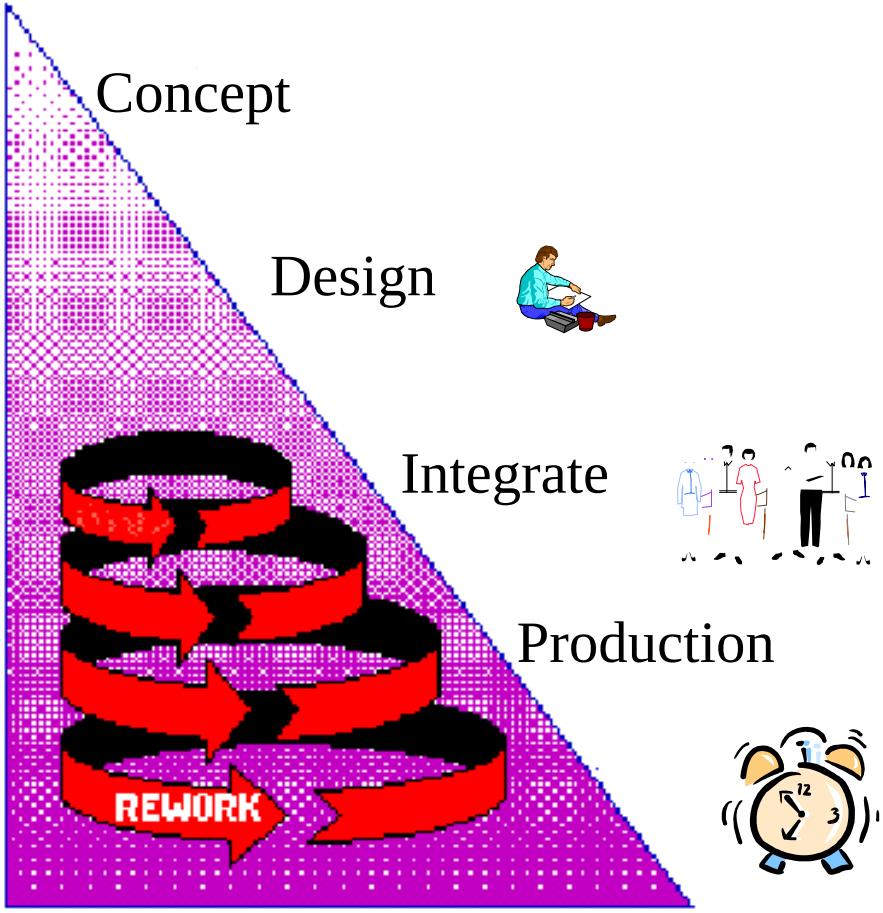
The Traditional Non-Predictive Design Process







