

SNIA  | SFF

# EDSFF E1.A Samsung Proposal (SFF-TA-1046)

Presented: 30<sup>th</sup> Jan.

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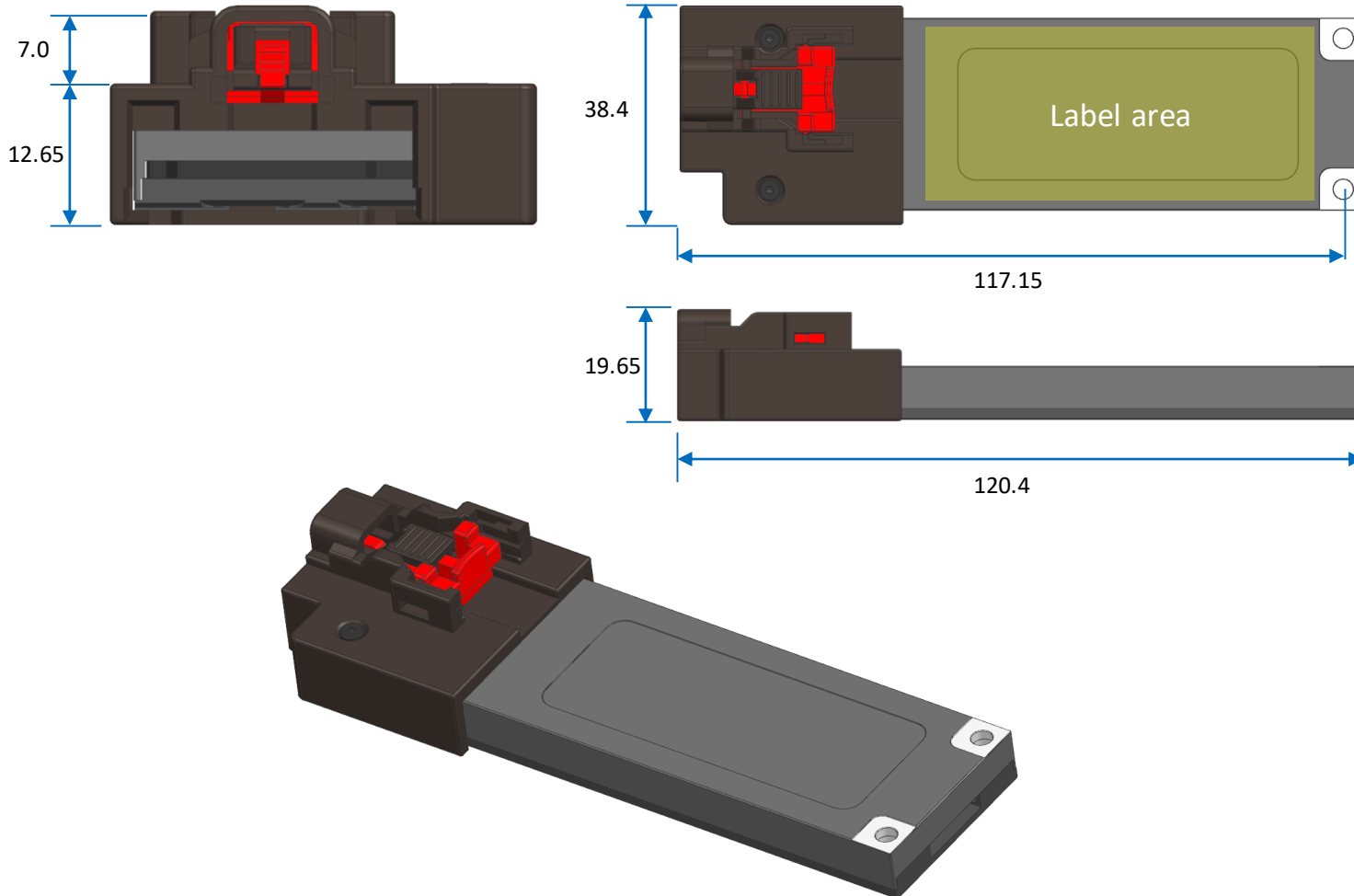
James Hou, Ma Hai Bin (Lenovo)

