

# JC64.8 - JEDEC SSD Committee

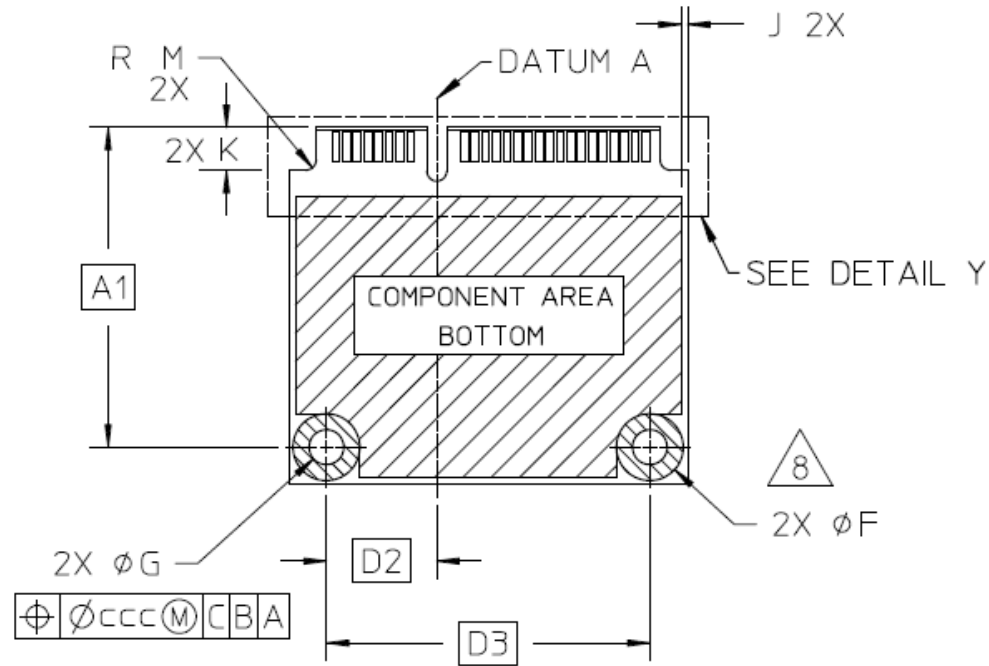
Dave Landsman, Western Digital  
Chair, JC-64.8

# JC64.8 Goal: Support industry with SSD standards

- SSD definition and form factors
  - mSATA – MO-300
  - Automotive SSD – JESD 312
- SSD behavior, testing and endurance requirements
  - JESD 218 – SSD Requirements and Endurance Test Method
  - JESD 219 – SSD Endurance Workload

# mSATA – JEDEC (module) & SATA-IO (protocol)

2010: First SATA SSD in non-HDD form factor



JEDEC SOLID STATE PRODUCT OUTLINE	mSATA SSD ASSEMBLY	ISSUE B	DATE OCT 2010	MO-300
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# Automotive is highly fragmented

