English Translation Version for Reference Only

Number：CTSO-C158
Date of approval：Sep 13, 2018
Approved by：Xu Chaoqun

China Civil Aviation Technical Standard Order

This China Civil Aviation Technical Standard Order (CTSO) is issued according to Part 37 of the China Civil Aviation Regulations (CCAR-37). Each CTSO is a criterion which the concerned aeronautical materials, parts or appliances used on civil aircraft must comply with when it is presented for airworthiness certification.

Aeronautical Mobile High Frequency Data Link (HFDL) Equipment

1. Purpose.

This China Civil Aviation Technical Standard Order (CTSO) is for manufacturers applying for Aeronautical Mobile High Frequency Data Link (HFDL) communications equipment CTSO authorization (CTSOA). This CTSO prescribes the minimum performance standards(MPS) that HFDL systems and equipment must first meet for approval and identification with the applicable CTSO marking.

2. Applicability.

This CTSO affects new application submitted after its effective date. Major design changes to article approved under this CTSO will require a new authorization in accordance with section 21.353 of CCAR-21R4.

3. Requirements.

New models of HFDL systems and equipment that are to be so

identified and that are manufactured on or after the effective date of this CTSO must meet the Minimum Performance Standards (MPS) set forth in RTCA document No. (RTCA/DO)-265, “Minimum Operational Performance Standards For Aeronautical Mobile High frequency Data Link (HFDL)”, Section 2, dated December 14, 2000.

a. Functionality. The standards of this CTSO apply to equipment intended to provide worldwide data communications directly between aircraft sub networks and ground sub networks via High Frequency (HF) radio and HF ground stations. HFDL equipment will support data communication between aircraft users and ground-based users, such as Air Route Traffic Control Centers (ARTCCs) and aircraft operators. HFDL communication services include three categories: Air Traffic Services (ATS), Aircraft Operational Control (AOC), and Aeronautical Administrative Communications (AAC).

b. Failure Condition Classification. Failure of the function defined in paragraphs 3. and 3.a. of this CTSO is at least a minor failure condition, and the applicant must develop the system to at least the design assurance level commensurate with this failure condition classification.

c. Functional Qualification. The required performance shall be demonstrated under the test conditions set forth in RTCA/DO-265 “Minimum Operational Performance Standards For Aeronautical Mobile High frequency Data Link (HFDL)”, Section 2, dated December 14,

2000.

d. Environmental Qualification. Demonstrate the required performance under the test conditions specified in RTCA/DO-160E, titled Environmental Conditions and Test Procedures for Airborne Equipment, using standard environmental conditions and test procedures appropriate for airborne equipment. The applicable environmental performance requirements used during the environmental test procedures are in RTCA/DO-265, Section 2.3.

Note: The use of RTCA/DO-160D (with Changes 1 and 2 only, incorporated) or earlier versions is generally not considered appropriate and will require substantiation via the deviation process as discussed in paragraph 3.f of this CTSO.

e. Software Qualification. If the article includes software, develop the software according to RTCA/DO-178B, “Software Considerations in Airborne Systems and Equipment Certification,” dated December 1, 1992.

f. Deviations. For using alternative or equivalent means of compliance to the criteria in this CTSO, the applicant must show that the equipment maintains an equivalent level of safety. Apply for a deviation under the provision of 21.368(a) in CCAR-21R4.

4. Marking.

a. Mark at least one major component permanently and legibly with all the information in 21.423(b) of CCAR-21R4.

b. Also, mark the following permanently and legibly, with at least the manufacturer's name, subassembly part number, and the CTSO number:

(1) Each component that is easily removable (without hand tools);

(2) Each interchangeable element;

(3) Each subassembly of the article that manufacturer determined may be interchangeable.

c. If the component includes software, then the part number must include hardware and software identification. The part numbering scheme can use a separate part number for hardware and software. Either way, the applicant must include a means to show the modification status.

