



ASSEMBLY  
19th session  
Agenda item 10

**RESOLUTION A.816(19)**  
adopted on 23 November 1995

**PERFORMANCE STANDARDS FOR SHIPBORNE  
DECCA NAVIGATOR RECEIVERS**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

BEARING IN MIND IMO's policy (resolution A.815(19)) concerning the establishment of a world-wide radionavigation system to provide ships with navigational position-fixing throughout their intended voyages,

NOTING that the Maritime Safety Committee has recognized that the Decca Navigator system may be a component of the world-wide radionavigation system,

NOTING ALSO that shipborne receiving equipment for the world-wide radionavigation system should conform to the general requirements for navigational equipment referred to in resolution A.694(17) and be designed to satisfy the detailed requirements of the particular system,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-third session,

1. **ADOPTS** the Recommendation on Performance Standards for Shipborne Decca Navigator Receivers set out in the Annex to the present resolution;
2. **INVITES** Governments to ensure that Decca Navigator receivers carried on ships entitled to fly their flag conform to these Performance Standards;
3. **REQUESTS** the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

## ANNEX

**RECOMMENDATION ON PERFORMANCE STANDARDS FOR  
SHIPBORNE DECCA NAVIGATOR RECEIVERS****1 INTRODUCTION**

1.1 Receivers for the Decca Navigator system intended for navigational purposes on ships with maximum speeds not exceeding 50 knots should, in addition to the general requirements contained in resolution A.694(17), comply with the following minimum performance requirements.

1.2 The Decca Navigator system is a medium-range radionavigation system operating sequentially at four assigned frequencies in the frequency bands 70-72 kHz (5f-purple slave), 84-86 kHz (6f-master), 112-115 kHz (8f-red slave) and 126-129 kHz (9f-green slave). Lines of position are determined by the measurement of the phases of signals transmitted by at least one master and three slave stations. The use of four frequencies allows lane identification taking into account the range of the system.

1.3 The equipment should be able to comply with this standard within 15 min. of being switched on.

**2 PERFORMANCE STANDARDS FOR THE RECEPTION OF DECCA NAVIGATOR SIGNALS**

2.1 The receivers should be capable of operating and processing signals received within the frequency bands 70-72 kHz, 84-86 kHz, 112-115 kHz and 126-129 kHz with the following characteristics:

- .1 signal level of between 25  $\mu\text{V/m}$  and 25  $\text{mV/m}$  (28 to 88  $\text{dB/1 } \mu\text{V/m}$ );
- .2 differential signal level of not less than 40  $\text{dB}$ ; and
- .3 a minimum signal noise ratio of 20  $\text{dB}$  in a noise band of 20  $\text{Hz}$ .

2.2 The receivers should be capable of operating correctly in regions of good wanted signal coverage in the presence of other signals which are outside the frequency bands specified in paragraph 2.1 and which have field strengths not exceeding:

- .1 80  $\text{dB/1 } \mu\text{V/m}$  at 1  $\text{kHz}$  below and above each frequency band;
- .2 100  $\text{dB/1 } \mu\text{V/m}$  at 5  $\text{kHz}$  below and above each frequency band;
- .3 120  $\text{dB/1 } \mu\text{V/m}$  at 15  $\text{kHz}$  below the lowest and above the highest frequency bands; and
- .4 140  $\text{dB/1 } \mu\text{V/m}$  at 35  $\text{kHz}$  below the lowest and above the highest frequency bands.

2.3 The receivers should function correctly in the presence of signals from Decca Navigator transmitters other than those of the chain selected, provided the receivers and transmitters are separated by a distance in the order of 4 nautical miles.

2.4 The antenna to be used with the receiver should be capable at all times of receiving Decca Navigator transmissions from any direction in the horizontal plane.

### 3 PROCESSING

3.1 The receivers should be capable of processing the received signals:

.1 from at least one master and up to three slave stations into lines of position (LOPs) as follows:

Green (LOP) - 6f and 9f frequencies;  
Red (LOP) - 6f and 8f frequencies;  
Purple (LOP) - 6f and 5f frequencies; and

.2 of multipulse transmission format to extract the fundamental (1f) signal used to provide lane identification.

