

JEDEC STANDARD

Embedded Multimediacard (*e*•MMC) Security Extension

JESD227

NOVEMBER 2016

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



NOTICE

JEDEC standards and publications contain material that has been prepared, reviewed, and approved through the JEDEC Board of Directors level and subsequently reviewed and approved by the JEDEC legal counsel.

JEDEC standards and publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for use by those other than JEDEC members, whether the standard is to be used either domestically or internationally.

JEDEC standards and publications are adopted without regard to whether or not their adoption may involve patents or articles, materials, or processes. By such action JEDEC does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the JEDEC standards or publications.

The information included in JEDEC standards and publications represents a sound approach to product specification and application, principally from the solid state device manufacturer viewpoint. Within the JEDEC organization there are procedures whereby a JEDEC standard or publication may be further processed and ultimately become an ANSI standard.

No claims to be in conformance with this standard may be made unless all requirements stated in the standard are met.

Inquiries, comments, and suggestions relative to the content of this JEDEC standard or publication should be addressed to JEDEC at the address below, or refer to www.jedec.org under Standards and Documents for alternative contact information.

Published by
©JEDEC Solid State Technology Association 2016
3103 North 10th Street
Suite 240 South
Arlington, VA 22201-2107

This document may be downloaded free of charge; however JEDEC retains the copyright on this material. By downloading this file the individual agrees not to charge for or resell the resulting material.

PRICE: Contact JEDEC

Printed in the U.S.A.
All rights reserved

PLEASE!

DON'T VIOLATE
THE
LAW!

This document is copyrighted by JEDEC and may not be reproduced without permission.

For information, contact:

JEDEC Solid State Technology Association
3103 North 10th Street
Suite 240 South
Arlington, VA 22201-2107

or refer to www.jedec.org under Standards-Documents/Copyright Information.

EMBEDDED MULTIMEDIACARD (*e*•MMC) SECURITY EXTENSION

Contents

Foreword.....	iii
Introduction.....	iii
1 Scope.....	1
2 Normative reference.....	1
3 IEEE 1667 Functional Requirements.....	2
3.1 IEEE 1667 Overview.....	2
3.2 IEEE 1667's split command structure.....	2
3.3 IEEE 1667 structure.....	2
3.4 Requirements for IEEE 1667 functionality in the <i>e</i> •MMC security extension.....	3
4 TCG Storage Security Functional Requirements.....	3
4.1 TCG Storage Security overview.....	3
4.2 Requirements for the TCG Storage Core in the <i>e</i> •MMC security specification.....	4
4.3 Requirements for the TCG Storage Opal SSC in the <i>e</i> •MMC security specification.....	4
4.3.1 Level 0 Discovery.....	4
4.3.2 Properties Requirements.....	9
4.4 Requirements for the TCG Storage DataStore Tables feature set in the <i>e</i> •MMC security specification.....	9
4.5 Requirements for the TCG Storage Support Single User Mode feature set in the <i>e</i> •MMC security specification.....	10
4.6 Requirements for security characteristics for <i>e</i> •MMC devices that support the security extension.....	10
5 <i>e</i> •MMC Security Data Transport.....	11
5.1 Extended Security Commands.....	11
5.2 Discovery of Extended Security Commands Support.....	11
5.3 Atomicity of Extended Security Commands.....	11
5.4 Data transport requirements specific to this Security Extension Standards.....	11
6 Security Interactions with <i>e</i> •MMC Operations.....	12
6.1 Security Support Restrictions on Partitions.....	12
6.2 Authentication and Access Control Management on User Partition.....	12
6.3 Dynamic Capacity.....	12

7	Error Handling	12
7.1	IEEE 1667 errors	12
7.1.1	PROTOCOL_RD, PROTOCOL_WR Command Out of Sequence	12
7.1.2	Silo Index mismatch in PROTOCOL_RD, PROTOCOL_WR	13
7.1.3	PROTOCOL_RD, PROTOCOL_WR Transport Specific Error	13
7.2	<i>e</i> MMC Transport Errors	13
7.2.1	PROTOCOL_RD, PROTOCOL_WR Transport Specific Error	13
7.2.2	Unauthorized Access	13
8	Configuration	14
8.1	<i>e</i> MMC Partition Configuration	14

Foreword

This *e*•MMC Security Extension Standard has been prepared by JEDEC as an extension to the *e*•MMC Electrical Standard, JESD84-B51.

Introduction

The *e*•MMC Electrical Standard, JESD84-B51, defines a managed memory device capable of storing code and data. *e*•MMC devices are intended to offer the performance and features required by mobile devices while maintaining low power consumption. The *e*•MMC device contains features that support high throughput for large data transfers and performance for small random data accesses more commonly found in code usage. It also contains many desirable features for mobile applications.

This *e*•MMC Security Extension Standard describes the requirements to implement security functionality described in [IEEE1667], [TCGCore], [TCGOpal], [TCGAddDST], [TCGAddDST] and [TCGSIIS] in an *e*•MMC device. The document is considered an extension of the *e*•MMC Electrical Standard, JESD84-B51, [*e*•MMC] used as transport protocol for the security functionalities.

There are three external sets of requirements on the class of *e*•MMC device that support this security extension: IEEE 1667 layer requirements, TCG layer requirements, and requirements related to *e*•MMC security data transport and interaction with *e*•MMC functionality.

EMBEDDED MULTIMEDIACARD (*e•MMC*) SECURITY EXTENSION

(From JEDEC Board Ballot JCB-12-59, formulated under the cognizance of the JC-64.1 Subcommittee on Electrical Specifications and Command Protocols.)

1 Scope

This document provides a comprehensive definition of the *e•MMC* Security requirements for implementation of IEEE 1667 and TCG Opal security functionality. It also provides design guidelines and defines a tool box of macro functions and algorithms intended to reduce design-in overhead.

2 Normative reference

The following normative documents contain provisions that, through reference in this text, constitute provisions of this standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated. For undated references, the latest edition of the normative document referred to applies.

IEEE 1667 [IEEE1667], *IEEE P1667™ 2015 Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices.*

Trusted Computing Group [TCGCore], *TCG Storage Architecture Core Specification*, Version 2.01, Revision 1.00

Trusted Computing Group [TCGOpal], *TCG Storage Security Subsystem Class: Opal Specification*, Version 2.01, Revision 1.00

Trusted Computing Group [TCGAddDST], *TCG Storage Opal SSC Feature Set: Additional DataStore Tables Specification*, Version 1.00, Revision 1.00

Trusted Computing Group [TCGSUM], *TCG Storage Opal SSC Feature Set: Single User Mode Specification*, Version 1.00, Revision 2.00

Trusted Computing Group [TCGSIIS], *TCG Storage Interface Interactions Specification (SIIS)*, Version 1.05, Revision 1.00

JEDEC JESD84-B51 [*e•MMC*], *Embedded Multi-Media Card (e•MMC), Electrical Standard (5.0)*.