



ASQ CRE Prep course

Lesson V. A. 2.

Test Environment

Environmental Considerations

- **Isolated**
- **Waterfall**
- **Combined**

- **Nominal**
- **Specifications +**
- **To Failure**



Combined Environments for Reliability Testing (CERT)

- **Use conditions have all stresses at once**
- **Testing can look for interactions**
- **Chambers and test conditions may take creativity to implement**



Vibration Testing

- **Multiple axis**
- **Frequency & Intensity**
- **Random**
- **Fixtures**
- **Grms**
- **G^2/Hz**



Temperature Testing

- **Temperature Range**
- **Thermal Cycling**
- **Rate of change/
Shock**
- **Condensation**
- **Self heating**
- **Heat build up**



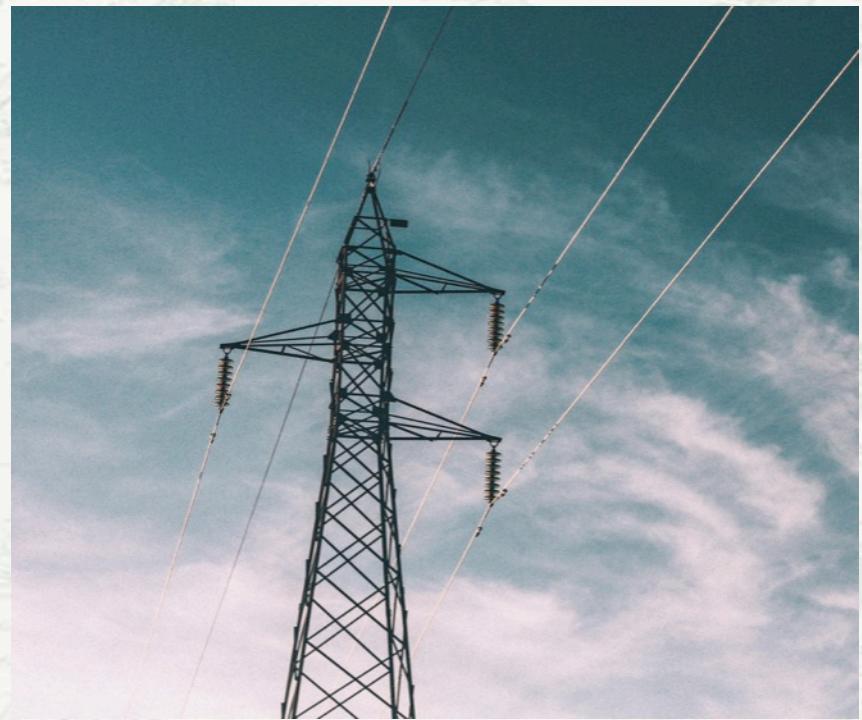
Electromagnetic Compatibility (EMC) Testing

- **Outside influence on system (robustness)**
- **System influence on external systems (emissions)**



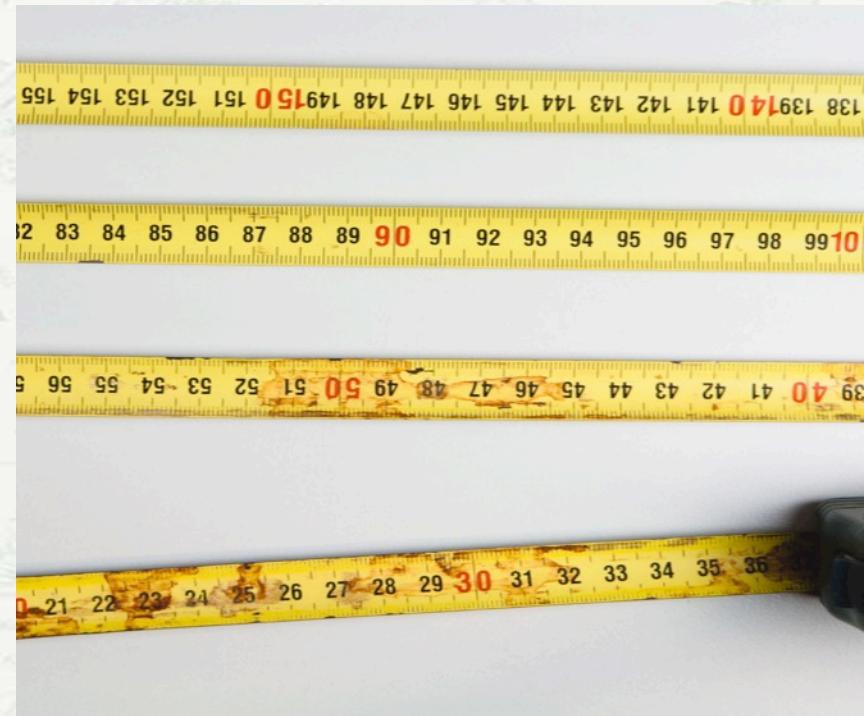
Power Line Testing

- **Expected Range
A & V**
- **Drops, sags, dips**
- **Spikes, transients,
surges**
- **Start up / Shut down**



Test Equipment Calibration

- **Readings are true**
- **There also are elements of measurement error**



What is it like
for your
product?



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Testing During Development