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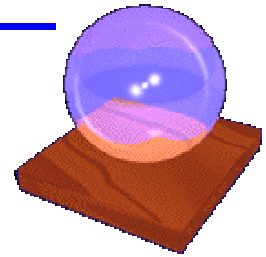
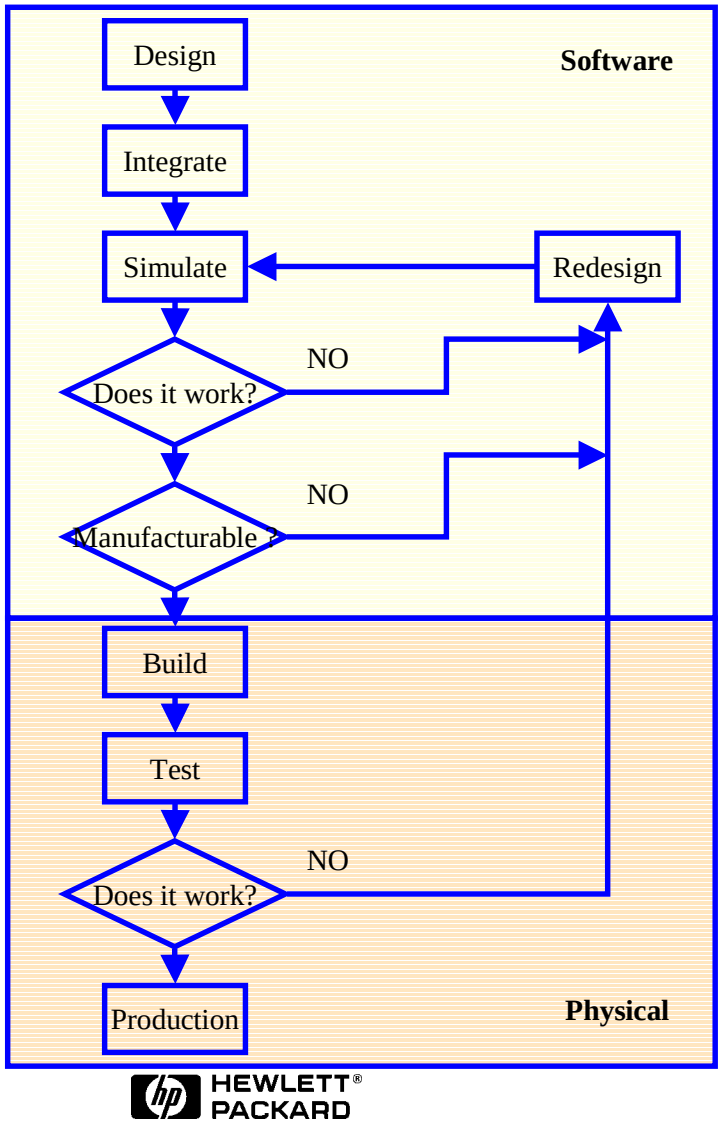
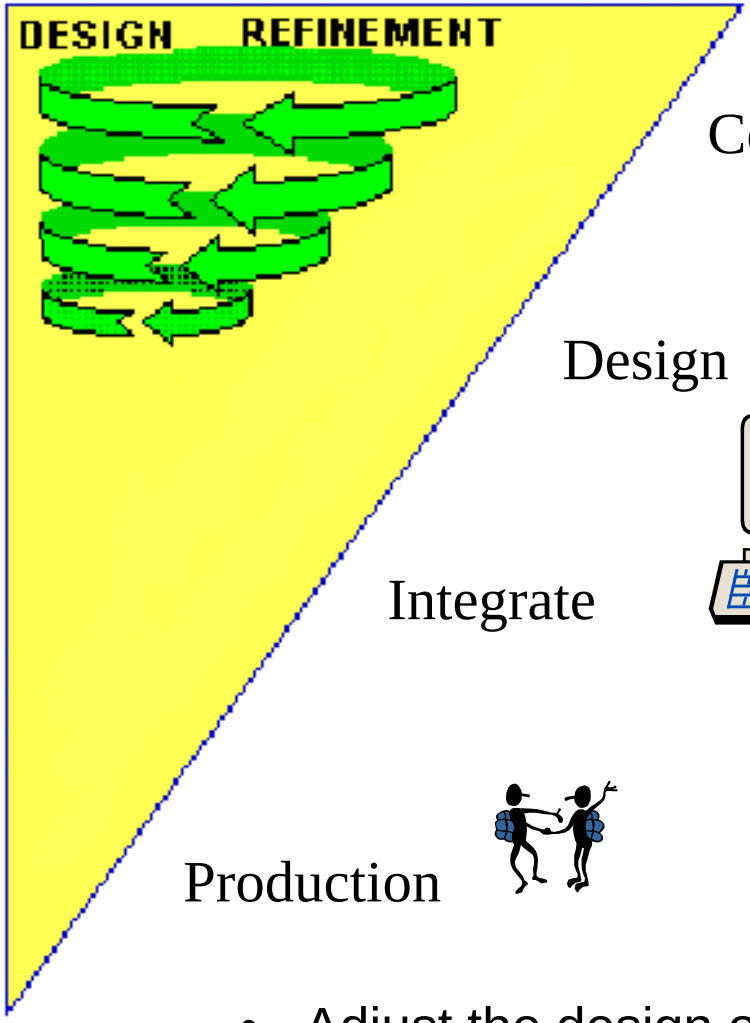
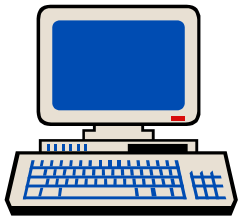
The Predictive RF Design Process