Complex supply chain, long lead requirements

**Multiple input sensors**

**Multiple displays**

**Cloud/network stream**

**In-vehicle entertainment**

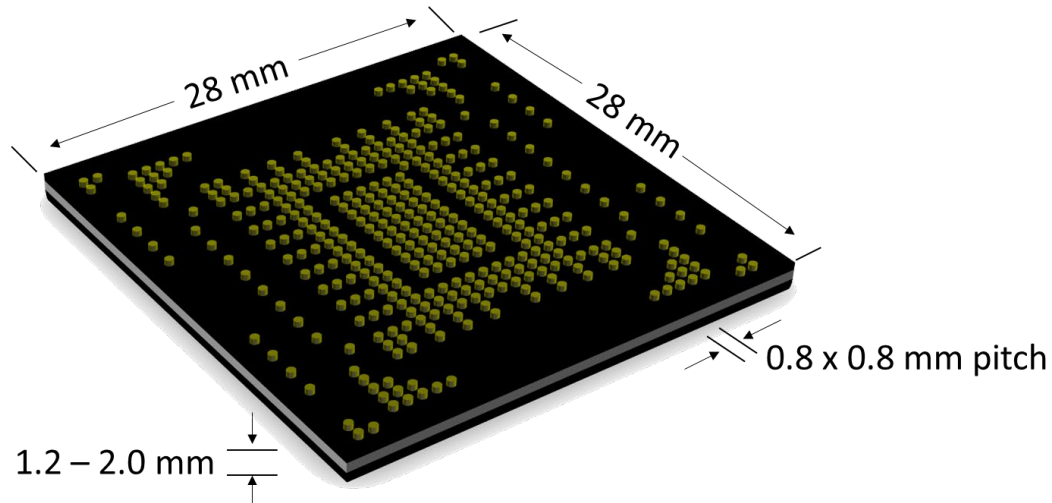
**Maps & Traffic**



# JESD 312 – Automotive SSD

## *2022: Begin standardizing requirements*

- Package: PCI-SIG 2828
- Electrical Interface: Gen4x4, SMBus, JTAG
- Command Protocol: NVMe
- Security: SPD
- Endurance: JESD 218/219
- Features: Storage Regions



## JEDEC STANDARD

### Automotive Solid State Drive (SSD) Device Specification

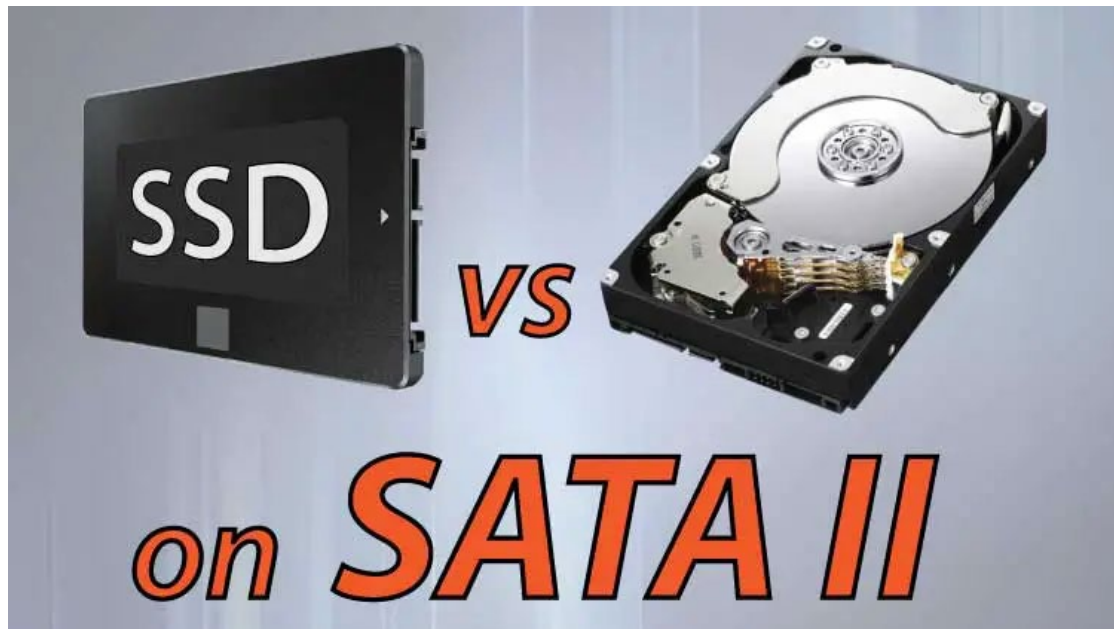
Rev 1.0

JESD312

June 2022

# The SSD Endurance Problem, circa 2010

In 2008-2009, SSDs were still new



And a question was growing re: SSDs:

- I hear SSD's "wear out"; what does that mean and how long does it take?
- How do I compare wear out claims (endurance) between vendors?

# JESD 218/219: SSD Reqt's and Endurance Test Method

## Model Framework: Use Conditions, Success Criteria, Standard Metric

Application Class	Reference Use Conditions Over Drive Lifetime			Success Requirements	
	Standard Workload (JESD 219)	Active Use Period (power on)	Retention Period (power off)	Functional Failure Rate (FFR)	UBER
Client	Trace based	40°C 8hrs/day	30°C 1yr	$\leq 3\%$	$10^{-15}$
Enterprise	SPC based	55°C 24hrs/day	40°C 3 months	$\leq 3\%$	$10^{-16}$



### Standard Metric (TBW)

Terabytes that can be written to a drive over its lifetime (Active Use + Retention periods)

