

AIS Aids To Navigation (AtoN) - Frequently Asked Questions

- Q.** Is there a test performance standard for AIS AtoN?
A. Yes, in process, IEC 62320-2 (CDV)
- Q.** What are the primary considerations for selecting the functional parameters of an AIS AtoN unit?
A. The primary considerations are power consumption and complexity. Complexity has a direct influence on unit cost (refer to IALA Recommendation A-126, 10. The AIS AtoN station).
- Q.** Could a ship / vessel AIS be used for an AIS AtoN
A. Most floating AtoN sites, and many fixed AtoN sites, have limited power availability due to physical constraints, and/or the high cost of energy. An AIS AtoN unit derived directly from a ship AIS unit will likely have a power requirement beyond the practical or economic power available at the intended location site.
- Q.** How many AIS AtoN classifications / types are defined in the respective recommendations / standards?
A. There are three classifications of an AIS AtoN station, with different functionality namely, Type 1, 2 and 3.
- Q.** What is the functionality of Type 1 AIS AtoN Station?
A. It is a transmit-only station, operating in FATDMA mode. Hence the slots used by the Type 1 AIS AtoN Station need to be reserved. This is the simplest type of AIS AtoN station, likely to have low cost and power consumption (refer to Table 1).
- Q.** What is the functionality of Type 2 AIS AtoN Station?
A. It is similar to a Type 1, but has, in addition, an AIS control receiver of limited capability operating on a single AIS channel. This receiver allows the Type 2 Station to be remotely controlled via the AIS VDL (refer to Table 1).
- Q.** What is the functionality of Type 3 AIS AtoN Station?
A. It is more complex than the Type 1 and Type 2, and contains two AIS receiving processes that allow it to participate fully on the AIS VDL. This means that in addition to FATDMA, the Type 3 station can function in RATDMA mode (refer to Table 1).
- Q.** What does FATDMA mode mean?
A. FATDMA means Fixed Access TDMA (Time Division Multiple Access), scheduled transmissions requiring slot reservations.
- Q.** What does RATDMA mode mean?
A. RATDMA means Random Access TDMA, autonomous operation, not requiring slot reservations.
- Q.** Are FATDMA transmissions more secure than RATDMA transmissions?
A. Yes, by virtue of slot reservations.
- Q.** What is the benefit of using RATDMA mode?
A. Transmitting unscheduled messages.
- Q.** What is required for operating in RATDMA mode?
A. Two AIS receivers and receiver processes that allow it to participate fully on the AIS VDL.
- Q.** If RATDMA mode is required, may the AIS station be put to "sleep" in order to conserve power consumption?
A. No, the two AIS receivers and subsequent processing must function continuously in order to maintain a 100% up-to-date VDL slot map.

- Q.** May an AIS station be put to “sleep” in order to conserve power consumption?
A. Yes, only AIS AtoN stations operating in FATDMA mode; RATDMA operation will be impaired when put to “sleep”.
- Q.** Can FATDMA mode be used for the transmission of AIS messages 21, 6, 8, 12 and 14?
A. Yes.
- Q.** Is the transmission of AIS Message 21 compulsory for all AIS AtoN stations?
A. Yes, it is the standard AIS AtoN report.
- Q.** May an AIS AtoN station transmit other AIS message types?
A. Yes, all AIS AtoN stations (Type 1, 2 & 3) are optionally allowed to transmit AIS message types 6, 8, 12 and 14.
- Q.** Are there more AIS AtoN message types?
A. Yes, AIS messages 7 and 13 which are AIS VDL acknowledgement messages for messages 6 and 12 respectively; only AIS AtoN Type 3 may transmit these message types.
- Q.** Do the acknowledgement messages 7 and 13 provide an application-to-application acknowledgment?
A. No, it is only a VDL (VHF Data-Link) acknowledgment.
- Q.** Are AIS AtoN Type 3 receiver parameter requirements similar to those of AIS Class A and AIS Base Stations?
A. Yes, refer to Table 2 below, Type of AIS Stations - Receiver Parameters.
- Q.** Does the IEC 62320-2 (CDV) test performance standard differentiate between RATDMA and Non-RATDMA receivers?
A. Yes.
- Q.** Are AIS Class A and AIS Base Station subject to co-located radio equipment operations?
A. Generally yes; therefore the specific receiver parameter performance requirements.
- Q.** Are AIS AtoN Stations subject to co-located radio equipment operations?
A. It depends on the type of installation; remote stations such as buoys are generally not subject to this situation.
- Q.** Will an AIS AtoN Type 3 station consume more power under normal operating conditions than AIS AtoN Type 1 or 2 stations?
A. Yes.
- Q.** Are the design parameters of an AIS AtoN Type 3 station more complex than AIS AtoN Type 1 or 2 stations?
A. Yes.
- Q.** Is the MTBF of an AIS AtoN Type 1 or 2 station better than the MTBF of an AIS AtoN Type 3 station?
A. Generally yes, due to less complexity.
- Q.** Will an AIS AtoN Type 3 station cost more than an AIS AtoN Type 1 or 2 station?
A. Generally yes.