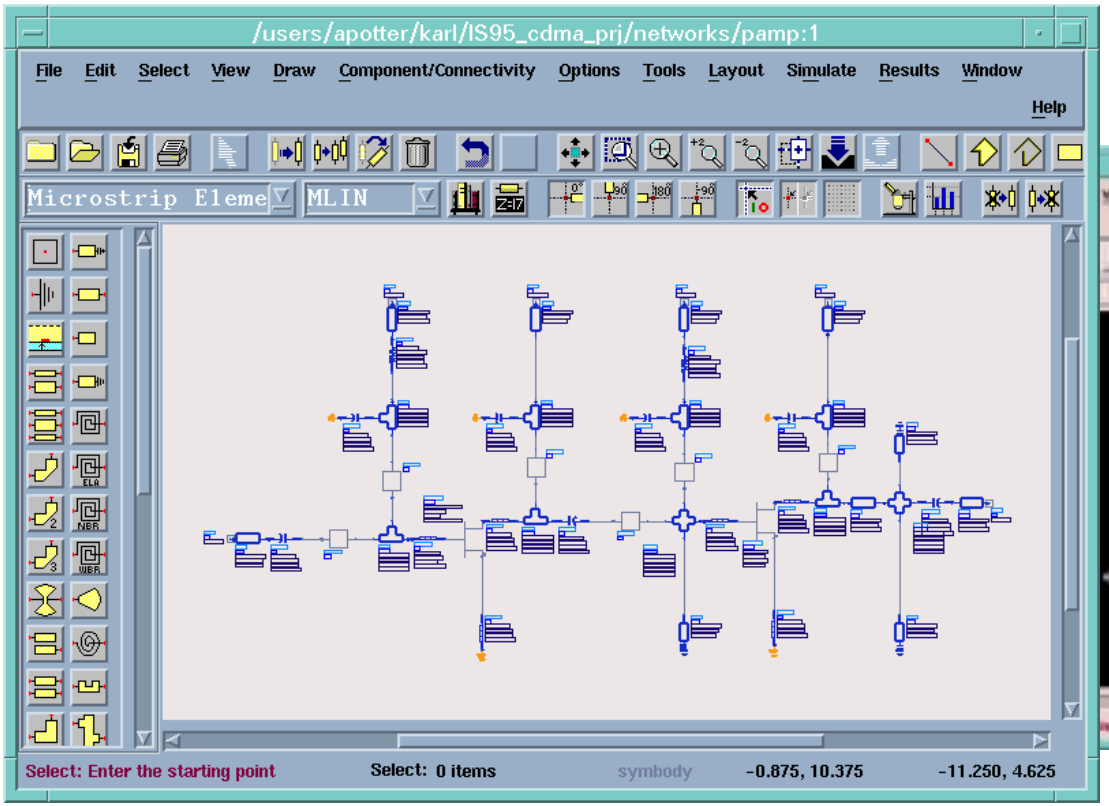


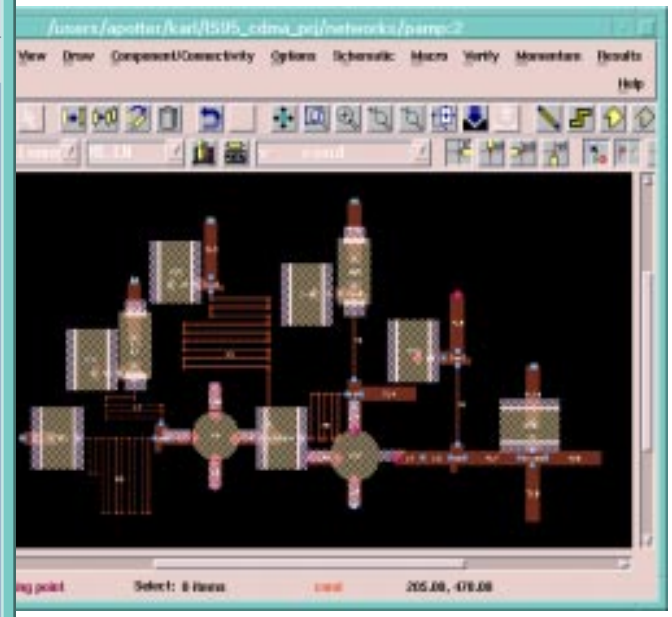


- Adjust the design on the work station not on the bench!

