Installation
and
Instruction Guide

CSB200

Class B AIS Transponder

GENERAL WARNINGS

All marine Automatic Identification System (AIS) units utilise a satellite based system such as the Global Positioning Satellite (GPS) network or the Global Navigation Satellite System (GLONASS) network to determine position. The accuracy of these networks is variable and is affected by factors such as the antenna positioning, how many satellites are used to determine a position and how long satellite information has been received for. It is desirable wherever possible therefore to verify both your vessels AIS derived position data and other vessels AIS derived position data with visual or radar based observations.

The proAIS software is intended for use as an installation and configuration tool. The application is not a navigation tool and should not be used as such.

LICENSING

IMPORTANT: In most countries the operation of an AIS unit is included under the vessels marine VHF licence provisions. The vessel on to which the AIS unit is to be installed must therefore possess a current VHF radiotelephone licence which lists the AIS system and the vessel Call Sign and MMSI number. Please contact the relevant authority in your country for more information. In accordance with a policy of continual development and product improvement the CSB200 hardware and software may be upgraded from time to time and future versions of the CSB200 may therefore not correspond exactly with this manual. When necessary upgrades to the product will be accompanied by updates or addenda to this manual. Please take time to read this manual carefully and to understand its contents fully so that you can install and operate your AIS system correctly.

Information contained in this manual is liable to change without notice. Comar Systems Ltd disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

LIMITED WARRANTY

Comar Systems Ltd warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Comar Systems Ltd will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Comar Systems Ltd. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.The above does not affect the statutory rights of the customer.

DECLARATION OF CONFORMITY

Hereby, Comar Systems Ltd of Medina Court, Arctic Road, Cowes, Isle of Wight, PO31 7XD, United Kingdom, declare that this CSB200 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This product carries the CE mark, notified body number and alert symbol as required by the R&TTE directive.

This product is intended for sale in the following member states:

FCC Compliance:

WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data into this device. The MMSI and Static Data in this transponder must be configured by the vendor of the device or by an appropriately qualified person in the business of installing marine communications equipment on board vessels. In no event shall the entry of static data in to this Class B device be performed by the end user. Knowingly programming a Class B device with inaccurate static data, or causing a Class B AIS to be programmed with inaccurate static data, is prohibited.

INTRODUCTION

Automatic Identification System (AIS)

How AIS Works

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped craft. Position is derived from a Global Navigation Satellite System (GNSS) network and communication between vessels is by Very High Frequency (VHF) digital transmissions. A sophisticated and automatic method of time sharing the radio channel is used to ensure that even where a large number of vessels are in one location, blocking of individual transmissions is minimised, any degradation of the expected position reporting interval is indicated to the user and even if the unit suffers extreme channel overload conditions it will always recover to normal operation.

AIS Classes

There are two classes of AIS unit fitted to vessels, Class A and Class B. In addition AIS base stations may be employed by the Coastguard, port authorities and other authorised bodies. AIS units acting as aids to navigation (A to Ns) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

Class A units are a mandatory fit under the safety of life at sea (SOLAS) convention to vessels above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also fit Class A units.

Class B units are currently not a mandatory fit but authorities in several parts of the world are considering this. Class B units are designed for fitting in vessels which do not fall into the mandatory Class A fit category.

The CSB200 is a Class B unit

Information Transmitted and Received

A **Class A** unit will transmit its IMO number (if known), MMSI, Call sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG), heading, navigational status, rate of turn, draught, cargo type, destination and safety related messages via a short message service (SMS) facility. Message lengths are variable with static and voyage related information being transmitted less often.

Class A ship borne reporting intervals

Ships dynamic conditions	Rate
Ship at anchor or moored	3 min
Ship 0-14 Knots	10 sec
Ship 0-14 Knots and changing course	3.3 sec
Ship 14-23 Knots	6 sec
Ship 14-23 Knots and changing course	2 sec
Ship > 23 Knots	2 sec
Ship > 23 Knots and changing course	2 sec
Ships Static Information	6 min

A **Class B** unit will transmit its MMSI, Call Sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG).

Class B ship borne reporting intervals

Ships dynamic conditions	Rate
Ship with Speed Over the Ground < 2 Knots	3 min
Ship with Speed Over the Ground > 2 Knots	30 sec
Ships Static Information	6 min

INSTALLING THE CSB200 UNIT

Packing List

1 x CSB200 Transponder unit

1 x Power Cable

1 x PC 9pin D Male to Female Serial cable

1 x 9pin D Male Plug with wire ends.