Cimet Eyal (Waymo)

# Agenda

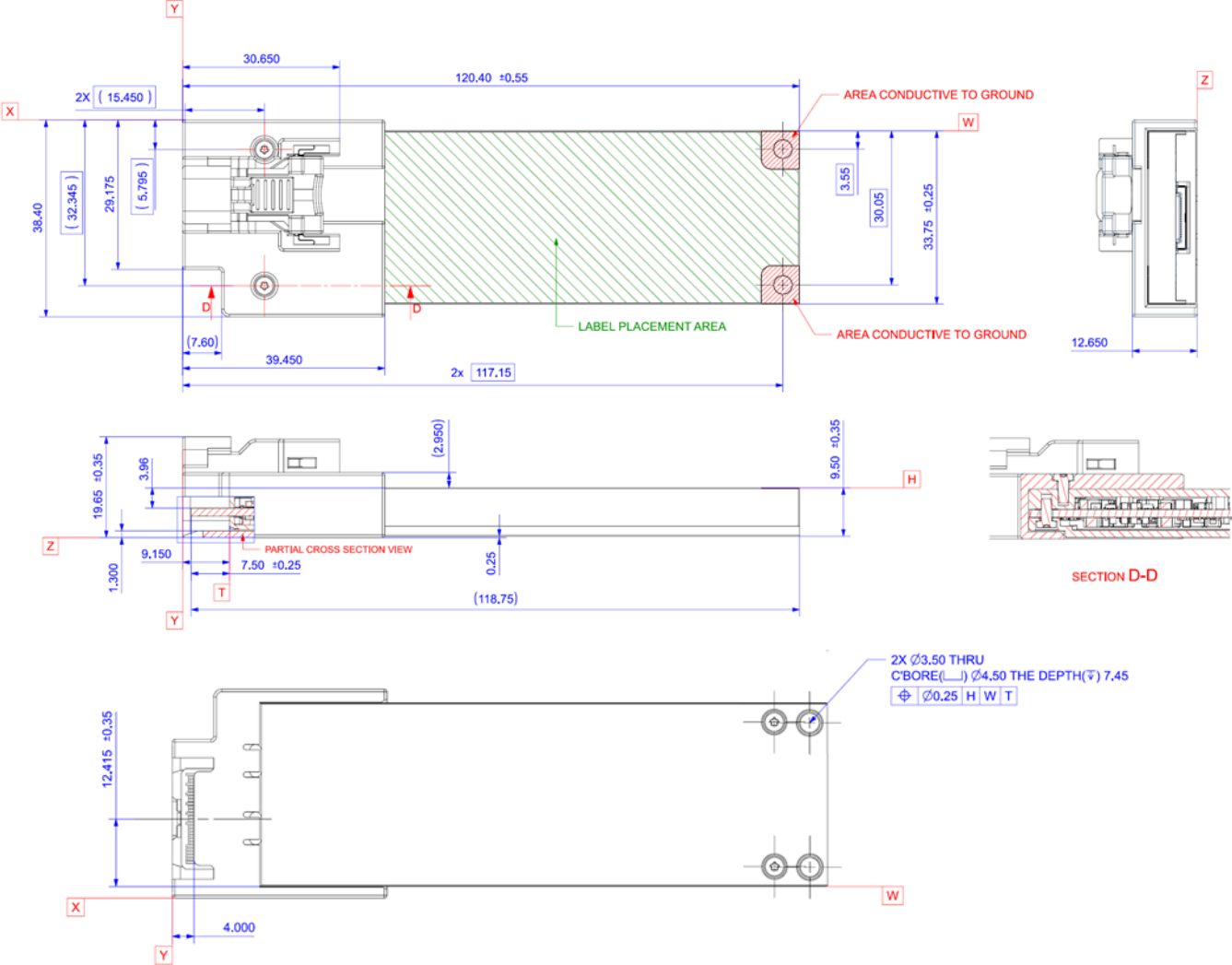
1. Standardization Scope
2. Pin configuration
  - Withdraw existing proposal, would be same with E1.S (SFF-TA-1009)
3. Why E1.A is based on E1.S ?
4. E1.A Naming Discussion