HP Advanced Design System

Total integration of schematic, simulation, and layout





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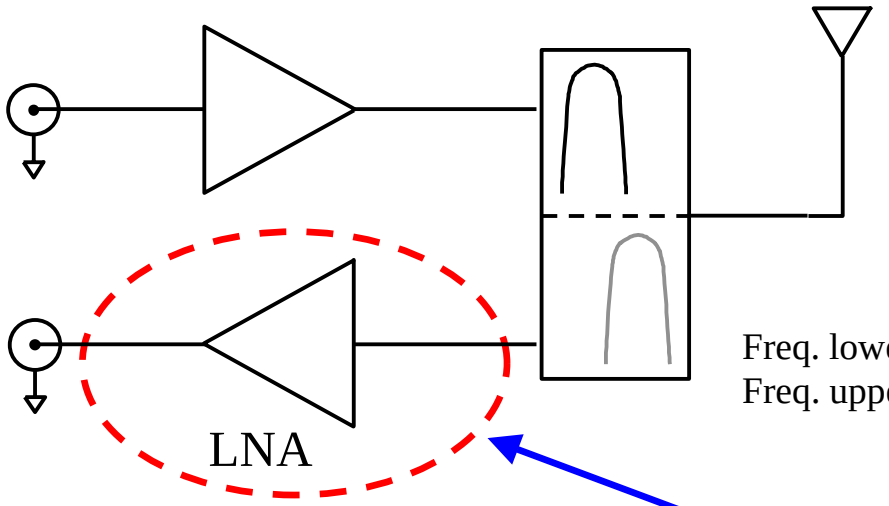
Concept: System-Level Design
(Simple PCS-band transceiver front end)

Power Amp

Freq. = 1880 MHz +/- 50 MHz min.
Pout (1 dB) = +27 dBm min
Psat = +30 dBm min
Gain = 25 dB min



