



FPD.DEV

THE FUTURE OF DISPLAY AND SYSTEMS DEVELOPMENT

DO-160 Display Qualification

Introduction

CHAPTER 1

In this chapter

Display capability and qualification evidence

Measurable acceptance criteria

The complete assembly and its installation



Diggy Breiling

Founder of FPD.DEV · Instructor

ASQ · American Society for Quality

Current: CMDA

Previously held: CSSBB, CMQ/OE

ASCM / APICS: CPIM, CSCP

Association for Supply Chain Management



Course scope and intended outcome



Components, systems and installation

Display engineering with Diggy

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Enhancing a COTS display

- 01** Temperature range and durability
- 02** Contrast, brightness and spectral performance
- 03** Touch capabilities and application interfaces
- 04** Verify the enhanced assembly and its limits



The qualification plan you will build

- 01** An identified display and installation
- 02** A matrix of requirements and evidence
- 03** A procedure, monitoring plan and handover



The running qualification matrix

Requirement	Method / category	Evidence state
Cold image performance	Section 4; allocation open	Planned; integrator input needed
Vibration, new bracket	Section 8; method open	Earlier report; credit unresolved
External exposure	Document applicability rationale	No result inferred from blank cells

Applicability and evidence status stay separate / Unknown inputs have a named owner / Each chapter adds to the same record



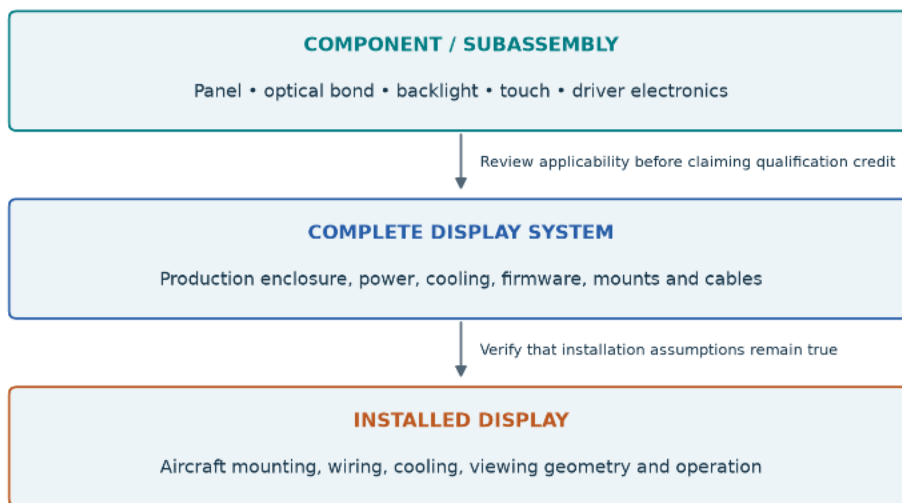
References and further study

- 01** DO-160 / ED-14 and adopted changes
- 02** Military, display and assurance requirements
- 03** Edition, applicability and evidence references



Component, system and installed display

Three boundaries. Three evidence questions.



Planning boundaries, not separate DO-160 certification classes. Remote sensors and radar hardware are outside scope.

Component capability has a defined boundary

The complete assembly carries the interfaces

Installation preserves the tested assumptions



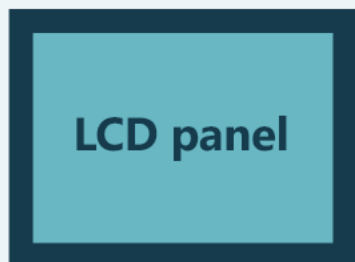
What a qualification claim needs

- 01** Edition and category
- 02** As-tested configuration and reports
- 03** Performance results and installation limits



Panel evidence has a defined boundary

TESTED COMPONENT



Panel report

Part / mode / profile
Measured results

Match the evidence to
the panel requirement



ADDED IN YOUR PRODUCT

Bonded glass

Touch electronics

Power conversion

Housing

Mount

Interfaces

Assess the complete assembly

A panel report supports a defined scope of evidence.