# Scope of SFF-TA-1046 (Enclosure+Adapter)



- Outline of SSD (Enclosure and Adapter)
- Grounded system mounting hole
- Label area
- Card edge placement on enclosure

# Example (Enclosure+Adapter)



# Why Adapter should be included in E1.A?

- SSD vendor should follow TA-1046 spec to design E1.A Enclosure including Adapter. Adapter is part of SSD.
  - The adapter is to make the SSD meet the automotive shock and vibration requirements
  - To modify FF for next generation, Adapter spec should be included in SFF-TA-1046

# E1.A Design Deep Dive – Pin Configuration

- The pin configuration is based on SFF-TA-1009(E1.S), but adding two pins (PLN#, PLA#) for power loss protection

\* PLN# : Power Loss Notification, defined by M.2 specification, \* PLA# : Power Loss Acknowledge defined by M.2 specification

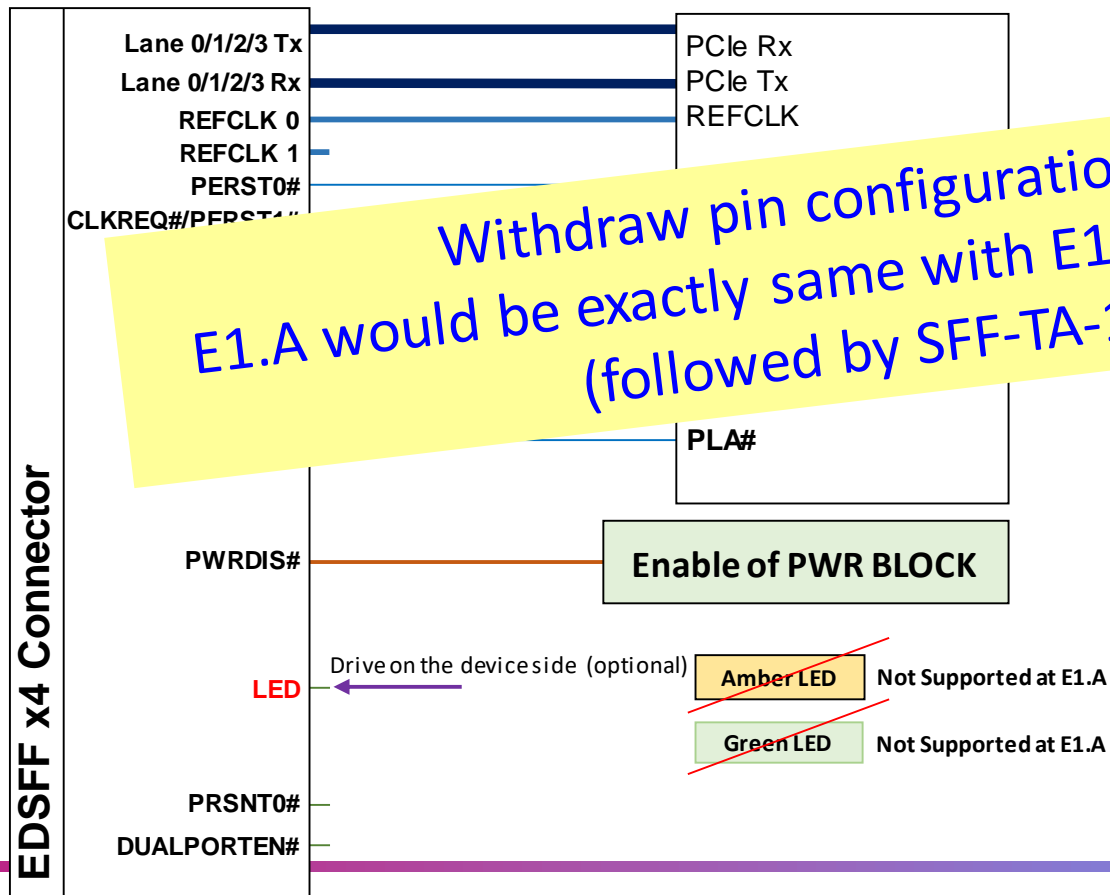
- Amber LED & Green LED defined by SFF-TA-1009 are not supported at E1.A

