See 2 Corrections

Advance copy pending issuance revised pages, Part 37

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Docket No. 15264; Amdt. No. 37-41]

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

Airborne Interim Standard Microwave Landing System Converter Equipment

The purpose of this amendment to Part 37 of the Federal Aviation Regulations is to add a new Technical Standard Order (TSO) for airborne interim standard microwave landing system (ISMLS) converter equipment (TSO-C93) that prescribes the standards that must be met in order for a manufacturer to identify equipment with the applicable TSO designation.

On December 22, 1972, the Federal Aviation Administration published in the FEDERAL REGISTER (37 FR 28311) an invitation for comments on a policy statement concerning the development of a non-federal low approach landing system. That system, described as an interim standard microwave landing system (ISMLS), was selected by the FAA for "* * * use at locations where a VHF/UHF ILS will not perform in an effective manner, or where the needs for low approach service would be better served by the use of the ISMLS." In determining the suitability for an ISMLS at any given location, the invitation for comments stated that "* * * full consideration will be given to the nature of the operational requirement and to the economics of the situation including the cost of airborne avionics equipment." Furthermore, the invitation for comments announced that the selection of the ISMLS would be based upon a standard performance specification, and requested current and potential ISMLS users to comment on the operational, technical, and economic aspects of such a system.

As a result of the invitation for comments, and a subsequent notice of policy decision (38 FR 14784), wherein the comments were discussed, the FAA proceeded with the development of a performance specification and subsequently issued a request for proposals. That request led to several proposals which the FAA evaluated through flight tests. As a result of the evaluation, the FAA published on August 30, 1974, the selection of the system manufactured by Tull Aviation Corporation, 4 Kaysal Court, Armonk, New York 10504 (Tull), as the interim standard microwave landing system (see 39 FR 31681). That system includes both ground and airborne equipment.

In selecting the ISMLS proposed by Tull, the FAA has concluded an agreement whereby Tull has agreed to grant royalty-free licenses in their technical data for the manufacture, sale, and use of the Tull system only within the United States, its territories and possessions, the District of Columbia, Puerto Rico, and the Canal Zone. Licensees of the technical data only will be required to indemnify purchasers and users of equipment manufactured by the licensee from this data against liability from patent infringement arising from the manufacture or sale of the ISMLS. The data will be available to licensees from Tull for the cost of reproduction and handling. Tull has further agreed with the FAA to grant, on reasonable terms, nonexclusive licenses for the manufacture, use and sale of the ISMLS equipment claimed to be covered by patents, within the United States, its territories and possessions, the District of Columbia, Puerto Rico, and the Canal Zone.

NOTE.—Copies of these agreements are contained in Docket No. 14120 and are available to interested persons upon request to the Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket, AGC-24, 800 Independence Avenue, SW., Washington, D.C. 20591.

Converter equipment that are the subject of this amendment are covered by these agreements.

The FAA takes no position on the scope, coverage, or validity of the patents claimed by Tull for its system, nor on any patents that may result from any pending applications.

This amendment is based on a notice of proposed rulemaking (Notice 75-41) published in the FEDERAL REGISTER on January 5, 1976 (41 FR 776). Six commentators responded to Notice 75-41, three of whom were in favor of the intent of the proposed rule. The more significant of the comments received are discussed below. Based upon the comments and upon further consideration by the FAA, a number of changes have been made to the proposed rule.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all matter presented. Except as modified by the following discussion, the reasons for this amendment are set forth in Notice 75-41.

One commentator objected to the proposal and stated that TSOs are usually issued for equipment commonly used by air carriers and that, except for rare circumstances, air carriers will not use ISMLS equipment. The commentator also stated that there existed an apparent intent to apply the proposed requirement to all operators although there existed no proposal to amend Part 91 to include such a requirement. Another commentator, while agreeing with the proposed TSO, objected to any requirement that equipment to be used in Part 91 operations be TSO-approved. The standards set forth in the TSO being adopted are mandatory only for equipment manufacturers who wish to obtain TSO authorizations covering airborne ISMLS converter equipment and are not directed to persons who install or use the equipment. Furthermore, while TSOs often cover equipment used by air carriers, TSOs are also issued, where necessary, for equipment that may be used by other operators, as is the case with airborne ISMLS converter equipment.