Duplexer

Freq. lower band = 1880 MHz +/- 30 MHz
Freq. upper band = 1960 MHz +/- 30 MHz

Freq. = 1960 MHz +/- 50 MHz min.
Gain = 25 dB min
NF < 3 dB

The first part of the case study will focus on the LNA

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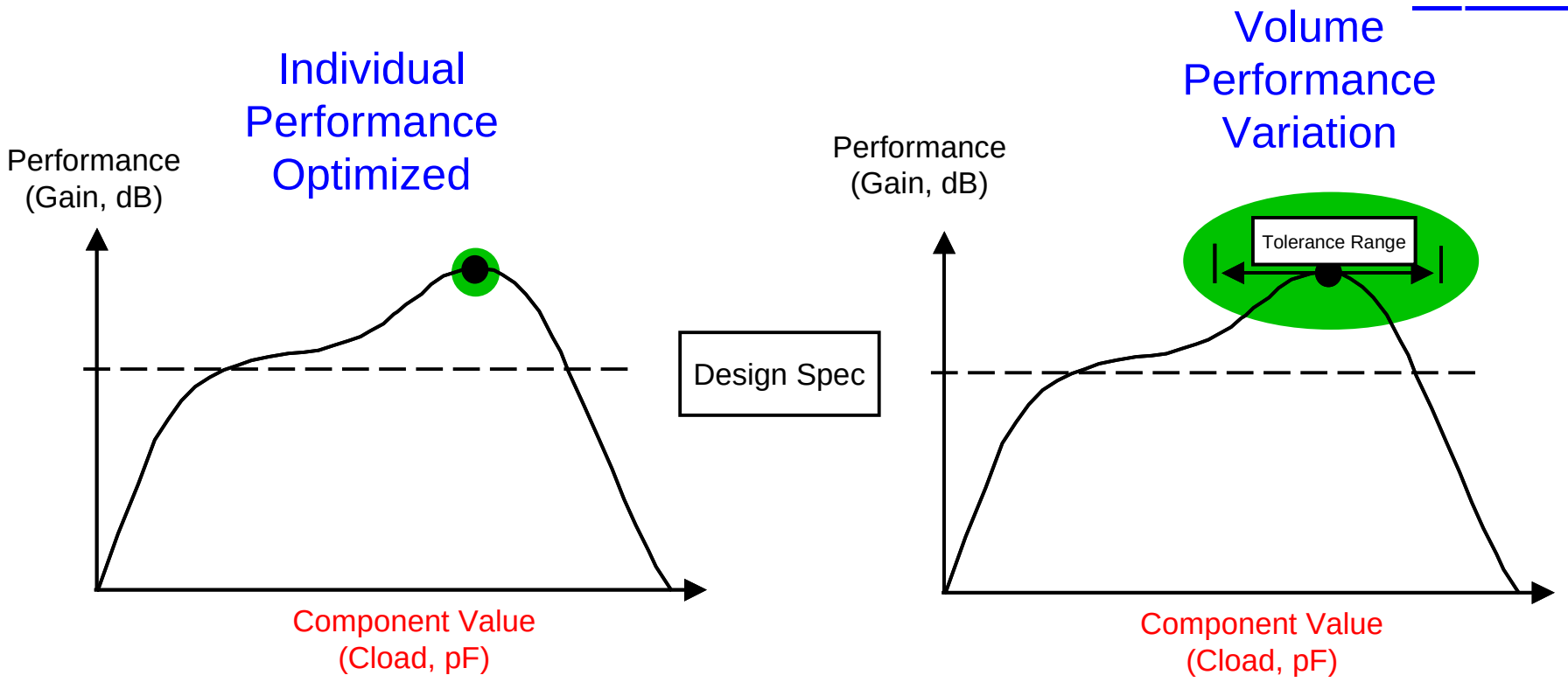
This one's good! But... What about Yield?



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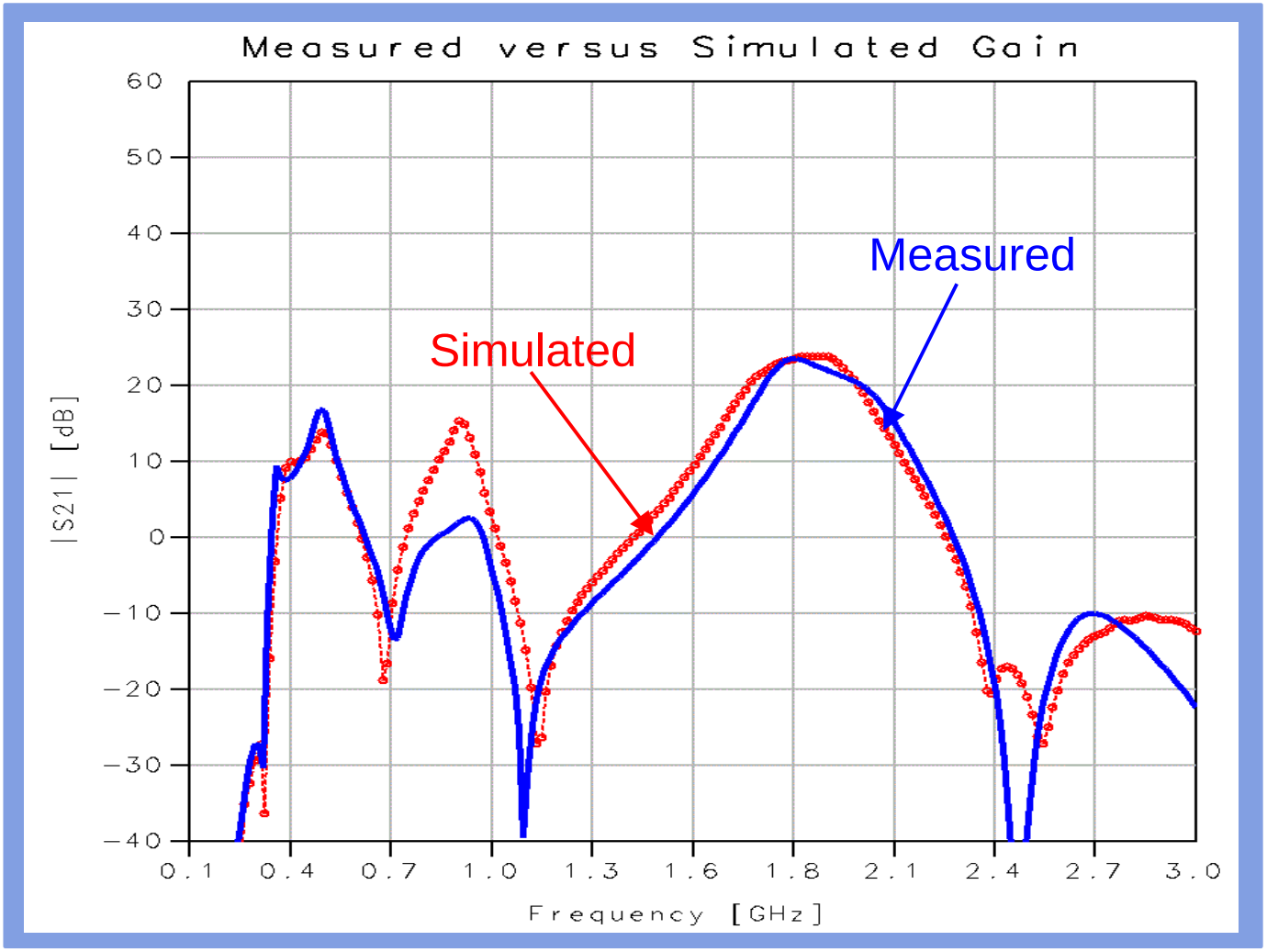
Working Power Amplifier !!!