\* Amber LED : fault indication \* Green LED : device activity

< E1.A SSD Pin Configuration >

< Block Diagram on Connector Side >

Host Side



Pin	Contact Sequence	Signal	Signal	Contact Sequence	Pin
B1	2 <sup>nd</sup> mate	12V	GND	1 <sup>st</sup> mate	A1
B2	2 <sup>nd</sup> mate	12V	GND	1 <sup>st</sup> mate	A2
B3	2 <sup>nd</sup> mate	GND	GND	1 <sup>st</sup> mate	A3
B4	2 <sup>nd</sup> mate	GND	GND	1 <sup>st</sup> mate	A4
B5	2 <sup>nd</sup> mate	GND	GND	1 <sup>st</sup> mate	A5
B6	2 <sup>nd</sup> mate	GND	GND	1 <sup>st</sup> mate	A6
B7	2 <sup>nd</sup> mate	IBCLK/I3CCLK	GND	2 <sup>nd</sup> mate	A7
B8	2 <sup>nd</sup> mate	BDATA/I3CDATA	GND	2 <sup>nd</sup> mate	A8
B9	2 <sup>nd</sup> mate	RST#	GND	2 <sup>nd</sup> mate	A9
B10	2 <sup>nd</sup> mate	PERST0#	LED Input → Output	2 <sup>nd</sup> mate	A10
B11	2 <sup>nd</sup> mate	3.3 Vaux	PERST1#/CLKREQ#	2 <sup>nd</sup> mate	A11
B12	2 <sup>nd</sup> mate	PWRDIS	PRSNT0#	2 <sup>nd</sup> mate	A12
B13	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A13
B14	2 <sup>nd</sup> mate	REFCLKn0	REFCLKn1	2 <sup>nd</sup> mate	A14
B15	2 <sup>nd</sup> mate	REFCLKp0	REFCLKp1	2 <sup>nd</sup> mate	A15
B16	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A16
B17	2 <sup>nd</sup> mate	PETn0	PERn0	2 <sup>nd</sup> mate	A17
B18	2 <sup>nd</sup> mate	PETp0	PERp0	2 <sup>nd</sup> mate	A18
B19	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A19
B20	2 <sup>nd</sup> mate	PETn1	PERn1	2 <sup>nd</sup> mate	A20
B21	2 <sup>nd</sup> mate	PETp1	PERp1	2 <sup>nd</sup> mate	A21
B22	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A22
B23	2 <sup>nd</sup> mate	PETn2	PERn2	2 <sup>nd</sup> mate	A23
B24	2 <sup>nd</sup> mate	PETp2	PERp2	2 <sup>nd</sup> mate	A24
B25	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A25
B26	2 <sup>nd</sup> mate	PETn3	PERn3	2 <sup>nd</sup> mate	A26
B27	2 <sup>nd</sup> mate	PETp3	PERp3	2 <sup>nd</sup> mate	A27
B28	1 <sup>st</sup> mate	GND	GND	1 <sup>st</sup> mate	A28