1 x Instruction Manual

WARNING: Do not connect the CSB200 unit to a mains (line) AC electrical supply, as an electric shock or fire hazard could result.

CAUTION: Do not connect the CSB200 unit to a DC supply exceeding 15.6 V or reverse the supply polarity. Damage to the unit may result.

CAUTION: The CSB200 unit is designed for operation in the temperature range -25 °C to +55 °C. Do not install (or use) the CSB200 unit in environments which exceed this range.

CAUTION: The CSB200 unit should be installed in a location where it is protected from water and spray.

Electrical Connections

Connect a 12V DC supply (9.6-15.6V) capable of supplying 2A peak to the DC power lead .

Positive = RED   Negative = BLACK

The case of the unit is not isolated from the negative terminal of the supply and therefore it is recommended that the unit is not attached to metal parts of the vessel.

Connect a suitable GPS antenna to the TNC connector (inner of the two) at the rear of the CSB200. Note that the CSB200 will not accept GPS NMEA input from another device, it must have its own internal GPS operating so will require the installation of a separate GPS antenna.

Connect a suitable VHF antenna to the BNC connector (outer of the two) at the rear of the CSB200

GPS Antenna

The GPS antenna used must be of the active type (i.e. it should incorporate an LNA) and must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.). An antenna should be selected with a gain (in dB) depending on the length of cable between the antenna and the AIS unit; after subtraction of cable and connector losses, a minimum total gain of 25 dB should be available at the CSB200 unit GPS antenna connector.

The GPS antenna to be used for AIS use must be a dedicated antenna, i.e. not shared with any other GPS receiver.

Installation of the GPS antenna is critical for the performance of the built in GPS receiver which is used for timing of the transmitted time slots and for the supply of navigational information should the main navigational GPS fail. We strongly recommend that:

1.   The GPS antenna is mounted in an elevated position and free of shadow effect from the ship's superstructure

2.   The GPS antenna has a free view through 360 degrees with a vertical angle of 5 to 90 degrees above the horizon.

3.   As the received GPS signal is very sensitive to noise and interference generated by other onboard transmitters, ensure that the GPS antenna is placed as far away as possible from radar,

Inmarsat and Iridium transmitters and ensure the GPS antenna is free from direct view of the radar and the Inmarsat beam.

4. It is also important that the MF/HF and other VHF transmitter antennas are kept as far away as possible from the GPS antenna. It is good practice never to install a GPS antenna within a radius of 5 meters from these antennas.

VHF antenna

The VHF antenna employed for AIS use:

*   Must be either a connected to a dedicated antenna, or shared with your VHF Radio Transmitter antenna using our AST100 Antenna Splitter.

*   Must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.)

*   Should be omni-directional and vertically polarised with unity gain (0 dB) with a bandwidth sufficient to maintain VSWR <1.5 over the frequency range 156 – 163 MHz. As a minimum the 3dB bandwidth must cover the two AIS channels and the DSC Channel.

*   Should be mounted with at least a two metre vertical separation distance from any other VHF antenna used for speech or DSC communication.

VHF Antenna Connection

Connecting a badly mismatched VHF antenna, leaving the VHF antenna port disconnected, or shorting the VHF antenna port will activate the VSWR alarm, cause the unit to stop sending position reports or cause damage to the transponder.

Radio Frequency Exposure

To meet the requirements for Radio Frequency Exposure it is necessary to install the VHF antenna correctly and operate the AIS equipment according to the instructions.

The VHF antenna must be mounted at a minimum distance (vertical separation) of 3 metres from the head of any person standing on deck in order to meet international safety directives on Maximum Permissible Exposure (MPE) / Specific Absorption Rate (SAR).

Where no suitable structure exists to achieve a 3 metre vertical separation then the antenna base must be mounted at least 1 metre above the head of any person within range, all persons should stay outside the 3-metre safety radius and if practical a grounded RF shield should be interposed between people and the antenna.

Failure to adhere to these limits could expose persons within the 3 metre radius to RF radiation in excess of the MPE / SAR limits.

Data Connection

If an external display unit is to be used to show other AIS units within range (such as a chart plotter, PC serial terminal or other display device) connect the user end of the data interface cable to the display device. Note that the software in the display device must be configured for AIS operation .

There is a 9-way D-type female connector mounted at the rear of the CSB200. The standard wire ended data cable assembly provided mates with this connector.