A number of commentators expressed concern with respect to the proper operation of VHF/UHF ILS receiving equipment after the installation of airborne ISMLS converter equipment meeting the proposed TSO standards. One of these commentators recommended that the proposed TSO be revised to cover the combined VHF/UHF ILS-ISMLS system. Another commentator suggested that the proposed TSO or TSO-C34c or TSO-C36c, contained in §§ 37.160 and 37.161, that specify TSO standards for ILS receiving equipment, be revised to cover the modifications necessary for the installation of the airborne ISMLS converter equipment.

The FAA recognizes that modification of VHF/UHF ILS receiving equipment may be necessary to ensure proper operation of the combined VHF/UHF ILS-ISMLS system. The FAA believes that the installation approval associated with the incorporation of airborne ISMLS equipment will ensure proper system functioning. In this connection, the FAA is considering the issuance of advisory material with information related to the installation of airborne ISMLS converter equipment. However, the FAA, at this time, does not believe it necessary or appropriate to promulgate specific technical standards relating to the installation of the airborne ISMLS equipment or relating to the overall VHF/UHF ILS-ISMLS airborne system.

Section 37.203(d)(3), as proposed, would have required the manufacturer to submit test reports. However, as one commentator pointed out, the proposal did not specify the particular test reports to be submitted. Proposed § 37.203(d)(3) has been revised to make it clear that the only test reports to be submitted are those related to the tests conducted to show compliance with the TSO standards.

One commentator questioned the use of the Radio Technical Commission for Aeronautics (RTCA) Document No. DO-138 as an environmental standard under

(As published in the Federal Register /41 F.R. 46843/ on October 26, 1976

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the TSO since it has been superseded by RTCA Document No. DO-160. The FAA does not agree. While DO-160 is the most current RTCA environmental standard, the FAA has determined that the conditions specified in either DO-138 or DO-160 provide an adequate environmental standard for this TSO. In this connection, proposed § 37.203(d)(4) has been revised to require the manufacturer to indicate the paragraphs of DO-160 used to determine compliance with paragraph 4.0 of the FAA standard specified at the end of § 37.203 in order to facilitate administration of the provision.

The notice proposed to require that the equipment manufacturer provide certain data with each TSOed article manufactured. It was recommended by one commentator that the provision be revised to require that only one set of such data be provided to each customer. The FAA agrees, and proposed § 37.203(e) has been revised accordingly.

Based on a comment that indicated that it was unclear whether a manufacturer would be required to test to show compliance with each of the TSO performance standards, an introductory sentence is being added to paragraph 3.0 and 4.0 of the proposed FAA standard to clearly indicate that equipment must be tested to show compliance with each of the standards specified in those paragraphs.

With respect to signal level for performance, a commentator stated that performance requirements should be stated in such a way as to indicate maximum cable losses permitted. Based on this comment a note has been added to paragraph 3.1 of the proposed FAA standard indicating the maximum cable losses considered in developing the standard; however, since the cables in question are not a part of the TSOed equipment, a maximum cable loss standard has not been adopted.

One commentator recommended that paragraphs 3.1, and 3.2 of the proposed FAA standard be revised to require compliance over the assigned ISMLS frequency band. However, the FAA believes that compliance with these requirements need only be shown over the frequency range for which the equipment has been designed and the standard has been revised to make this clear. Compliance, as recommended by the commentator, over the entire assigned ISMLS frequency band would impose an undue burden on the manufacturer.

The same commentator also recommended that the ISMLS frequency plan be specified in the standard and that a showing of frequency stability of the converter over the entire range of channels should be required under paragraph 3.4 of the proposed FAA standard. Since the frequency plan is not a performance standard its inclusion in the TSO would not be appropriate. In addition, since there exists no need for converter equipment to be operable over the entire ISMLS frequency band, there exists no need for the equipment to meet the requirements of paragraph 3.4 of the FAA standard over that range. Proposed paragraph 3.4 has been revised to clearly indicate that only design frequencies need be considered in showing compliance with the provision.