- Q.** Is there a standard for AtoN devices (flashers, lanterns, lamp changers, etc.) telemetry (monitor & control) interfaces, provided by the various AtoN manufacturers?
- A.** No, generally each AtoN manufacturer provides its own proprietary interface.
- Q.** Can any AtoN device (flashers, lanterns, lamp changers, etc.) as a standard be interface with any AIS device?
- A.** No, provision needs to be made for the specific AtoN device's proprietary interface and messages.

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Types of AIS AtoN Stations

There are three types of AIS AtoN Stations as defined in Table 1. The AIS AtoN Stations may have additional capabilities as defined in the Alternatives column.

Table 1 – Description of AIS AtoN Stations

Requirements	Type 1 AIS AtoN Station	Type 2 AIS AtoN Station	Type 3 AIS AtoN Station	Alternatives
VDL Receiver	No Receiver	Receiver for control functions only	2 Receiving processes for autonomous mode	
Transmitted Messages		21		21 plus one or more of 6, 8, 12, 14 and other appropriate messages (Types 1, 2 and 3) plus 7, 13 (Type 3 only)
Access Mode for Message 21	FATDMA			FATDMA and RATDMA (Type 3 only)
Access Mode for Messages other than 21, if implemented				FATDMA (Type 1 and 2) One or more of FATDMA, RATDMA or CSTDMA (Type 3)
Configuration / Communication method	Defined by manufacturer			Defined by manufacturer with Standard Sentences (Type 1, 2 and 3)
Physical Communication Interface	None			The electrical and physical characteristics shall be defined by manufacturer. (Type 1, 2 and 3)
Transmit Power	12.5 W			As defined by manufacturer (Type 1, 2 and 3)
Transmitter capability	Dual channel			Single channel (Type 1 and 2)
Synthetic and Virtual AtoN	No			Yes (Type 1, 2 and 3)
Positioning Device	EPFS and Surveyed Position			Surveyed Position Only (no EPFS) (Type 1, 2 and 3)
UTC synchronisation	Direct Only			Direct, Indirect or semaphore (Types 3)
Assignment	Shall not respond to assignment Messages 16 and 23			
Interrogation	Shall not respond to interrogation Message 15			

Table 2 –Type of AIS Station - Receiver Parameters

Receiver parameters	AIS AtoN Type 2	AIS AtoN Type 3	AIS Class A	AIS Base Station
	(Control Receiver or Non-RATDMA)	(AIS-RATDMA Receiver)	(AIS Receiver)	(AIS Receiver)
Sensitivity	20% PER @ -97 dBm	20% PER @ -107 dBm	20% PER @ -107 dBm	20% PER @ -107 dBm
High Input Levels	2% PER @ -77 dBm	2% PER @ -77 dBm	1% difference between -77 dBm and -7 dBm	1% PER @ -77 dBm
	10% PER @ -7 dBm	10% PER @ -7 dBm		1% PER @ -7 dBm
Co-Channel Rejection	20% PER @ -16 dBm	20% PER @ -10 dBm	20% PER @ -10 dBm	20% PER @ -10 dBm
Adjacent channel selectivity	20% PER @ 60 dBm	20% PER @ 70 dBm	20% PER @ 70 dBm	20% PER @ 70 dBm
Spurious response rejection	20% PER @ 60 dBm	20% PER @ 70 dBm	20% PER @ 70 dBm	20% PER @ 70 dBm
Intermodulation response rejection	20% PER @ 64 dBm	20% PER @ 74 dBm	20% PER @ 74 dBm	20% PER @ 74 dBm
Blocking and Desensitisation	20% PER @ 76 dBm	20% PER @ 86 dBm	20% PER @ 86 dBm	20% PER @ 86 dBm

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