



Number: CTSO-C139

Date of approval: Sep 19, 2011

Approved by: Yin Shijun

## China Civil Aviation Technical Standard Order

This technical standard order is issued according to Part 37 of the Chinese 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.

### AIRCRAFT AUDIO SYSTEMS AND EQUIPMENT

#### **1. Applicability**

**(1) Minimum Performance Standard.** This CTSO is the minimum performance standard that aircraft audio system and equipment must meet for approval and identification with the applicable CTSO marking. New models of audio equipment identified and manufactured on or after the effective date of this TSO must meet the MPS in Section 2 of RTCA/DO-214, Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment (March, 1993). CTSO-C50c, Audio Selector Panels and Amplifiers, CTSO-C57a, Headsets and Speakers, and CTSO-C58a, Aircraft Microphones(Except Carbon) are canceled after publishing this CTSO-C139.

**(2) Failure Condition Classification.** Failure of the intended function is a major failure condition. Develop audio systems and

equipment to at least the design assurance level for this failure condition.

**(3) Environmental Qualification.** RTCA/DO-160E, Environmental Conditions and Test Procedures for Airborne Equipment, dated December 9, 2004.

**(4) Software Qualification.** If the article includes a digital computer, develop the software following RTCA/DO-178B, Software Considerations in Airborne Systems and Equipment Certification, dated December 1, 1992. The applicant must submit the applicable software data under DO-178 for CAAC approval.

**(5) Complex Electronic Hardware (CEH).** If the hardware element contains programmable hardware with safety assurance level of C, D, or E, evaluate the hardware by test and analysis, or by demonstrating compliance with RTCA/DO-254, Design Assurance Guidance for Airborne Electronic Hardware, dated April 19, 2000. If the hardware element contains programmable hardware with a safety assurance level of A or B, the electronic hardware must demonstrate compliance with RTCA/DO-254.

**(6) Deviations.** For using alternative or equivalent means of compliance to the criteria in this TSO. If the applicant use these methods, the applicant must show that the equipment maintains an equivalent level of safety.

## **2. Marking**

Besides all the CTSO marking information in CCAR-21 , mark the following permanently and legibly.

(1) Each major component must include hardware (and software) identification which may show the modification status of hardware (and software).

(2) Software level.

## **3. Data Requirements.**

(1) Besides all the required CTSO data in CCAR-21, the applicant must give the following data for approval.

(i) Operating instructions and equipment limitations;

(ii) Installation procedures and limitations;

(iii) Schematic drawings of the installation procedures;

(iv) Wiring diagrams of the installation procedures;

(v) Technical and design specifications;

(vi) List of the components (by part number) that make up the audio system;

(vii) An environmental qualifications form as required in RTCA/DO-160E;

(viii) Manufacturer's CTSO qualification test report;

(ix) Nameplate drawing;

(x) Software certification data (determined by software levels) as

required in DO-178B.

(2) The following data must also be prepared for review by civil aviation authority.

- (i) List of all drawing and process that define the article's design;
- (ii) Functional qualification specifications for qualifying each production article to ensure compliance with this CTSO;
- (iii) Equipment calibration procedures;
- (iv) Corrective maintenance procedures within 12 months after CTSO;
- (v) Schematic drawings;
- (vi) Wiring diagrams;
- (vii) The results of the environmental qualification tests conducted following RTCA/DO-160E.

(3) If furnishing one or more articles manufactured to operator, provide the following data.

- (i) The data in paragraph 3.(1).(i)through 3.(1).(vii);
- (ii) Any other data needed for continued airworthiness, such as instructions for periodic maintenance and calibration;
- (iii) A note with the following statement "The conditions and tests required for CTSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type of class of aircraft to determine that the

aircraft installation conditions are within the CTSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by civil aviation authority.”

#### **4. Availability of Reference Documents.**

Copies of RTCA Documents may be purchased from RTCA Inc., 1828 L Street NW, Suite 805, Washington DC 20036-4001, Telephone (202) 833-9339, fax (202) 833-9434. You may also order them online from the RTCA Internet website at [www.rtca.org](http://www.rtca.org).