At the time Notice 75-41 was developed, it was believed the maximum ISMLS signal for the localizer could be as high as −43 dbm and the maximum ISMLS signal for the glide slope could be as high as −27 dbm. The requirements of paragraphs 3.2, 3.3, and 3.5 of the proposed FAA standard were, in part, based on this belief. Subsequent review of the ISMLS signal strengths has revealed that threshold signals from the localizer will not exceed −54 dbm and threshold signals from the glide slope will not exceed −43 dbm. Paragraphs 3.2, 3.3, and 3.5 of the proposed FAA standard have been revised accordingly.

It was suggested by a commentator that the response limits in the table in proposed paragraph 3.3 of the FAA standard be better defined. The FAA agrees, and the heading in the right hand column of the table has been revised to indicate that the response limits specified are relative to center response. The same commentator recommended that the lower frequency limit in the table be increased from 0 to 100 MHz and that the response limit for the lower frequency band response limit from −100 to −60 db and an increase in the lower frequency limit from 0 to 0.09 MHz, would make the proposal consistent with the present VHF/UHF-ILS TSOs, TSO-C34c and -C36c. The proposed rule has been revised accordingly. However, the FAA believes that an increase in the lower frequency limit above 0.09 MHz, as suggested by the commentator, would be excessive.

Two commentators recommended a change to the table of paragraph 3.3 of the proposed FAA standard to make it clear that a 35 db attenuation of the operating band is not required. The FAA agrees, and the table has been revised to specifically exclude the input frequency operating band from consideration with respect to the 35 db attenuation standard.

The FAA does not agree with comments received that recommended that a maximum permitted signal distortion be specified and that limits on course accuracy effects of distortion be established. The FAA believes that the provisions of paragraph 3.5 of the proposed FAA standard are sufficient to define distortion limits, and that the maximum effects on course accuracy of signal distortion cannot be measured directly on the converter.

It was recommended by a commentator that a broader horizontal antenna coverage provision than contained in paragraph 3.6(b) of the proposed FAA standard was needed to permit normal ILS intercepts during crosswinds. A value of ±90 degrees was suggested. Based on further review, in light of this comment, the proposal has been revised to provide for horizontal coverage of ±60 degrees in lieu of the value of ±37.5 degrees proposed. Any increase in horizontal antenna coverage in excess of ±60 degrees would necessitate a reevaluation of the entire ISMLS and is not needed. As pointed out in another comment, the change to ±60 degrees necessitates changes to the proposed standard relating to permissible variations in field strength of the radiated signal for test purposes also specified in paragraph 3.6 (b), and those changes have been incorporated into the adopted standard.

One commentator stated that the proposed antenna polarization requirements of the proposed FAA standard should be considerably less if it is to apply to an installed antenna. Since the TSO standard covers only uninstalled antennas, the provision has been adopted as proposed. The FAA also does not agree with the commentator's suggestion that the standard be revised to avoid confusion with respect to the direction of horizontal polarization. The proposal is clear in this regard.

The need for the proposed antenna voltage standing wave ratio (VSWR) standard of paragraph 3.8 of the proposed FAA standard was questioned by a commentator since it could lead to increased equipment complexity and cost. The FAA does not agree. The performance of the system is dependent upon the equipment sensitivity, gain, and losses, the latter of which varies with VSWR. Any relaxation of the VSWR for the antenna over that proposed would require corresponding changes to the other standards and would be more likely to increase the equipment complexity and costs. It was also stated by the commentator that if the system is sensitive to VSWR, the system is too sensitive for reliable operations. All systems using antennas will be sensitive to VSWR conditions. However, a system meeting the proposed standards will not be overly sensitive. This same commentator also stated that it should be made clear whether or not the receiver to antenna transmission lines are covered in the VSWR standards. The FAA believes that aside from the need to provide a proper connection between the antenna and the equipment receiving the signal, transmission lines will not affect VSWR measurements. Consequently, there is no need for the requested clarification.