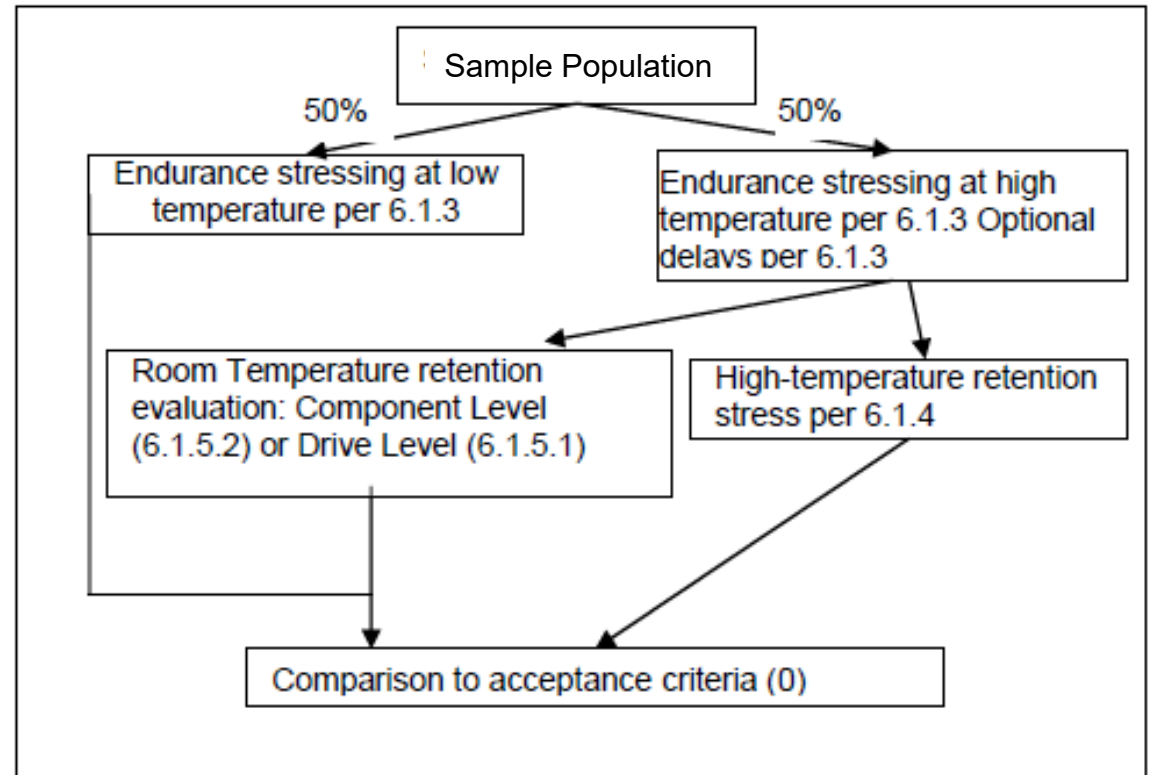
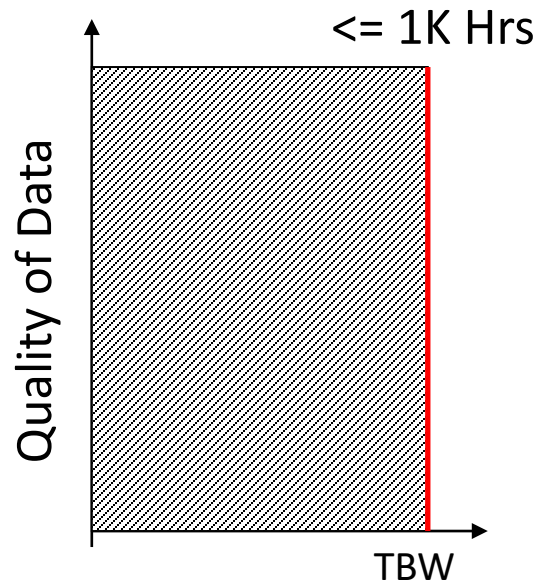
- under the Reference Use Conditions (Workload, Temp, Duty Cycle)
- and such that the drive meets the Success Requirements



