



Number: CTSO-C137a

Date of approval: Jan 14, 2019

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.

Aircraft Portable Megaphones

1. Purpose.

This China Civil Aviation Technical Standard Order (CTSO) is for manufacturers applying for aircraft portable megaphones CTSO authorization (CTSOA). This CTSO prescribes the minimum performance standards (MPS) that aircraft portable megaphones 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-21-R4.

3. Requirements

New models of aircraft portable megaphones identified and manufactured on or after the effective date of this CTSO must meet the

MPS qualification and documentation requirements in SAE International's Aerospace Standard (AS) 4950B, Design and Performance Criteria for Transport Aircraft Portable Megaphones, dated March 2007, as modified by appendix 1 of this CTSO.

a. 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 standards appropriate for aircraft portable megaphones are specified in SAE AS 4950B, Section 5.

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.b of this CTSO.

b. 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. The marking must

include the serial number, except for the following:

(1) 21.423(b)(2) of CCAR-21R4. Use the name, type, and part number. Do not use the optional model number;

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);
and,

(2) Each interchangeable element; and,

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

c. Identifying deviations granted to the article by marking "Deviation. See installation/instruction manual (IM)" after the CTSO number.

d. Optional marking is permitted to allow aircraft-specific or operational-specific installation limitations, such as: "FOR USE ON {insert aircraft type or serial number} ONLY", "FOR USE ON AIRCRAFT USED IN PART {insert number} OPERATIONS ONLY" or "SEE DRAWING NO. {insert number} FOR INSTALLATION LIMITATIONS".

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-21-R4 and one copy each of the following technical data:

a. A Manual(s) containing the following:

(1) Operating instructions and equipment limitations sufficient to describe the equipment's operational capability.

(2) Describe in detail any deviations.

(3) Installation procedures and limitations sufficient to ensure that aircraft portable megaphones, when installed according to the installation or operational procedures, still meet this CTSO's requirements. Limitations must identify any unique aspects of the installation. 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.”

(4) For each unique configuration of software and airborne electronic hardware, reference the following:

(i) Software part number including revision and design assurance level;

(ii) Airborne electronic hardware part number including revision and design assurance level;

(iii) Functional description.

(5) A summary of the test conditions used for environmental qualifications for each component of the article. For example, a form as described in RTCA/DO-160E, Environmental Conditions and Test Procedures for Airborne Equipment, Appendix A.

(6) Schematic drawings, wiring diagrams, and any other documentation necessary for installation of aircraft portable megaphones.

(7) List of replaceable components, by part number, that makes up aircraft portable megaphones. Include vendor part number cross-references, when applicable.

b. Instructions covering periodic maintenance, calibration, and repair, for the continued airworthiness of aircraft portable megaphones. Include recommended inspection intervals and service life, as appropriate.

c. A drawing depicting how the article will be marked with the information required by paragraph 4 of this CTSO.

d. Identify functionality or performance contained in the article not evaluated under paragraph 3 of this CTSO (that is, non-CTSO functions). Non-CTSO functions are accepted in parallel with the CTSO authorization. For those non-CTSO functions to be accepted, the applicant must declare these functions and include the following

information with CTSO application:

(1) Description of the non-CTSO function(s), such as performance specifications, failure condition classifications, software, hardware, and environmental qualification levels. Include a statement confirming that the non-CTSO function(s) don't interfere with the article's compliance with the requirements of paragraph 3.

(2) Installation procedures and limitations sufficient to ensure that the non-CTSO function(s) meets the declared functions and performance specification(s) described in paragraph 5.d.(1).

(3) Instructions for continued performance applicable to the non-CTSO function(s) described in paragraph 5.d.(1).

(4) Interface requirements and applicable installation test procedures to ensure compliance with the performance data defined in paragraph 5.d.(1).

(5) Test plans, analysis and results, as appropriate, to verify that performance of the hosting CTSO article is not affected by the non-CTSO function(s).

(6) Test plans, analysis and results, as appropriate, to verify the function and performance of the non-CTSO function(s) as described in paragraph 5.d.(1).

e. The quality system description required by section 21.358 of CCAR-21R4, including functional test specifications. The quality system

should ensure that it will detect any change to the approved design that could adversely affect compliance with the CTSO MPS, and reject the article accordingly.

f. Material and process specifications list.

g. List of all drawings and processes (including revision level) that define the article's design.

h. Manufacturer's CTSO qualification report showing results of testing accomplished according to paragraph 3.a of this CTSO.

6. Manufacturer Data Requirements.

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

a. 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 CTSOA.

d. Schematic drawings.

e. Wiring diagrams.

f. Material and process specifications.

g. The results of the environmental qualification tests conducted according to paragraph 3.a of this CTSO.

h. If the article contains non-CTSO function(s), the applicant must also make available items 6.a through 6.g as they pertain to the non-CTSO function(s).

7. Furnished Data Requirements.

a. If furnishing one or more articles manufactured under this CTSO to one entity (such as an operator or repair station), provide one copy or technical data and information specified in paragraphs 5.a and 5.b of this CTSO. Add any data needed for the proper installation, certification, use, or for continued compliance with the CTSO, of aircraft portable megaphones.

b. If the article contains declared non-CTSO function(s), include one copy of the data in paragraphs 5.d.(1) through 5.d.(4).

8. Availability of Referenced Documents.

a. Order SAE documents from:

Society of Automotive Engineers, Inc.

400 Commonwealth Drive, WARRENDALE, PA 15096-001, USA

You may also order them online from the SAE Internet website at:

www.sae.org.

b. Order RTCA documents from:

Radio Technical Commission for Aeronautics, Inc.

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

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You may also order them online from the RTCA Internet website at:

www.rtca.org.

Appendix 1. Modifications of SAE AS 4950B for Minimum Performance
Standards for Aircraft Portable Megaphones

This appendix prescribes the MPS for aircraft portable megaphones. The applicable standard is SAE AS 4950B, Design and Performance Criteria for Transport Aircraft Portable Megaphones, dated March 2007.

We modified it as follows

SAE AS 4950 citation:	CAAC modification:
Section 1, SCOPE	Disregard
Section 2, REFERENCES	Disregard
Paragraph 2.1.1 and elsewhere	Change all references from RTCA/DO-160D to RTCA/DO-160E.
Paragraph 3.4.1	Revise to read: “Except small parts like knobs, triggers, fasteners, seals, and electrical parts that won’t contribute significantly to the propagation of a fire, materials including packaging must comply with CCAR-21R4 25.853(a) and Appendix F, Part I(a)(1)(iv).”
Paragraph 3.8	Revise to read: “The megaphone power source must be self-contained, with no external electrical connections. An external indicator of power source status is desirable. Manufacturers must provide a defined service life for the power source, or a means to show or test the power source status.”
(new) Paragraph 3.8.1	If lithium batteries are used, they must meet the requirements of: <ul style="list-style-type: none"> ● CTSO-C142a, Non-Rechargeable Lithium Cells and Batteries, which cites RTCA/DO-277, Minimum Operational Performance Standards for Lithium Batteries, or ● CTSO-C179, Permanently Installed

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	Rechargeable Lithium Cells, Batteries and Battery Systems, which cites Underwriters Laboratories' publication UL 1642, Standard for Safety for Lithium Batteries
Paragraph 3.12	Revise to add: "Mark the article according to paragraph 4 of this CTSO."
Section 6, DATA REQUIREMENTS	Disregard. Requirements are contained in paragraphs 5 and 6 of this CTSO.
Section 7, NOTES	Disregard