# Why E1.A is based on E1.S? (1/3)

E1.S Market Adaptation		
2022	2025	2030
~8%	~22%	~45%

Source: TrendFocus

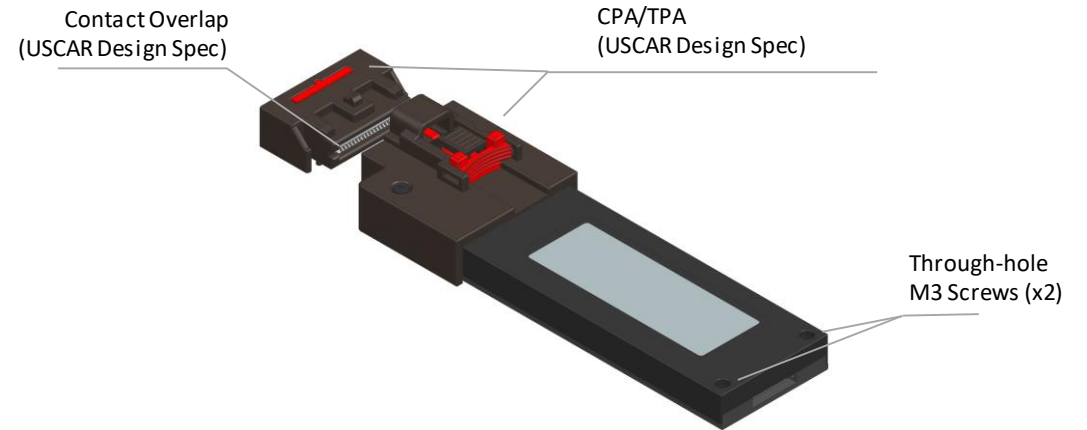
- E1.S SSD FF was designed for high density, high perf. storage for current hyper-scale datacenter customers
  - E1.S is standardized by SNIA supported by memory vendor and leading hyperscalers
  - Therefore, there was no consideration for Automotive connection reliability and USCAR requirements
- E1.A SSD form factor is designed to meet **“Automotive requirements while maintaining the advantages of E1.S”**
  - Specifically, it aims to meet USCAR connector design guide with the CPA/TPA feature