Note: Similar software versions, approved to different software levels must be differentiated by part number.

d. When applicable, identify the equipment as an incomplete system or that the appliance performs functions beyond that described in paragraphs 3 and 3a of this CTSO.

5. Application Data Requirements.

The applicant must furnish the responsible certification personnel

with the related data to support design and production approval. The application data include a statement of conformance as specified in section 21.353(a)(1) in CCAR-21R4 and one copy each of the following technical data:

a. Operating instructions and equipment limitations, sufficient to describe the equipment's operational capability.

b. Installation procedures and limitations, sufficient to ensure that the HFDL communication equipment, when installed according to the installation procedures, still meets this CTSO's requirements. The limitations must identify any unique aspects of the installation. Finally, the limitations must include a note with the following statement:

"This article meets the minimum performance and quality control standards required by a CTSO. Installation of this article requires separate approval."

c. If the appliance is an incomplete or multi-use system. Describe the functions that the appliance is intended to provide.

d. The hardware and software design assurance requirements may vary, depending on equipment installation guidelines. The equipment manufacturer should identify the hardware and software design assurance for qualified equipment in the Installation Manual (IM) or Component Maintenance Manual (CMM), or both.

e. Schematic drawings as applicable to the installation procedures.

f. Wiring diagrams as applicable to the installation procedures.

g. Equipment specifications.

h. List of components, by part number, that makes up the HFDL communications equipment that complies with the standards in this CTSO. Manufacturers should include vendor part number cross-references, when applicable.

i. A CMM, covering periodic maintenance, calibration and repair, for the continued airworthiness of installed equipment. Instructions should include recommended inspection intervals and service life. Details of deviations and limitations, as noted in paragraph 5a and 5b of this CTSO, may also be described in the CMM, IM or both.

j. The quality system description required by section 21.358 of CCAR-21R4, including functional test specifications. This system tests each production article to ensure compliance with this CTSO.

k. Manufacturer's CTSO qualification test report.

l. Nameplate drawing with the information required by paragraph 4 of this CTSO.

m. A list of all drawings and processes (including revision level), to define the article’s design. For a minor change, follow the directions in 21.369 of CCAR-21R4. Show any revisions to the drawing list on CAAC request.

n. An environmental qualifications form as described in

RTCA/DO-160E for each component of the system.

o. If the article includes software: a Plan for Software Aspects of Certification (PSAC); Software Configuration Index; and Software Accomplishment Summary. It is recommended that the applicant submit the PSAC early in the software development process. Early submittal allows us to quickly resolve issues, such as partitioning and determination of software levels.

6. Manufacturer Data Requirements.

Besides the data given directly to the authorities, have the following technical data available for review by the authorities:

a. The functional qualification specifications for qualifying each production article to ensure compliance with this CTSO.

b. Equipment calibration procedures.

c. Corrective maintenance procedures within 12 months after CTSO authorization.

d. Schematic drawings.

e. Wiring diagrams.

f. The results of the environmental qualification tests conducted per RTCA/DO-160E.

g. If the article includes software, the appropriate documentation defined in RTCA/DO-178B, including all data supporting the applicable

objectives in Annex A of RTCA/DO-178B, Process Objectives and Outputs by Software Level.

7. Furnished Data Requirements.

a. One copy of the technical data and information specified in paragraphs 5a through 5o of this CTSO. Add any other data necessary for the proper installation, certification and use, or for continued airworthiness, or both of the Aeronautical Mobile High Frequency Data Link (HFDL) equipment.

b. If the appliance accomplishes any additional functions beyond that described in paragraphs 3 and 3a of this CTSO, then a copy of the data and information specified in paragraphs 5a through 5o must also go to each person receiving for use one or more articles manufactured under this CTSO.

8. Availability of Referenced Documents.

Order RTCA documents from:

Radio Technical Commission for Aeronautics, Inc.

1150 18th Street NW, Suite 910, Washington D.C. 20036.

You may also order them online from www.rtca.org.