9 Pin D	Cable Colour	Signal Name
1	BROWN	-NMEA Output (RS422)
2	RED	+RS232 Output
3	ORANGE	+RS232 Input
4	YELLOW	+NMEA Output (RS422)
5	GREEN	Ground
6	BLUE	Configurable Switch +
7	VIOLET	Not Used
8	GREY	+NMEA Input (RS422)
9	BLACK	-NMEA Input (RS422)

Connections to a PC.

CSB200	PC 9 Pin Serial Port
2- Red -TX Data	2- RX Data
3- Orange- RX Data	3- Transmit Data
5 –Green-Ground	5 -Ground

Connections to a Plotter.

CSB200	Plotter/Radar
1 – Brown- NMEA Output B	NMEA Input B- Return
4 – Yellow NMEA Output A	NMEA Input A - Positive

Data

The default baud rate of the data link is 38.4kBaud with 8 data bits, one stop bit and no parity. No handshaking is used.

The data interface conforms to IEC 61162-1.

VDM, VDO, RMC, ACA, ACS, ALR, TXT and ACK messages conform to NMEA 0183. Please refer to the **SERIAL DATA INTERFACE** section of this manual for full details of these AIS messages.

PROGRAMMING THE CSB200

Before the CSB200 can transmit it requires to be programmed with your own vessels information. This configuration is done by the vendor of the CSB200 using data of your vessel.
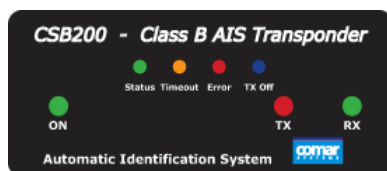
You will need to provide the vendor of the CSB200 with the following information:

- Your MMSI number
- Your Vessel name
- Your Radio Callsign
- Your Vessel dimensions
- The planned location of the AIS GPS antenna on your vessel

Instructions for programming the unit are provided to approved vendors and are not available to end users.

Using the CSB200

Switching on

When the 12VDC supply is switched on the green ON LED will light and the other six LED's visible on the front panel of the unit will illuminate twice for a period of one second on each illumination. The Status, TX Off and TX LEDs will then go out. The green RX LED will flash when it is receiving data from other AIS units.

When the internal GPS is locked the yellow LED will go out and the green Status Led will light; note that this process may take several minutes depending on the switch-on state of the GPS receiver. The red TX LED will flash momentarily every time the unit transmits.

NOTE If the unit has not been programmed with an MMSI number the green RX, yellow Timeout and red Error LED will remain on.

Warning and Fault States

If the unit has not been able to transmit a position report during the last expected two reporting intervals (i.e. the nominal reporting interval cannot be maintained for operational reasons such as a Message 23 quiet period, high channel load conditions, etc) the yellow LED will illuminate. This is a **warning condition only** and indicates that your vessels position is not currently being reported to other vessels. Reception of other vessel AIS information by the CSB200 is not affected. When the unit is able to commence reporting the yellow LED goes out.

If a fault occurs the red Error LED will illuminate. This may illuminate briefly if the power supply is interrupted or if the VHF antenna characteristics are briefly affected.

If the Red Error LED illuminates continuously the unit should be assumed to be faulty and should either be switched off (power removed) or if this is not practical any other vessel position information derived from the unit should not be used and it should also be assumed that the unit is not transmitting valid position information for your vessel.

The unit should be examined by an authorised service agent at the earliest opportunity.

LED Indicators

ON

This is a green LED which indicates, when lit, that power has been connected correctly to the transponder.

Status

This is a green LED which indicates, when lit, that the transponder hardware has been configured, that the operating software is present, that the CPU has booted up, the application software is running and everything is correct.

RX

This is a green LED which indicates when flashing that the CSB200 is receiving data from other AIS transponders and is outputting this data as VDM NMEA sentences on the output data ports. If the Green LED is on continuously the unit has not been programmed with its personalised data. It will still send received data to the output port, but will not transmit.

TX

This is a red LED which flashes momentarily when the CSB200 transmits its own AIS data.

Timeout

This is a yellow LED which indicates when lit that the transmitter is prevented from transmitting. Reasons for this include the following:

- The transponder's internal GPS receiver is not operating or is not yet ready.

- The transponder was unable to transmit an AIS message due to the channel being already occupied, e.g. by transmissions from other AIS transponders, or the TX Off function is in operation.