USCAR : United States Council for Automotive Research

CPA : Connector Position Assurance  
 TPA : Terminal Position Assurance



E1.S Design + Extension Kit (Latch) Assembly for Datacenter

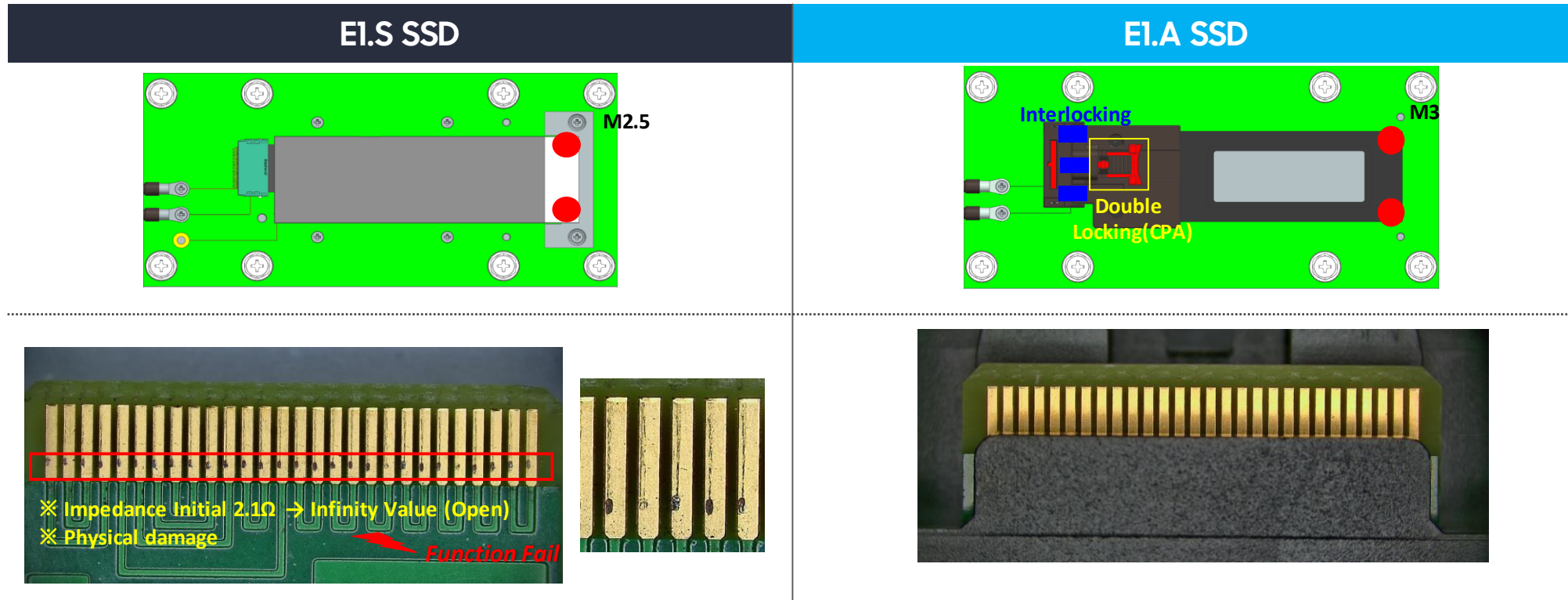


E1.A Design for Automotive

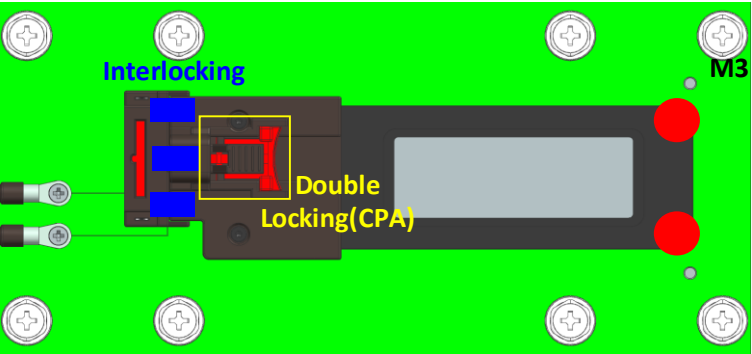
# Why E1.A is based on E1.S? (2/3)

- Compared to conventional E1.S, damage to the gold fingers of E1.A is significantly reduced due to a reliable connection
- Test Condition: LV124/ISO16750-3 Vibration Spec
  - Vibration : 5~2000Hz, 31.3m/s<sup>2</sup>, 8h per direction

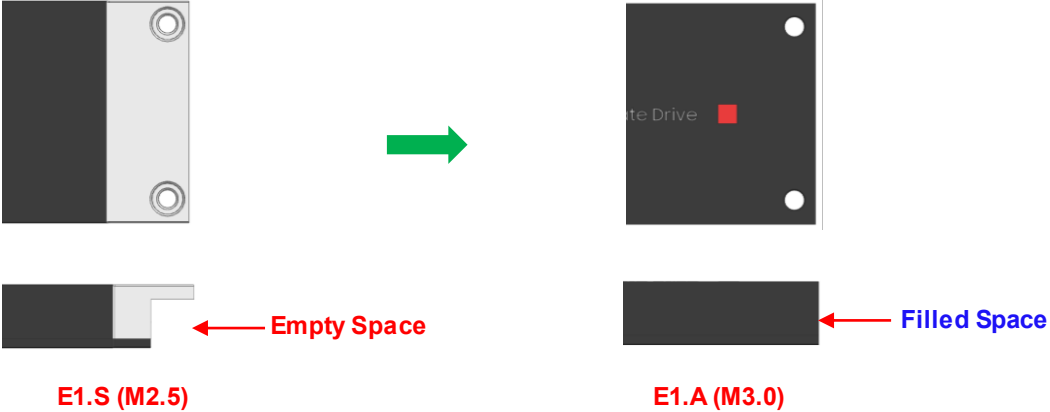
[ Test Result Comparison ]



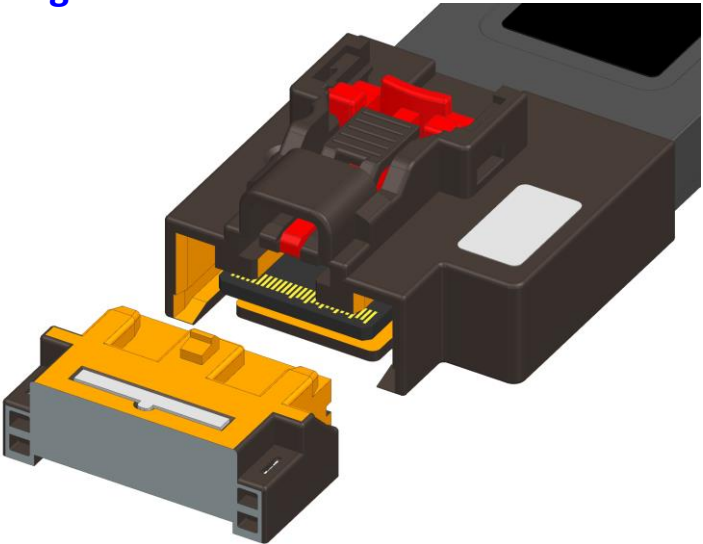
# Why E1.A is based on E1.S? (3/3)