Another commentator questioned the value of the voltage standing wave ratio (VSWR) on the transmission line connecting the converter input and the signal source as specified in paragraph 3.9 of the proposed FAA standard. The commentator stated that the value of 1.7:1 could be increased to 2.2:1 with no adverse effect on system operation with a resultant decrease in equipment cost. The FAA agrees and paragraph 3.9 has been revised accordingly. In addition, the reference to receiver in the heading of this paragraph has been corrected to refer to converter input. Another change has been made to make the requirement of paragraph 3.9 applicable over the frequency range for which the equipment is designed rather than over the entire frequency band from 5000 MHz to 5250 MHz. Coverage of the entire frequency band is unnecessary.

One commentator stated that the antenna and transmission line characteristics of paragraphs 3.6 through 3.9 of the proposed FAA standard are ambiguous and should be either clarified or eliminated. The FAA does not agree. The paragraphs referenced by the commentator clearly concern antenna and converter impedances and not transmission line characteristics, and the FAA finds no ambiguity.

The same commentator stated that a specific antenna design was considered in the development of the TSO and that the antenna may be difficult or costly to install. The TSO being adopted contains minimum performance standards specifying antenna gain and coverage. While it is possible that some antennas may not meet these performance standards, any antenna meeting the standards would be acceptable. The FAA is aware of no data to indicate that complying antennas will be difficult or costly to install.

When subjected to the temperature variation tests under paragraph 4.5 of the FAA standard, it was proposed to permit a deterioration in the converter noise figure from 20 to 26 db. A commentator asserted that there was no need to permit a deterioration in the noise figure under this environmental condition, but that some deterioration in converter output stability should be allowed. Since the ISMLS equipment will perform satisfactorily with a less severe sensitivity requirement during the temperature variation test, the proposed requirement has not been changed in this regard. However, the recommendation to permit a deviation from the stability requirements during the temperature variation tests, will eliminate an unnecessary design restriction, and, therefore, proposed paragraph 4.5 has been revised to permit a frequency drift from ± 5 kHz to ± 7.5 kHz.

Two commentators stated that the degree of degradation in performance allowed under the low voltage condition of paragraph 4.7(a) of the proposed FAA standard should be defined. The FAA agrees, and a change has been made to specify limits for sensitivity and gain losses during the tests.

Paragraph 4.7(b)(2) of the proposed FAA standard has been revised to make it clear that paragraph 2.3 of the standard applies to the equipment after the test specified in paragraph 4.7(b)(1).

One commentator recommended that the proposed converter output signal strength requirement of paragraph 3.2 of the FAA standard be lower than specified in the notice to ensure that VHF/UHF ILS receivers will not be overloaded in service. The same commentator also suggested that an ILS switching requirement be added to the FAA standard. While the FAA believes the changes recommended by the commentator may be desirable, they can not be incorporated as a part of the new TSO within the scope of Notice 75-41. The FAA will consider the institution of additional rule making in this regard in the future.

This amendment is made under the authority of sections 313(a) and 601 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a) and 1421), and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

In consideration of the foregoing, Part 37 of the Federal Aviation Regulations is amended by adding a new § 37.203 to read as follows; effective November 26, 1976:

§ 37.203 Airborne interim standard microwave landing system converter equipment—TSO-C93.

(a) *Applicability.* This technical standard order prescribes the minimum performance standards that airborne interim standard microwave landing system converter equipment must meet in order to be identified with the applicable TSO marking. Equipment that is to be so identified must meet the requirements of the "Federal Aviation Administration Standard, Airborne Interim Standard Microwave Landing System Converter Equipment" set forth at the end of this section.

(b) *Environmental standards.* Radio Technical Commission for Aeronautics (RTCA) Document No. DO-138, titled "Environmental Conditions and Test Procedures for Airborne Electronic/Electrical Equipment and Instruments", dated June 27, 1968, including Change Number 2, dated October 29, 1969, or RTCA Document No. DO-160, dated February 28, 1975, having the same title, must be used to determine the environmental conditions over which the equipment has been designed to operate.

(c) *Markings.* In addition to the markings specified in § 37.7(d), the equipment must be marked as follows:

(1) The environmental categories over which it has been designed to operate, as set forth in Appendix B of RTCA Document DO-138 or Appendix A of RTCA Document DO-160 must be permanently and legibly marked on the equipment. Where an environmental test procedure is not applicable and the test is not conducted, an "X" must be placed in the space assigned for that category.

