



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Engine & Propeller Directorate

Boston Aircraft Certification Office  
12 New England Executive Park  
Burlington, MA 01803-5299

**MAR 03 2014**

In reply refer to: 2014-0468

Mr. Markus Görnemann  
Certification Manager Parts & Appliances Section  
European Aviation Safety Agency (EASA)  
Postfach 10 12 53  
D-50452 Cologne  
Germany

Dear Mr. Görnemann:

Subject: LODA Application AFO/nru/C1(5)/2014/(D)/51029

This letter supersedes TP/sn/10/17/2012-626 dated October 18, 2012, and is in response to EASA's subject request for the holder name change and for the addition of an open brackets part number convention in order to more easily accommodate minor changes.

This is in reply to f.u.n.k.e. AVIONICS GmbH application dated February 14, 2014, for Technical Standard Order (TSO) design approval. We acknowledge our receipt of EASA letter AFO/nru/C1(5)/2014/(D)/51029, dated February 27, 2014, stating that the article complies with the requirements of TSO-C112c, and that EASA assumes responsibility for oversight of the production of the article. We accept f.u.n.k.e. AVIONICS GmbH statement certifying, in accordance with 14 CFR 21.621, that Mode-S Transponder listed below complies with the requirements of TSO-C112c, and 14 CFR part 21 subpart O.

Based on the EASA certifying statement, we accept f.u.n.k.e. AVIONICS GmbH TSO design approval to include the Mode-S Transponder article listed below for manufacture at f.u.n.k.e. AVIONICS GmbH located at Heinz-Strachowitz-Str. 4, D-86807 Buchloe, Germany.

Approved Part Number	Description
800ATC-H-(XXX)-(XXX) Except: -(XXX)-(0XX) -(XXX)-(1XX) -(XXX)-(20X) -(XXX)-(3XX) -(XXX)-(R00)	Mode-S Transponder

This letter of TSO design approval (LODA), together with the EASA certificate of airworthiness for export, authorizes f.u.n.k.e. AVIONICS GmbH to identify the Mode-S

Transponder article with the TSO marking requirements described in 14 CFR § 45.15(b) and in TSO-C112c. We issue the LODA in accordance with 14 CFR 21.621 governing issuance of TSO design approval for import articles. Each item must be accompanied by a certificate of airworthiness for export issued by the EASA or a duly authorized designee/organization (14 CFR 21.502(a)).

f.u.n.k.e. AVIONICS GmbH must furnish the following statement to the original owner or installer of each article or multiple articles, if furnished to one source:

The conditions and tests required for TSO approval of this article are minimum performance standards. Those installing this article either on or within a specific type or class of aircraft must determine that the aircraft installation conditions are within the TSO standards which include any accepted integrated non-TSO function standards. TSO articles and any accepted integrated non-TSO function(s) must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 or the applicable airworthiness requirements.

Approved deviations granted under the provisions of 14 CFR 21.618:  
See Table 1.

Table 1 - Deviation Response

Index #	TSO Standard	Requirement	Deviation Request	Request Granted/ Denied	Comments to Request
1	TSO-C112d/RTCA/DO-181E	Version called out by TSO: TSO-C112d is the most current TSO.	Use of FAA TSO-C112c in lieu of FAA TSO-C112d. Please see EASA letter explaining delay in submitting the LODA beyond the 6 month transition period due date of December 06, 2011.	Granted	This office agrees with the use of TSO-C112c in this case. This use meets the intent of the TSO and has no additional effect on ELOS.
2	TSO-C112d/RTCA/DO-181E	Section 3.b. Failure Condition Classification: Use of Design Assurance Level (DAL) C (Major). (Funkwerk: Software was developed to DO-178B Assurance Level D instead of C.)	2. DO-1788 DAL 'D' instead of DAL 'C' The TRT800H cannot be used as an ADS-B transponder in the FAA National Airspace. If a GPS source is connected, the ADS-B information broadcasted by the transponder has the Navigation Integrity Category (NIC) always set to 0 (zero), indicating that the position may not be used for surveillance purposes. Without ADS-B, the transponder only provides basic Mode A/C transponder functionality in the FAA National Airspace for which the failure classification according to AC 23.1309-IE is MINOR. We thus believe that the level of safety provided by DAL 'D' meets the FAA requirements.	Granted with limitation	The proper DAL of major is specified in TSO-C112d. The use of this transponder has these limitations to protect the ELOS: It cannot be used as an ADS-B transponder and cannot be connected to any GPS source. Any upgrade to the radio requires DAL C compliance.
3	TSO-C112d/RTCA/DO-181E	Section 3.d. Environmental Qualification: Use of RTCA/DO-160F. (Funkwerk: DO-160D was applied instead of DO-160F for qualification testing.)	DO-160D instead of DO-160F The environmental qualification was performed according to RTCA DO-160D whereas the TSO references DO-160F. At the time of ETSO qualification, DO-160D was the latest version of the standard. According to FAA AC 21-16G. "The FAA has determined that versions D,E, F, and G provide an equivalent level of safety (ELOS) when the applicable version is identified in the Environmental Qualification Form (EQF)". Since the transponder will not be installed in locations where HIRF will be an issue, we believe that the qualification to DO-160D provides an equivalent level of safety.	Granted	A comparison of RTCA/DO-181D Section 2.3 Table 2-11 to Funkwerk's environmental testing results finds compliance with FAA TSO-C112c Section 3.d. Environmental Qualification. Therefore, the Boston ACO has no concern with omitted tests.

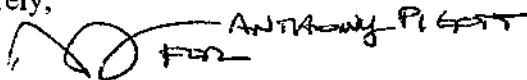
This LODA, issued under 14 CFR 21.621, is effective until surrendered, withdrawn or otherwise terminated by the FAA under the provisions of 14 CFR 21.613. You, as the holder of this LODA, may not transfer it as stated in 14 CFR 21.614. The EASA airworthiness certification and production surveillance is essential in establishing and maintaining that these articles meet TSO-C112c. With notice, we may withdraw this LODA if we find articles are not in compliance with the applicable TSO under the provisions of 14 CFR 21.2.

Without further FAA approval, we don't allow f.u.n.k.e. AVIONICS GmbH to mark articles if the company's name, address, or ownership changes. f.u.n.k.e. AVIONICS GmbH must notify the FAA through the EASA of proposed company name, address, or ownership changes.

Please note that technical data the FAA retains may be subject to Freedom of Information Act (FOIA) request. This office will notify f.u.n.k.e. AVIONICS GmbH of any request(s) pertaining to their data and give them the opportunity to protect the data from public disclosure.

If there are any questions, please feel free to have your staff contact Mr. Tony Pigott at (781) 238-7158.

Sincerely,

A handwritten signature in black ink, appearing to read "Anthony Pigott". The signature is written in a cursive style with a large initial "A".

Robert G. Mann  
Manager, Boston Aircraft Certification Office, ANE-150