



Federal Aviation Administration

Memorandum

Date: FEB 26 2008
To: See Distribution
From: Manager, Aircraft Engineering Division, Aircraft Certification Service, AIR-100 DJ
Prepared by: R. Jennings, AIR-130
Subject: Application of High-intensity Radiated Fields (HIRF) Protection Final Rule under §21.101
Regulatory Reference: 14 Code of Federal Regulations (CFR) §§ 21.16, 21.101, 23.1308, 25.1317, 27.1317, and 29.1317

Background

Since 1987, the FAA has imposed certification standards to protect aircraft electrical and electronic systems that perform critical functions from high-intensity radiated fields (HIRF). These requirements have been imposed using the special condition process (14 CFR § 21.16). In 1993, the FAA initiated rulemaking to establish standards for the protection of aircraft electrical and electronic systems from the adverse affects caused by HIRF. These standards became effective on September 5, 2007, and as a result, the FAA will no longer be imposing HIRF protection requirements using the special condition process. This memorandum provides information on when an applicant should show compliance with the new HIRF certification standards (14 CFR §§ 23.1308, 25.1317, 27.1317, and 29.1317) under the provisions of 14 CFR § 21.101, *Designation of applicable regulations*.

Establishing the Certification Basis

Section 21.101 requires an applicant for a change to a type certificate to meet the latest requirements, except where the change is 1) not significant; 2) where areas of the product are not affected; 3) where it would be impractical; or, 4) where it would not contribute materially to the level of safety of the changed product. Therefore, if a change is determined to be significant, compliance must be shown to the new HIRF protection certification standards unless the change meets one of the above exceptions. Advisory Circular (AC) 21.101-1, Change 1, provides guidance on determining whether a change to a type certificate is considered significant or not significant.

For changes that are determined to be not significant, § 21.101 allows continued compliance with the existing certification basis unless the existing certification basis does not provide adequate

standards for the design change (reference FAA Order 8110.48). In this case, the change must comply with later appropriate regulations. For proposed installations of electrical and electronic systems with catastrophic failure conditions, the certification basis is considered inadequate when the original certification basis does not include HIRF protection requirements (e.g., special condition). For these systems, compliance must be shown to §§ 23.1308(a), 25.1317(a), 27.1317(a), or 29.1317(a), as appropriate. Alternatively, paragraph (d) of the new HIRF rules (sometimes referred to as the “reuse” provision) can be used in lieu of paragraph (a) if the applicant can show that the installation meets all of the conditions specified in paragraph (d). Guidance on how to comply with all aspects of the new HIRF rule can be found in AC 20-158.

Since the FAA will no longer be issuing HIRF special conditions, the following table summarizes how you should apply the new HIRF standards to an applicant’s project.

If the aircraft’s certification basis	And the change is considered...	
	Significant under § 21.101	Not Significant under § 21.101
...does not include the new HIRF rule	Compliance with paragraphs (a), (b), and (c) of the new HIRF rule, as appropriate, must be shown, unless an exception to paragraphs (b) and/or (c) of the HIRF rule is granted under 14 CFR § 21.101.	<p>Certification basis is considered inadequate to address HIRF for installations of electrical and electronic systems with catastrophic failure conditions.</p> <p>Compliance to paragraph (a) of the new HIRF rule must be shown.</p> <p>For installations of electrical and electronic systems with hazardous and/or major failure conditions, compliance to paragraphs (b) and/or (c) of the new HIRF rule is recommended, but not required.</p> <p><i>(See Note 1)</i></p>
...includes the new HIRF rule	Compliance with the new HIRF rule, as appropriate, must be shown.	
<p>Note 1: If the aircraft’s original certification basis included HIRF special conditions, the applicant has the option of either complying with paragraph (a) of the new HIRF rule, or with the previous issued special conditions.</p>		

However, applicants should be aware that for installation of electrical and electronic systems with hazardous or major failure conditions, lack of demonstrated compliance to paragraphs (b) and/or (c) of the new HIRF certification standards may be considered unacceptable to other Civil Aviation Authorities. Further, compliance with paragraph (d) of the new HIRF certification standards in lieu of paragraph (a) may also be considered unacceptable. Therefore, for applicants who are anticipating acceptance of their FAA type certificated product or supplemental type certificated installation into a global market should research the HIRF regulations of other Civil Aviation Authorities to determine if the product or installation will be acceptable for import into those countries.

For questions regarding this memorandum, contact Rich Jennings of the Avionic Systems Branch, AIR-130, at (202) 385-4562.

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