(2) Each separate component of the equipment must be permanently and legibly marked with at least the name of the manufacturer, model or part number, the TSO number, and the environmental categories over which it has been tested. Where an environmental test procedure described in DO-138 or DO-160 is not applicable to that component and the test is not conducted, an "X" must be placed in the space assigned for that environmental category.

(d) *Data requirements.* In accordance with § 37.5, the manufacturer must furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division (or in the case of the Western Region, the Chief, Aircraft Engineering Division), Federal Aviation Administration, in the region in which the manufacturer is located, one copy of the following technical data, except that additional copies must be furnished upon request:

(1) Manufacturer's operating instructions and equipment limitations.

(2) Installation procedures with applicable schematic drawings, wiring diagrams, and specifications. Any limitations, restrictions, or other conditions pertinent to the installation must be included.

(3) Manufacturer's test reports of the tests conducted to show compliance with the requirements of this TSO.

(4) Equipment data sheets specifying, within the prescribed range of environmental conditions, the actual performance of equipment of that type with respect to each performance factor prescribed in the standard. If RTCA Document No. DO-160 is used under paragraph (b) of this section, the data sheets must identify the paragraph of DO-160 used to show compliance with each of the requirements of paragraphs 4.1 through 4.10 of the standard set forth at the end of this section.

(5) A drawing list enumerating all the drawings and processes that are necessary to define the article design.

(e) *Data to be furnished with each manufactured unit.* A copy of the instructions specified in paragraphs (d)(1) and (d)(2) of this section must be furnished to each person receiving for use one or more articles manufactured under this TSO.

(f) *Availability of Documents.* RTCA Document Nos. DO-138, including Change Number 2, and DO-160 are incorporated herein in accordance with 5 U.S.C. 552(a)(1) and § 37.23 of the Federal Aviation Regulations and are available for inspection as indicated in § 37.23. Additionally, RTCA Document Nos. DO-138 and DO-160 may be examined at any FAA Regional Office of the Chief, Engineering and Manufacturing Branch (or in the case of the Western Region, the Chief, Aircraft Engineering Division). RTCA Document Nos. DO-138 and DO-160 may also be obtained from the RTCA Secretariat, Suite 655, 1717 H Street, NW., Washington, D.C. 20006, at a cost of $16.00 per copy for DO-138 and $20.00 per copy for DO-160.

FEDERAL AVIATION ADMINISTRATION STANDARD

AIRBORNE INTERIM STANDARD MICROWAVE LANDING SYSTEM CONVERTER EQUIPMENT

1.0 PURPOSE. This standard contains minimum performance and test requirements for Airborne Interim Standard Microwave Landing System Converter Equipment (Converter equipment).

2.0 GENERAL STANDARDS.

2.1 *Operation of Controls.* The operation of controls intended for use during flight must not, in any possible combination or sequence, result in a condition whose presence or continuation would be detrimental to the proper functioning of the equipment.

2.2 *Accessibility of Controls.* Controls not intended for in-flight adjustment must be located so as not to be readily accessible to flight personnel.

2.3 *Effects of Tests.* Except as expressly provided in this standard, the design of the equipment must be such that subsequent to the application of the specified tests no condition may exist which would be detrimental to the proper functioning of the equipment.

3.0 MINIMUM PERFORMANCE STANDARDS

UNDER STANDARD CONDITIONS. The equipment must be tested to show compliance with the following minimum performance requirements under standard conditions.

3.1 *Sensitivity*. The noise figure of the equipment must not be more than 20 db over the frequency range for which the equipment is designed.

NOTE: Maximum cable attenuations of 3db between the antenna and converter and 3db between the converter and ILS receivers were considered in developing this provision.

3.2 *Conversion Gain*. Input signals of not more than −54 dbm for localizer and −43 dbm for glide slope must produce outputs of at least −23 dbm for localizer and −17 dbm for glide slope. This standard must be met over the frequency range for which the equipment is designed.

3.3 *Spurious Response*. Spurious responses in the outputs must not exceed the values in the following table when input signals of −54 dbm for localizer and −43 dbm for glide slope are applied throughout the frequency bands specified.