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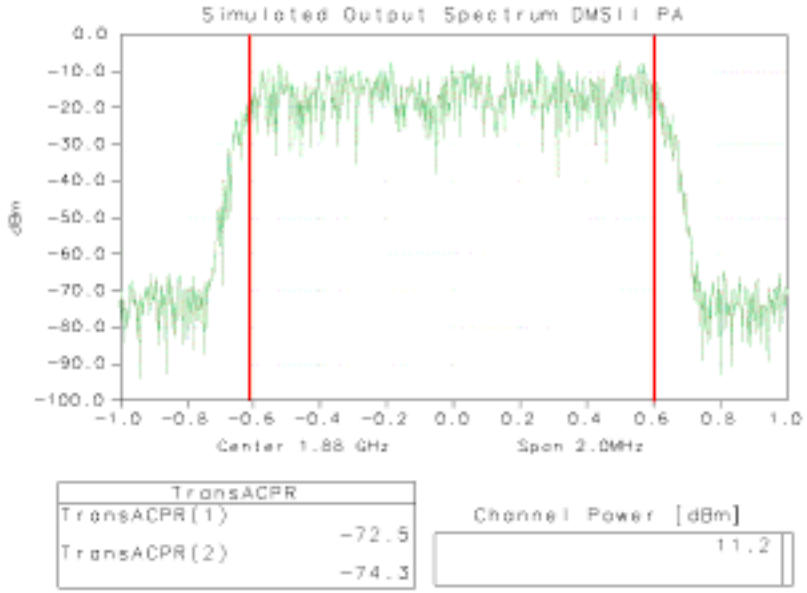
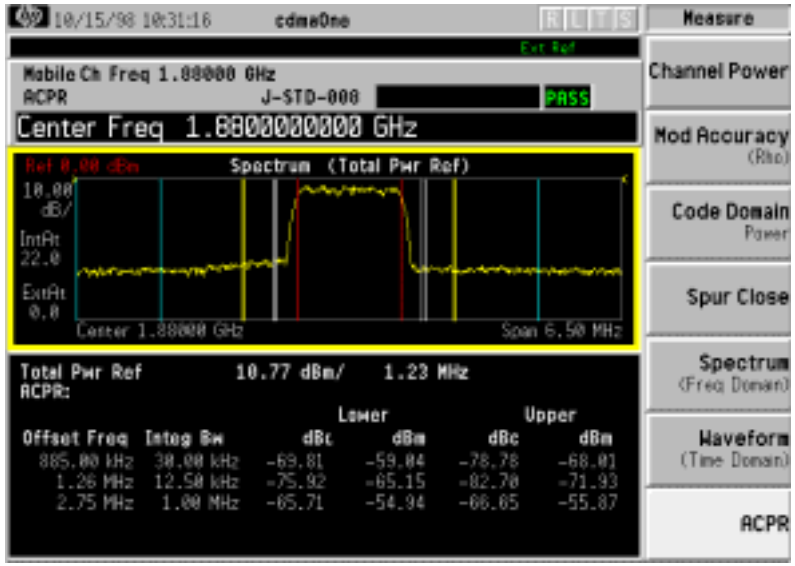
CDMA Tests