Error

This is a red LED which indicates, when lit, one of the following status conditions is possible:

- Transmitter lockout timer (1 second maximum) has operated
- GPS is unable to gain lock after 30 minutes
- VHF antenna VSWR is out of range
- Power Supply is out of range
- Background noise level is above the threshold level (-77dBm)

Transmit Off Facility.

The Blue LED can be configured by the vendor to operate in 3 modes :

- Switch has no function, default mode as supplied.
- Silent mode facility is provided in the event that you do not wish to disclose your position to other users or to conserve power when it is not necessary to transmit your position. The transmitter can be turned off by connecting a simple ON/OFF switch between the Blue cable on pin 6 and the Green cable on pin 5. Closing this switch will cause the Blue-TX off LED and the Yellow Timeout LED to light, the Green Status LED will extinguish. Opening the switch will resume transmissions. Reception of AIS data during this operation will not be affected.
- Send Safety Related Message will send a Type 14 message with your MMSI number and the words MAYDAY MAYDAY. The message can be turned on by connecting a momentary push on button between the Blue cable on pin 6 and the Green cable on pin 5. Holding the switch down for 3 seconds will activate the function and cause the blue LED to light, it will stay illuminated for 1 minute, further pushes of the switch, after the Blue LED extinguishes, will repeat the message.

LED Status Indicators

Power	Status	Timeout	Error	TX Off	TX	RX	Indicates
🟢	🟢	🟡	🔴	🔵	🔴	🟢	
✓	✓				Blinking	Blinking	Normal
✓		✓	✓			Fixed	No MMSI
✓		✓				Blinking	No GPS
✓		✓		✓		Blinking	Tx off Switch
✓	✓			✓		Blinking	SRM switch

The table above is a quick reference check on the operational status of the CSB200.

Built in Integrity Test

The CSB200 is equipped with Built In Integrity Testing (BIIT). BIIT tests run continuously or at appropriate intervals simultaneously with the standard functions of the equipment. The BIIT detects any failure or malfunction that will significantly reduce integrity or stop operation of the CSB200 unit.

The tests include:

- AIS TX malfunction (synthesiser not locked and TX time-out not exceeded)
- Antenna VSWR exceeds limit
- Rx channel 1 malfunction (synthesiser not locked)
- Rx channel 2 malfunction (synthesiser not locked)

- Internal GPS not in use

- No valid SOG information

- No valid COG information

- Background noise > -77dBm

- GPS failure

- VSWR exceeding the maximum allowed level

- The input voltage is out of the specified range

MAINTENANCE

WARNING: Unauthorized opening of the CSB200 unit will invalidate the warranty.

CAUTION: Avoid using chemical solvents to clean the CBS200, solvents may damage the case material.

NOTE: The CSB200 contains no serviceable parts. Contact your local Dealer if the unit fails to function correctly.

SERIAL DATA INTERFACE

Serial Port Input/Output

There are two serial ports, one presenting NMEA (RS422) format and the other RS232 format. Data can be input from either or both ports.

The serial port interface(s) output:

- At power-up boot-loader and main application splash text screens including version numbers and memory status.

- As a VHF Data Link Message (VDM) all incoming VHF Data Link (VDL) data received by the CSB200.

- The VHF data link own vessel (VDO) messages sent by the CSB200 over the VHF Data Link.

- AIS regional channel assignment messages (ACA) received. These are derived from an incoming VHF Data Link message (message 22) or a DSC message.

- AIS channel management information source (ACS) messages.

- Alarm messages (ALR, TXT).

The data interface will accept

- Personality programming messages

- Alarm acknowledgement messages (ACK)

On power up the unit will report details of the firmware versions residing in the unit.

NMEA Messages

Receipt of a VHF transmission on either AIS radio channel causes a VDM message to be output via the data port.

VDM Message Format

!--VDM,x1,x2,x3,a,s--s,x*hh<CR><LF>

- x1 = Total number of sentences needed to transfer the message , 1 to 9

- x2 = Sentence number, 1 to 9

- x3 = Sequential message identifier, 0 to 9

- a = AIS Channel, "A" or "B"

- s - - s = Encapsulated ITU-R M.1371 radio message

- x = Number of fill-bits, 0 to 5

VDM Message Types

For example, the information contained in the s - - s portion of the VDM = Encapsulated ITU-R M.1371 radio message. Note that messages 5 and 19 may be sent as multi part messages using the x1, x2 and x3 parameters for message sequence control

VDL Message Number	VDM Message Description
AIS Target Display Information	
1, 2, 3, 9,18, 21	position report
4	base station report
5	voyage related data
18, 24	Class B reports
19	Class B – extended data
Safety message handling	
12	addressed safety related
14	broadcast safety related
External Application handling	

6	binary addressed
8	binary broadcast
System control	
7	binary acknowledge (INFO)
10	UTC and data inquiry (INFO)
11	UTC and data response (INFO)
13	safety related ack (INFO)
15	interrogation (INFO)
16	assignment mode command (INFO)
17	DGNSS corrections (INFO)
20	data link management (INFO)
22	channel management (INFO)

VDO Message Format

This sentence sends the own vessels details.