Frequency Band (megahertz)	Response Limit Relative to Center Response (db)
0.09–4599.99	−60
4600–4899.99	−45
4900–4998.99	−30
4999–5249.99 *	−35
5250–5298.99	−40
5299–10,000	−60

* Exclusive of assigned input frequency band.

3.4 *Stability*. The frequency of the output must be within ±5 kHz of the assigned VHF localizer/UHF glide slope frequencies when assigned microwave frequencies are applied throughout the frequency range for which the equipment is designed.

3.5 *Intermodulation*. When equal level two-tone test signals within the bands 5,000 MHz to 5,030 MHz for localizer and 5,220 MHz to 5,250 MHz for glide slope are applied at input signal levels of −54 dbm for localizer and −43 dbm for glide slope, intermodulation products must be down at least 30 db from the desired output signals.

3.6 *Antenna Efficiency*.—(a) Over the frequency band from 5,000 MHz to 5,250 MHz, the desired component of the radiated signal in the forward direction must be at least +8.5 db when compared to an isotropic source.

(b) At any frequency from 5,000 MHz to 5,250 MHz, the desired component of the radiated signal must not be less than 0 db when compared to an isotropic source at any point in the principal horizontal plane from 60 degrees left to 60 degrees right of directly forward of the antenna nor less than 5.5 db above an isotropic source at any point in the principal elevation plan from 17.5 degrees below to 17.5 degrees above directly forward of the antenna.

3.7 *Antenna Polarization*. Over the frequency range from 5,000 MHz to 5,250 MHz, the reception of signals with horizontal (H plane) polarization from the forward direction with respect to the antenna must be at least 20 db below the reception of signals with the vertical (E plane) polarization from the same direction.

3.8 *Voltage Standing Wave Ratio (Antenna)*. The voltage standing wave ratio on the transmission line connecting the antenna and a signal source may not exceed a value of 1.7:1 over the frequency range from 5,000 MHz to 5,250 MHz.

3.9 *Voltage Standing Wave Ratio (Converter Input)*. The voltage standing wave ratio on the transmission line connecting the receiver and a signal source may not exceed a value of 1.7:1 over the frequency range for which the equipment is designed.

4.0 MINIMUM PERFORMANCE REQUIREMENTS UNDER ENVIRONMENTAL CONDITIONS. The equipment must be tested to show compliance with the following minimum performance requirements under environmental conditions. Unless otherwise specified in this standard, the measurement procedures applicable to a determination of the performance of the equipment under the environmental conditions specified are those set forth in either RTCA Document DO-138 titled "Environmental Conditions and Test Procedures for Electronic/Electrical Equipment and Instruments" dated June 27, 1968, including Change Number 2, dated October 29, 1969, or RTCA Document No. 160 dated February 28, 1975, having the same title. Performance testing may be done following a series of environmental exposures. However, the order of tests must be in accordance with paragraph 3.2 of Document Nos. DO-138 or DO-160.

4.1 *Temperature—Altitude*.—(a) *Low Temperature*.—(1) When the equipment is subjected to this environment, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met. All mechanical devices must perform their intended functions.

(2) After subjection to this environment, the requirements of paragraph 3.8 of this standard must be met.

(b) *High Temperature*.—(1) When operated at the High Short-Time Operating Temperature, the equipment must operate both electrically and mechanically.

(2) When the equipment is exposed to the High Operating Temperature, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

(3) After the equipment is subjected to the environments specified in subparagraphs (1) and (2) of this paragraph, the requirements of paragraph 3.8 of this standard must be met.

(c) *Altitude*.—(1) When the equipment is subjected to this environment, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

(2) After subjection to this environment, the requirements of paragraph 3.8 of this standard must be met.

4.2 *Humidity*.—After subjection to the humidity environment and—

(a) Within 15 minutes after the time primary power is applied, the noise figure may not be more than 26 db; and

(b) Within 4 hours from the time primary power is applied, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

4.3 *Shock*.—(a) Following the application of the operational shocks, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

(b) The equipment must remain in its mounting, and no part of the equipment or its mounting may become detached and free of the shock test table or the equipment under test during or following the application of the crash safety shocks. Paragraph 2.3 of this standard does not apply to the crash safety shock environment.