Channel Power and ACPR

Simulation



Measured



Pwr = 11.2 dBm
ACPR < -70 dBc

Pwr = 10.8 dBm
ACPR < -70 dBc

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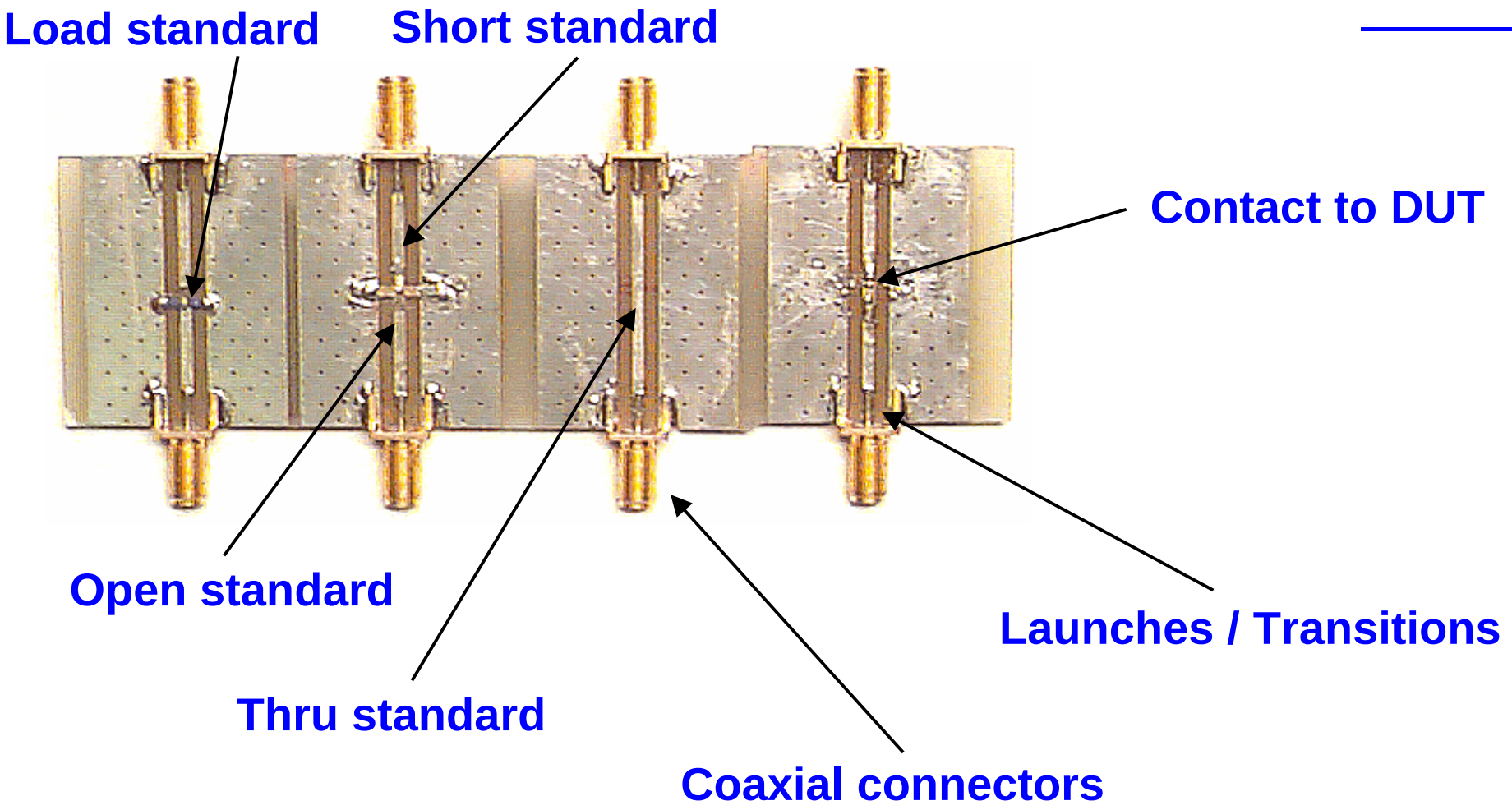
Typical PCB Fixture (with Cal Standards)



