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## NVM Express™ Technical Errata

|                            |                          |
|----------------------------|--------------------------|
| <b>Errata ID</b>           | <b>008</b>               |
| <b>Revision Date</b>       | <b>03/11/2021</b>        |
| <b>Affected Spec Ver.</b>  | <b>NVM Express™ 1.4b</b> |
| <b>Corrected Spec Ver.</b> |                          |

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### Errata Overview

ANA Change Asynchronous Event Notification Clarification – Reword the ANA Change Asynchronous Event Notifications exception list to make it clear the requirement is to eliminate duplicate Asynchronous Event Notifications and update the list of events that may cause duplicate Asynchronous Event Notifications to improve clarity about some specific events that should not cause duplicate Asynchronous Event Notifications.

### Revision History

| <b>Revision Date</b> | <b>Change Description</b>   |
|----------------------|---|
| 1/11/2021            | Initial creation  |
| 1/13/2021            | Reword example list   |
| 1/15/2021            | Replace AEN with Asynchronous Event Notification. Updates from Keith Busch: remove create since it doesn't change the ANA Log page anyway; and update section 8.20.3.6. |
| 1/19/2021            | Fix the heading in 8.21.5.  |
| 1/21/2021            | Update "is as a result of" to "is a result of"  |

|           |  |
|-----------|--|
| 1/28/2021 | Change “Asynchronous Namespace Access” to “Asymmetric Namespace Access”  |
| 2/19/2021 | Updates from 30-day review (change references in section 8.20.3.6).  |
| 3/7/2021  | Integrated into the NVMe Base Specification.   |
| 3/11/2021 | Accepted all changes, removed all comments, and converted references/cross-references to text. Ready for ratification. |

Editor’s Note:

**BLACK** text indicates unchanged text; **RED** text indicates new or deleted text; **BLUE** text indicates copied or moved text; **GREEN** text indicates editor notes.

## Incompatible Changes

- The description of the Asymmetric Namespace Access Change Asynchronous Event Notification (03h) indicated that the controller shall not send that event for cases where the Namespace Attribute Change is already sent (to reduce duplicate Asynchronous Event Notifications for the same event – “as the Namespace Attribute Changed event is sent for these changes”). The text specifically mentions excluding the event if it was as a result of creation of the namespace or the deletion of the namespace. However, those two statements conflict. The general statement (to reduce duplicate Asynchronous Event Notifications was not fully expanded to list the exact events that caused the duplicate Asynchronous Event Notifications). In addition, a NS Creation didn’t change the ANA Log page, so it would never have generated an ANA AEN anyway.

The Namespace Attribute Changed event is sent for any change in any Identify Namespace data (including changes to CNS=0h data, CNS=02h data, and CNS=11h data). Therefore, the statement to reduce the duplicate Asynchronous Event Notifications and not send this the ANA Change Asynchronous Event Notifications if the Namespace Attribute Change event is sent would apply - which would prevent the ANA Change Asynchronous Event Notifications if it occurred as a result of an NS Create (CNS=11h change), an NS Attach (CNS=02h), a NS Detach (CNS=02h), or a NS Detach (CNS=11h change). However, the specific list does not include Attach or Detach.

This ECN clarifies this wording. This may be considered an incompatible change.

## Description of Specification Changes

Modify a portion of section 5.2 as shown below:

## 5.2 Asynchronous Event Request command

...

### 5.2.1 Command Completion

...

Figure 149: Asynchronous Event Information – Notice

| Value      | Description  |
|------------|--|
| ...        |  |
| 03h        | <p><b>Asymmetric Namespace Access Change:</b> The Asymmetric Namespace Access information (refer to section 5.14.1.12) related to an ANA Group that contains namespaces attached to this controller has changed (e.g., an ANA state has changed, an ANAGRPID has changed). The current Asymmetric Namespace Access information for attached namespaces is indicated in the Asymmetric Namespace Access log page (refer to section 5.14.1.12). To clear this event, the host issues a Get Log Page with the Retain Asynchronous Event bit cleared to '0' for the Asymmetric Namespace Access log.</p> <p>A controller shall not send this event if a Namespace Attribute Changed notice is sent for the same event, such as a <del>the</del> change <del>is</del> due to:</p> <ul style="list-style-type: none"><li>a) the <del>creation</del> attachment of a namespace (refer to section <del>5.20-5.19</del>);</li><li>b) <del>-or the change is due to-</del> the deletion of a namespace (refer to section 5.20);, or</li><li>c) the detachment of a namespace (refer to section 5.19)).</li></ul> <p><del>as the Namespace Attribute Changed event is sent for these changes.</del></p> |
| 07h to EFh | Reserved   |
| F0h to FFh | Refer to the NVMe over Fabrics specification   |

...

### 8.20.3.6 Asymmetric Namespace Access Change Notifications

If Asymmetric Namespace Access Change Notices are enabled (refer to section 5.21.1.11) on a controller, then an Asymmetric Namespace Access Change Notice shall be sent **as described in Figure 149** by the controllers where the change occurred:

- a) if an ANA Group Identifier (refer to Figure 251) changes;
- b) if an asymmetric namespace access state transition fails (e.g., a transition begins, but does not complete and the controller returns to the state that existed before the transition began); or
- c) upon entry to the following ANA states, **unless the state entry is a result of a namespace attachment:**
  - ANA Optimized State;
  - ANA Non-Optimized State;
  - ANA Inaccessible State; and
  - ANA Persistent Loss State.

...

### 8.21.5 Host ANA ~~Transition~~ Change Notice Operation

Receipt of an Asymmetric Namespace Access Change Notice from a controller may indicate ...