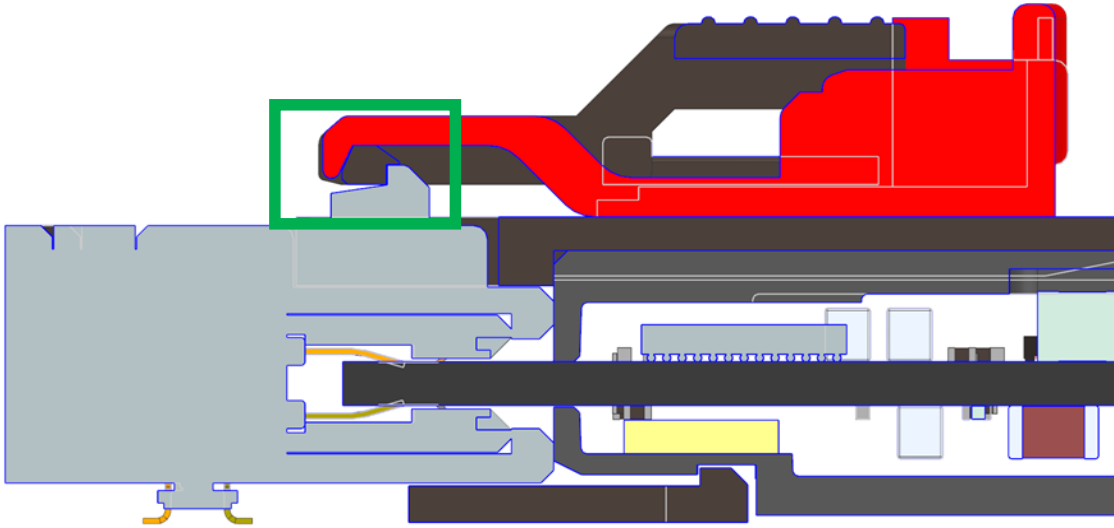
## System Screw



## Interlocking



## Double Locking (Latch / CPA)

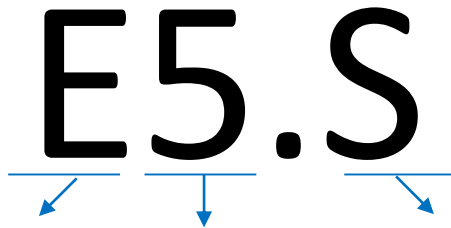


# E1.A Naming Discussion

- Samsung developed E1.A F/F leveraging E1.S design concept
  - Pin configuration is same with E1.S followed by SFF-TA-1009
- Samsung hopes stick to E1.A for naming, but we are open for further discussion
  - We think A1.S is not proper, since it could not show design concept based on E1.S
  - How about allocating another name like E5.S, EA.S?

## Alternative Proposal 1

**E5.S**

The diagram shows the text 'E5.S' in a large, bold, black font. Below each character (E, 5, and S) is a horizontal blue line. From the center of each line, a blue arrow points downwards and slightly outwards to the left or right, indicating the breakdown of the code into its components.

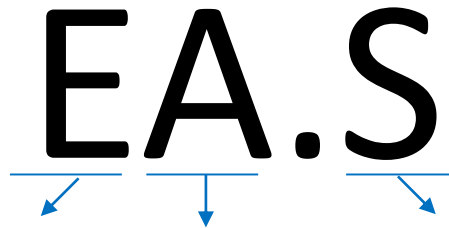
Enterprise Class  
Performance &  
Density

Auto Grade  
Form Factor

Design variation  
(Enclosure Length)

## Alternative Proposal 2

**EA.S**

The diagram shows the text 'EA.S' in a large, bold, black font. Below each character (E, A, and S) is a horizontal blue line. From the center of each line, a blue arrow points downwards and slightly outwards to the left or right, indicating the breakdown of the code into its components.

Enterprise Class  
Performance &  
Density

Auto Grade  
Form Factor

Design variation  
(Enclosure Length)



# Thank You

SNIA SFF Chair Contact: [sff-chair@snia.org](mailto:sff-chair@snia.org)

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