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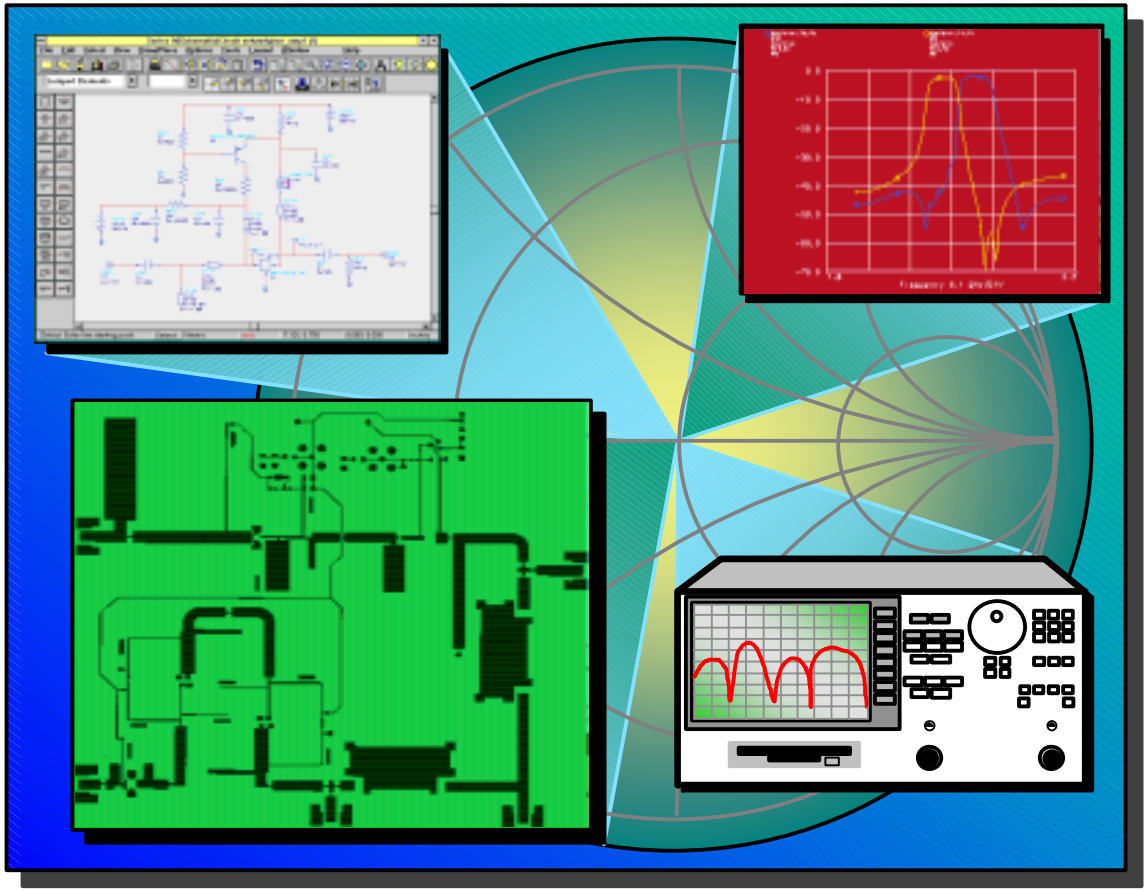
Thank You for Attending - HP RF Design and Measurement Seminar



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