

European Aviation Safety Agency

European Technical Standard Order (ETSO)

Subject: STAND ALONE AIRBORNE NAVIGATION EQUIPMENT USING THE GLOBAL POSITIONING SYSTEM AUGMENTED BY THE SATELLITE BASED AUGMENTATION SYSTEM

1 – Applicability

This ETSO gives the requirements which new models of stand alone airborne navigation equipment using the Global Positioning System (GPS) augmented by the Satellite Based Augmentation System that are manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.

2 - Procedures

2.1. - General

Applicable procedures are detailed in CS-ETSO Subpart A.

2.2 - Specific

None

3 - Technical Conditions

3.1 - Basic

3.1.1 - Minimum Performance Standard

Standards set forth for functional equipment Class Gamma or Delta in RTCA document DO-229D, *Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment*, dated December 13 2006, Section 2, except as modified by **Appendix 1** of this ETSO.

Classes Gamma and Delta equipment are defined in DO-229D, Section 1.4.

3.1.2 - Environmental Standard

See CS-ETSO Subpart A paragraph 2.1

3.1.3 - Computer Software

See CS-ETSO Subpart A paragraph 2.2

3.1.4 Electronic Hardware Qualification.

See CS-ETSO Subpart A paragraph 2.3

3.2 - Specific

3.2.1 Failure Condition Classification

See CS-ETSO Subpart A paragraph 2.4.

Failure of the function defined in paragraph 3.1.1 of this ETSO is a:

- *Major* failure condition for loss of function and malfunction of en route, terminal, approach lateral navigation (LNAV), and approach LNAV/vertical navigation (VNAV) position data,
- *Major* failure condition for loss of function of approach localiser performance without vertical guidance (LP), and approach localiser performance with vertical guidance (LPV) position data, and
- *Hazardous* failure condition for malfunction of approach (LP and LPV) position data.

3.3. - Functional qualifications.

None

4 - Marking

4.1 - General

Marking is detailed in CS-ETSO Subpart A paragraph 1.2

4.2 – Specific

At least one major component must be permanently and legibly marked with the operational equipment class as defined in Section 1.4.2 of RTCA document DO-229D (e.g., Class 2). A marking of Class 4 indicates compliance to Delta-4 requirements. The functional equipment class defined in Section 1.4.1 of RTCA document DO-229D (e.g. Gamma, Delta) is not required to be marked.

It is sufficient to declare the proper functional equipment class in the DDP.

5 - Availability of Referenced Document

See CS-ETSO Subpart A paragraph 3.

APPENDIX 1

MPS for stand-alone airborne navigation equipment using GPS augmented by SBAS

1. This appendix prescribes modifications to the MPS for functional equipment class Gamma found in RTCA document DO-229D, Section 2. Gamma operational Class 3 and Delta operational Class 4 equipment already complies with the MPS changes below. These MPS changes apply for operational Class 1 or Class 2 equipment only.

a Section 2.5

Section 2.5.6.1, Scenario #1, Step 3)

Change step 3) to read: "Broadband external interference noise ($I_{Ext, Test}$) of spectral density equal to -170.5 dBm/Hz at the antenna port."

Section 2.5.6.1, Scenario #2, Step 4)

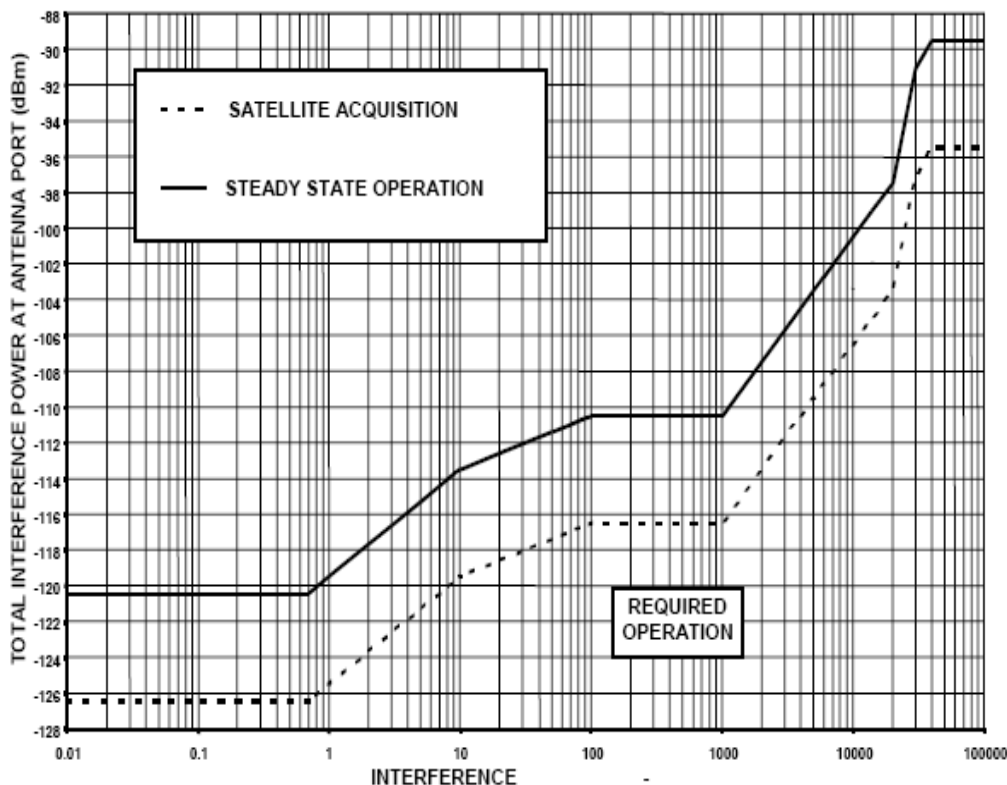
Change step 4) to read: "Broadband external interference noise ($I_{Ext, Test}$) of spectral density equal to -170.5 dBm/Hz at the antenna port."

Section 2.5.8.2, Requirement 1), Item a)

Change item a) to read: "The broadband external interference noise ($I_{Ext, Test}$) of spectral density equal to -170.5 dBm/Hz at the antenna port."

b Appendix C, Figure C-2, In-Band and Near-Band Interference Environments

Replace Figure C-2 with the following:



c Appendix C, Section C.2.2

Change the first paragraph to read:

The baseline in-band and near-band interference environments apply to steady-state operation. For initial acquisition of the GPS and SBAS signals prior to steady-state navigation, the in-band and near-band interference levels are 6 dB less than those for steady-state operation. The interference bandwidth is the 3 dB bandwidth.

Delete the last paragraph in the section (as shown below).

~~The in-band and near-band interference levels for the LNAV approach steady-state navigation operations are 3 dB less than those for LNAV/VNAV, LP, and LPV approach steady-state navigation operations. For terminal area and en route steady-state navigation operations, and for initial acquisition of the GPS and WAAS signals prior to steady-state navigation for all flight phase operations, the in-band and near-band interference levels are 6 dB less than those for LNAV, LNAV/VNAV, and LPV approach steady-state navigation operations.~~