# JESD 218/219: SSD Reqt's and Endurance Test Method

## Accelerated Wear and Verification: Direct Method

- Can reach TBW in 1K hours with ref workload
- Whole drive is stressed in normal operation
- Few assumptions: Failures simply counted
- No model-based “predictions” or assumptions

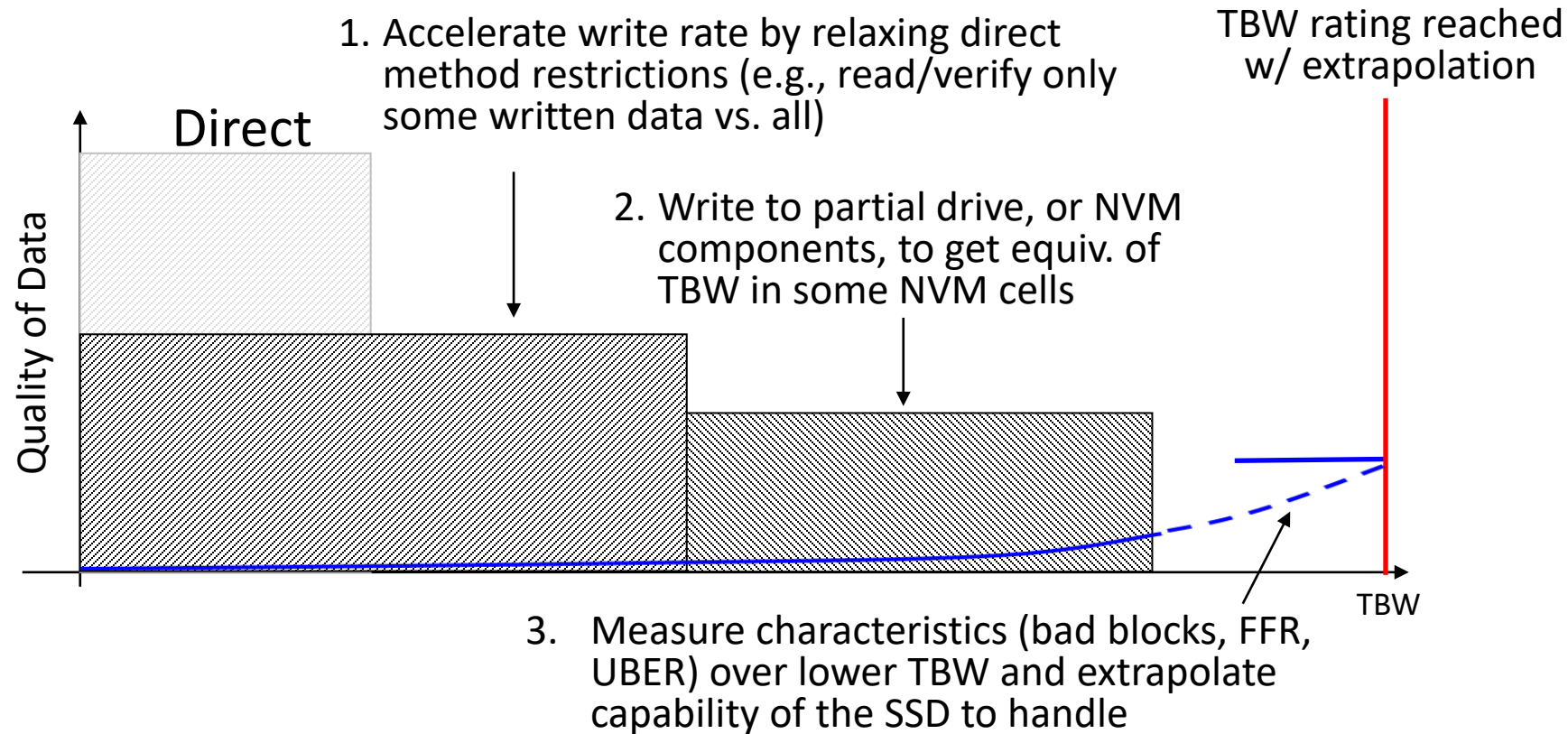




# JESD 218/219: SSD Reqt's and Endurance Test Method

## Accelerated Wear and Verification: Extrapolation Methods

(when direct method won't reach TBW in  $\leq 1K$  hours)



Visibility into higher TBW; tradeoff in data quality, number of assumptions

JC64.8 is active  
*Come join us!*