3.2 Receiver instrumental errors in measuring the LOPs on a stationary ship within good coverage of the selected Decca Navigator chain should not exceed  $\pm 0.05$ ,  $\pm 0.07$  and  $\pm 0.08$  of the lanes respectively for the Green, Red and Purple LOPs.

3.3 When a ship is sailing on a constant heading at speeds not exceeding 50 knots, the instrumental errors shall not exceed  $\pm 0.15$ ,  $\pm 0.20$  and  $\pm 0.25$  of the lanes respectively for the Green, Red and Purple LOPs.

3.4 The receivers may process the LOP results to provide positional information by reference to a latitude-longitude grid. The processing of LOPs to latitude-longitude position should not introduce an additional error greater than 1 centilane on any pattern. Where this facility is provided, the conversion of LOPs' results to a grid reference should be based upon a recognized world datum, e.g., WGS 72 (as amended).

3.5 Means may be provided to transform the computed position based on WGS 72 into data compatible with the datum of the navigational chart in use. Where this facility exists, positive indication should be provided to show when it is in use, and means should be provided to indicate the transformation correction.

3.6 Means may also be provided for entering corrections manually in order to provide corrected LOP information or latitude-longitude grid. For receivers providing position information by geographical co-ordinates, means may be provided for entering pre-computed corrections in order to display co-ordinates automatically corrected for a given area. Where this facility exists, positive indication should be provided to show when it is in use and what correction is being applied.

### 4 DISPLAY OF POSITIONAL INFORMATION

4.1 The receivers should display the positional information either by means of Green, Red and Purple LOPs, together with lane identification, or by means of a latitude-longitude grid, or both.

4.2 Receivers which provide positional information by means of LOPs should be capable of displaying two or three operated-selected LOPs simultaneously with the following facilities:

.1 the identification of the Decca chain in use;

.2 for each LOP a display of:

- the zone letter (A to J), (the zone group may also be displayed);
  - the whole lane count (from 0-23 for the Red LOP, from 30-47 for the Green LOP and from 50-79 for the Purple LOP);
  - the centilane count (from 0.00 to 0.99);
- .3 means to set up initially the zone letter and the whole lane count;
- .4 a display of the lane identification as indicated by the most recent lane identification transmission; and
- .5 means to correct the whole lane count to correspond with the lane identification display.
- 4.3 Receivers which provide positional information by means of a latitude-longitude grid should be capable of displaying both latitude and longitude simultaneously with the following facilities:
- .1 a display of latitude and longitude in the form of degrees, minutes and hundredths of minutes with North or South and East or West, as appropriate, being indicated; and
  - .2 means to set up initially the approximate latitude and longitude grid.
- 4.4 Where provision is made for corrections to be entered manually, it should be possible to display the correction at the time of entry and to recall, at any time, the correction being applied. When appropriate, there should be a clear indication that the displayed LOPs or latitude-longitude grid are corrected by the manual input. The corrections should be cleared automatically in the event of a chain change.
- 4.5 Where the alpha-numeric of a digital display are built up of individual parts, e.g., segments, a facility should be provided which would make it possible to check all the segments of each alpha-numeric. During segment checks the operation of the receiver, except for the display, should not be interrupted.

## 5 WARNING DEVICES

Warning should be given in the following circumstances:

- .1 the absence of a usable signal from any selected Decca chain, regardless of whether such selection is made manually or by automatic means;
- .2 where the position is capable of being displayed in latitude-longitude co-ordinates, whenever the error between any of the LOPs being used for co-ordinate conversion differs from the concurrent lane identification computation by more than 0.5 of a lane for more than two minutes. This indication may be capable of being reset by manual operation whenever necessary; and
- .3 after an interruption of the power supply, to warn of the need to check the setting up of the receiver. This indication should be such that it can only be reset manually.

## **6 ANCILLARY EQUIPMENT**

The receivers may be fitted with outputs to allow the connection of peripheral equipment, such as track plotters, data recorders or integrated navigation systems. Data from these outputs should be in digital form and comply with IEC 1162:1993 (Digital Interface Standard).

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