4.4 *Vibration*.—(a) When the equipment is subjected to this environment the requirements of paragraph 3.2 of this standard must be met.

(b) After subjection to this environment, the requirements of paragraphs 3.1, 3.2, 3.4, and 3.8 of this standard must be met.

4.5 *Temperature Variation*. When subjected to this environment—

(a) The noise figure may not be more than 26 db;

(b) The requirements of paragraph 3.2 of this standard must be met; and

(c) The stability requirement of paragraph 3.4 of this standard must be met within ±2.5 kHz (7.5 kHz total).

4.6 *Electrical Input Variation*. When subjected to this environment, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

4.7 *Low Voltage*.—(a) *AC and DC Equipment*. When the primary power voltages of DC operated equipment is 80 percent of the design voltages, and when that of AC operated equipment is 87½ percent of the design voltages, the equipment must operate both mechanically and electrically, the requirements of paragraph 3.1 of this standard must be met within 3 db, and the signal output requirements of paragraph 3.2 of this standard must be met within 3 db.

(b) *DC Equipment*.—(1) DC operated equipment must meet the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard within 2 minutes after the primary power voltages are returned to the design voltages after operating at 50 percent of the design voltages for at least 10 minutes.

(2) The reduction of the primary power voltages of DC operated equipment from 50 percent of design voltages to zero volts may not produce fire or smoke. Paragraph 2.3 of this standard does not apply after the exposure to zero volts.

4.8 *Conducted Voltage Transients*.—(a) *DC Equipment*.—(1) *Intermittent Transients*. Following the application of the intermittent transients, the requirements of paragraphs 3.1, 3.2, and 3.4 of this standard must be met.

(2) *Repetitive Transients*. While the repetitive transients are being applied, the requirements of paragraph 3.1 of this standard must be met.

(b) *AC Equipment*. While the transients are being applied, the requirements of paragraph 3.1 of this standard must be met.

4.9 *Radio-Frequency Susceptibility*. When subjected to this environment, the requirements of paragraph 3.1 of this standard must be met.

4.10 *Emission of Spurious Radio Frequency Energy*. The levels of conducted and radiated spurious radio frequency energy emitted by the equipment may not exceed those levels specified in Appendix A to RTCA Document No. DO-138 or paragraph 21 of Document No. DO-160.

The Federal Aviation Administration has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

Issued in Washington, D.C., on October 18, 1976.

R. P. SKULLY,
Director,
Flight Standards Service.

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Docket No. 15264; Amdt. No. 37-41]

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

Airborne Interim Standard Microwave Landing System Converter Equipment

Correction

In FR Doc. 76-31195 appearing at page 46843 of the issue for Tuesday, October 26, 1976, in the second full paragraph in the third column, page 46844, in the thirteenth line insert the following between the words "band" and "response": "be increased from −100db to −60db. An increase in the lower frequency band".

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Docket No. 15264] 37-41

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

Airborne Interim Standard Microwave Landing System Converter Equipment; Correction

A document amending Part 37 of the Federal Aviation Regulations by adding a new Technical Standard Order (TSO) concerning Airborne Interim Standard Microwave Landing System Converter Equipment (TSO–C93, § 37.203) was published in the FEDERAL REGISTER on October 26, 1976, (41 FR 46843; FR Doc. 76–31195). The preamble of the amendment indicated that the voltage standing wave ratio specified in paragraph 3.9 of the Federal Aviation Standard contained in the TSO was changed from the 1.7:1 originally proposed to 2.2:1. This intended change inadvertently was not reflected in the rule.

Therefore, that document (41 FR 46843; FR Doc. 76–31195) is corrected by striking the number "1.7:1" in paragraph 3.9 of the Federal Aviation Standard contained at the end of § 37.203 and inserting the number "2.2:1" in its place.

Issued in Washington, D.C., on December 27, 1976.

WILLIAM J. SULLIVAN,
Acting Director,
Flight Standards Service.

[FR Doc.76–38479 Filed 12–30–76;8:45 am]

FS 75-107-RT