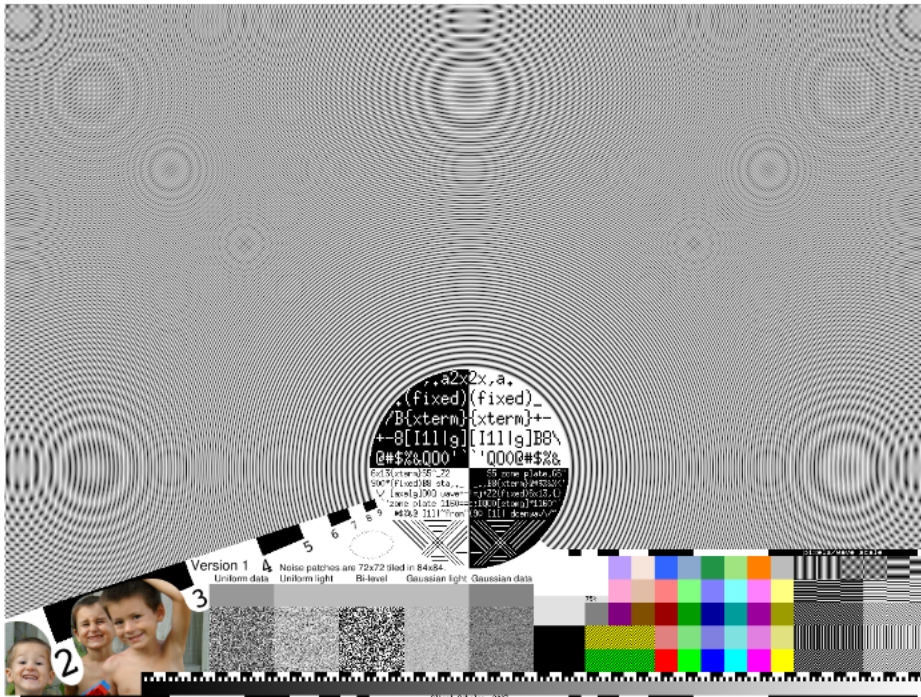
Turn the report into an evidence plan

Record	What to establish
Supported scope	Panel requirement matched to report conditions
Open inputs	Missing configuration, results or installation data
Remaining verification	Added functions, interfaces and assembly behavior

Keep supported credit, open inputs and remaining work visible



Acceptance criteria come first



A lit screen can still show stale information

Image, controls and validity need monitoring

During, after and survival are separate states

AlbertCahalan (Wikimedia Commons: AlbertCahalan~commonswiki); CC BY-SA 3.0



A measurable acceptance record

Function	Teaching criterion	Required measurement context
Cold startup	Usable image within 60 s	Initial soak, valid input, power threshold
Hot Contrast	Ambient contrast at least 5:1	Panel +70 C; 50,000 lx; stated geometry

Illustrative values only; program requirements control



Hot Contrast in bright ambient light

- 01** Hot Contrast: contrast at a stated display temperature
- 02** Bright ambient light falls onto the screen
- 03** Record lux, reflection geometry and viewing direction
- 04** Heat and reflected light can both reduce contrast



Worked example: capture the transient

- 01 Use a changing image and log control outputs
- 02 Synchronize events with the applied exposure
- 03 Judge duration and recovery against agreed criteria



The environmental coverage map

Family	DO-160G sections
Temperature, pressure, moisture, mechanical	4–8, 10–14
Magnetic, power, induced signals and RF	15–21
Lightning and human-accessible ESD	22, 23, 25
Explosion proofness, icing, fire	9, 24, 26

Climatic and mechanical exposures / Electrical and electromagnetic effects / Installation-specific hazards



DO-160 and MIL-STD-810

- 01** DO-160: airborne categories and procedures
- 02** MIL-STD-810: life-cycle tailoring and methods
- 03** Each invoked requirement needs traceable evidence



Related subjects, separate procedures

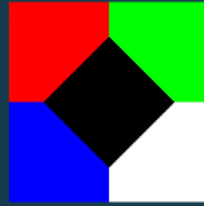
Subject	DO-160G	MIL-STD-810 family
Temperature	Section 4	Methods 501 / 502
Vibration	Section 8	Method 514
Humidity / salt	Sections 6 / 14	Methods 507 / 509

Subject mapping guides the comparison



Qualification credit across standards

- 01** Purpose, configuration and operating state
- 02** Complete profile, duration and sequence
- 03** Monitoring, acceptance and unresolved gaps



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The Future of Display and Systems Development

Next chapter

Temperature and Pressure

I'm Diggy Breiling. Thank you for joining me.

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