Message Format

!--VDO,x1,x2,x3,a,s--s,x*hh<CR><LF>

- x1 = Total number of sentences needed to transfer the message , 1 to 9

- x2 = Sentence number, 1 to 9

- x3 = Sequential message identifier, 0 to 9

- a = AIS Channel, "A" or "B"

- s - - s = Encapsulated ITU-R M.1371 radio message 4

- x = Number of fill-bits , 0 to 5

VDO Message Number	VDO Message Description
AIS Target Display Information	
13	Safety Related Acknowledgement
18	Standard Class B position report (Includes MMSI, SOG, position accuracy, lat, long, COG, true heading,)
24a	Class B "CS" Static data Part A (Includes MMSI and vessel name)
24b	Class B "CS" Static data Part B (Includes MMSI, ship type, cargo type, call sign, ship dimensions)

ACA Message Format

The CSB200 unit can receive regional channel management information (ACA) in two ways: ITU-R M.1371 message 22 or a DSC telecommand received on channel 70,

Message Format

$--ACA,x,llll.ll,a,yyyyy.yy,a,llll.ll,a1,y1y1y1y1y.y1y1,a2,x1,x2x2x2x2,

   x3,x4x4x4x4, x5,x6,x7,a3,x8,hhmmss.ss*hh <CR><LF>

- x = Sequence Number , 0 to 9
- llll, ll, a = Region Northeast corner latitude – N/S
- yyyyy.yy,a1 = Region Northeast corner longitude – E/W
- llll.ll,a = Region Southwest corner latitude – N/S
- y1y1y1y1y1.y1y1,a2 = Region Southwest corner longitude – E/W
- x1 = Transition Zone Size
- x2x2x2x2 = Channel A
- x3 = Channel A bandwidth
- x4x4x4x4 = Channel B
- x5 = Channel B bandwidth
- x6 = Tx/Rx mode control

- x7 = Power level control
- a3 = Information source
- x8 = In-Use Flag
- hhmmss.ss = Time of "in-use" change

ACS Message Format

This sentence is used in conjunction with the ACA sentence and identifies the originator of an ACA message.

$--ACS,x,xxxxxxxxx, hhmmss.ss,xx,xx,xxxx*hh <CR><LF>

- x = Sequence Number , 0 to 9
- xxxxxxxxx = MMSI of originator
- hhmmss.ss = UTC of receipt of channel management information

- xx = UTC Day, 01 -31
- xx = UTC Month, 01 -12
- xxxx = UTC Year

ALR Message Format

Alarm message

$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>

- hhmmss.ss = Time of alarm (UTC)
- xxx = Unique alarm number
- A = Alarm condition
- A = Alarm acknowledge state
- c--c = Alarm description, text

Alarms descriptions presented are:

- AIS: TX malfunction
- AIS: Antenna VSWR exceeds limit
- AIS: Rx channel 1 malfunction

- AIS: Rx channel 2 malfunction
- AIS: general failure
- AIS: no sensor position in use
- AIS: no valid SOG information
- AIS: no valid COG information
- AIS: 12V alarm
- AIS: 5V alarm
- AIS: Loss of serial interface integrity
- AIS: Background noise above -77dBm

ACK Message Format

Can be generated by a minimum keypad and display (MKD) unit, chart plotter or other display device connected to the CSB200 to acknowledge an alarm condition reported by the CSB200.

