

Standard

Electromagnetic Compatibility Requirements for Space Equipment and Systems

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Standard

Electromagnetic Compatibility Requirements for Space Equipment and Systems

Sponsored by

American Institute of Aeronautics and Astronautics

Approved

11 December 2017

Abstract

This document, when followed in its entirety, will yield a robust electromagnetic compatibility design suitable for high-reliability space missions. This document specifies general design practices and sets recommended verification and validation requirements for space vehicles and launch vehicles.

Library of Congress Cataloging-in-publication data on file

Published by
American Institute of Aeronautics and Astronautics
12700 Sunrise Valley Drive, Reston, VA 20191

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Printed in the United States of America

ISBN 978-1-62410-520-3

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Foreword

This standard has been developed under the sponsorship of the Chief Engineer's office of the United States Air Force Space and Missile Systems Center (SMC) and under the auspices of the AIAA Electromagnetic Compatibility (EMC) Committee on Standards. It is one in a series of standards planned to codify industry best practices to ensure the very highest level of performance and reliability for the next generation of high-reliability space systems. It follows in the footsteps of MIL-STD-1541A, "Electromagnetic Compatibility Requirements for Space Systems and Equipment," but has been thoroughly updated to reflect current industry design practices.

The starting point for this document was "Electromagnetic Compatibility Requirements for Space Systems and Equipment," TOR 2005(8583)-1, dated 8 August 2005, also published as USAF Space and Missile Systems Center Standard number SMC-S-008). However, as a result of committee deliberations, this standard (AIAA S-121A-201X) draws most of its content from MIL-STD-461G and MIL-STD-134C. Additional requirements deemed necessary for high-reliability space systems have been added by the committee.

The intent is to address approximately 80% of space systems. Tailoring may be performed to balance performance, risk, and cost to suit the needs of specific projects.

The final product reflects the best EMC design and verification practices for high-reliability space systems.

At the time of approval, the members of the AIAA EMC Committee on Standards were:

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The above consensus body approved this document in (30 November 2017).

The AIAA Standards Executive Council (Mr. Allen Arrington, Chairman) accepted the document for publication in (December 2017).

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1 Scope

This standard is applicable for the procurement of space systems, including spacecraft, space vehicles, launch vehicles, ground systems, and associated equipment/subsystems.

This standard establishes performance and verification requirements for the purpose of ensuring space systems electromagnetic compatibility (EMC), including all electromagnetic environmental effects. Engineering issues that must be addressed in order to achieve system-level EMC are identified herein, with guidance and rationale toward achieving specification compliance.

2 Tailoring

When viewed from the perspective of a specific program or project, the requirements defined in this standard should be tailored to match the actual requirements of the particular program or project. Tailoring of requirements shall be undertaken in consultation with the procuring agency where applicable.

NOTE Tailoring is a process by which individual requirements or specifications, standards, and related documents are evaluated and made applicable to a specific program or project by addition, deletion, or modification of requirements.

3 Applicable Documents

The following documents contain provisions that, through reference in this text, constitute provisions of this standard to the extent specified herein. 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 below. For undated references, the latest edition of the normative document referred to applies.

AFSPCMAN 91-710, Vol. 3	<i>Range Safety User Requirements Manual, Volume 3 – Launch Vehicles, Payload, and Ground Support Systems Requirements</i>
AFSC DH 1-4 (4 th Ed, Rev 1)	<i>AFSC Design Handbook 1-4</i>
AIAA S-113-2005	<i>Criteria for Explosive Systems and Devices on Space Launch Vehicles</i>
ANSI/IEEE C95.1-2005	<i>Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz</i>
SAE ARP5412B	<i>Aircraft Lightning Environment and Related Test Waveforms, Rev B, January 2013, SAE Aerospace</i>
ECSS-E-20-01A	<i>Space Engineering – Multipaction and Test, European Space Agency (ESA) for the European Cooperation for Space Standardization (ECSS), 5 May 2003</i>
ISO/IEC 17025:2005	<i>General requirements for the competence of testing and calibration laboratories</i>
JSC-28596 (2000)	<i>NASA Standard Initiator User's Guide</i>
MIL-HDBK-83575 (1998)	<i>General Handbook for Space Vehicle Wiring Harness Design and Testing</i>
MIL-STD-331C	<i>Fuse and Fuse Components Environmental and Performance Tests</i>