$--ACK,xxx*hh <CR><LF>

- xxx = Unique alarm number

RMC Message Format

Own vessels GPS information

$GPRMC,hhmmss.ss,A,llll.lllll,a,yyyyy.yyyyy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>

- hhmmss.ss = UTC of position fix
- A = Data Valid V = Navigation receiver warning
- llll.lllll,a = Latitude, N/S
- yyyyy.yyyyy,a = Longitude, E/W
- x.x = Speed over ground, knots
- x.x = Course over ground, degrees True
- xxxxxx = Date, ddmmyy
- A = Mode indicator Autonomous

PRODUCT SPECIFICATION

Physical: Dimensions 190 x 128 x 50 mm (L x W x H)

Weight 600g

Power: DC (9.6-15.6V)

Average power consumption 4W

Peak current rating 2A

GPS Receiver:

IEC 61108-1 compliant

Electrical Interfaces:

RS232 38.4kBaud bi-directional

RS422 NMEA 38.4kBaud bi-directional

Connectors:

Power

VHF Antenna connector BNC

GPS Antenna connector TNC

Interface RS232/RS422

VHF Transceiver:

Transmitter x 1

Receiver x 2

(One receiver time shared between AIS and DSC)

Frequency: 156.025 to 162.025 MHz in 25 kHz steps

Output Power:

33dBm ± 1.5 dB

Channel Bandwidth:

25kHz

Modulation Modes:

25kHz GMSK (AIS, TX and RX)

25kHz AFSK (DSC, RX only)

Bit rate: 9600 b/s ± 50 ppm (GMSK)

1200 b/s ± 30 ppm (FSK)

VHF Receiver:

Sensitivity - 107dBm 25kHz (Message Error Rate 20%)

Co-Channel 10dB

Adjacent Channel 70dB

IMD 65dB

Blocking 84dB

Environmental

IEC 60945

Operating Temperature: -25ºC to +55ºC

Indicators

On, TX, RX, Status, TX timeout, Error, TX Off

Standards

This product complies with all the necessary standards under the European R&TTE directive for Article 3.1(a), 3.1(b), 3.2 and 3.3(e). The following standards have been followed in pursuance of this:

IEC62287-1: 2006-03 Maritime navigation and radio communication equipment and systems – Class B ship borne equipment of the automatic identification system (AIS) – Part 1: Carrier-sense time division multiple access (CSTDMA) techniques

IEC60945: 2002-08 Maritime navigation and radio communication equipment and systems – General requirements – Methods of testing and required test results

IEC61162-1: Maritime navigation and radio communication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners

IEC61108-1: GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) – Part 1: Global positioning system (GPS) -Receiver equipment - Performance standards, methods of testing and required test results

EN 301 843-1 v2.1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for marine radio equipment and services; Part 1: Common technical requirements

EN 50383: 2002 Basic standard for calculation and measurement of electromagnetic field strength and SAR related to human exposure from radio base stations and fixed terminal stations for wireless telecommunications system (110MHz – 40GHz)

EN60950-1:2002 Information technology equipment – Safety – Part 1: General requirements

GLOSSARY

ACA	(AIS) Regional Assignment Channel Assignment Message
ACK	Acknowledgement
ACS	(AIS) Channel management information source messages
AFSK	Audio frequency-shift keying
ALR	(AIS) Alarm Message
A to N	Aid to Navigation
AIS	Automatic Identification System
BIIT	Built In Integrity Testing
BNC	Bayonet fitting type RF connector
COG	Course over Ground
CR	Carriage Return
CS	Carrier Sense
CSTDMA	Carrier Sense Time Division Multiple Access
DC	Direct Current
DGNSS	Differential Global Navigation Satellite System
DSC	Digital Selective Calling
GLONASS	Global Navigation Satellite System
GNSS	Global Navigation Satellite System
GMSK	Gaussian Minimum Shift Keying
GPS	Global Positioning Satellite / System
HF	High Frequency
IMO	International Maritime Organization
IEC	International Electro technical Commission
LED	Light Emitting Diode
LF	Line Feed
LNA	Low-noise Amplifier
MF	Medium Frequency
MKD	Minimum Keypad and Display

MMSI	Maritime Mobile Service Identity
MPE	Maximum Permissible Exposure
NMEA	National Marine Electronics Association
PC	Personal Computer
PI	Presentation Interface
RF	Radio Frequency
RTCM	Radio Technical Commission for Maritime Services Commission
RX	Receive or Receiver
RFI	Radio Frequency Interference
SAR	Specific Absorption Rate
SELV	Separated Extra Low Voltage
SMS	Short Message System
SOG	Speed over Ground
SRM	Safety Related Message
TDMA	Time-division Multiple Access
TNC	Threaded type RF connector
TX	Transmit or Transmitter
UTC	Universal Time Co-ordinated
VDM	(AIS) VHF Data Link Messages
VDO	(AIS) VHF data link own vessel messages
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio

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