Bundesrepublik Deutschland
Federal Republic of Germany

Bundesamt für Seeschifffahrt und Hydrographie
Federal Maritime and Hydrographic Agency

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Conformance test report of an

AIS AtoN system

Equipment under test: **SRT**

Type: **Carbon AtoN Type 3**

Applying test standards: IEC 62320-2 (2008) Section 8

Test Report No.: BSH/46162/4322093/13-2

Applicant: SRT Marine Technology

Wireless House, Westfield Industrial Estate,
Midsomer Norton
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United Kingdom

Hamburg, 13 March 2013
For the Federal Maritime and Hydrographic Agency

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nach EN ISO/IEC 17025:2005
akkreditiertes Prüflaboratorium

Deutscher Akkreditierungs Rat
DAR
DAT-P-086/98

DATech Deutsche Akkreditierungsstelle Technik in der TGA GmbH
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The **TGA GmbH,** represented by the **DATech Deutsche Akkreditierungsstelle Technik in der TGA GmbH**, confirms that the Testing Laboratory

Federal Maritime and Hydrographic Agency
Department Shipping
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Bernhard-Nocht-Straße 78

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Frankfurt/Main, 2008-12-23

Correctness of the english translation confirmed: Frankfurt/Main, 2008-12-23

i.V. Dipl.-Ing.(FH) R. Egner
Head of the Accreditation Body

Member in EA, ILAC, IAF

Translation for information purposes only. The German Accreditation Certificate is authoritative

See notes overleaf

General

Applicant:	SRT Marine Technology Wireless House, Westfield Industrial Estate, Midsomer Norton, BA3 4BS Bath, United Kingdom
Equipment under test:	
Type:	Carbon AtoN Type 3
Manufacturer:	SRT Marine Technology
	Wireless House, Westfield Industrial Estate, Midsomer Norton, BA3 4BS Bath, United Kingdom
Place of test:	BSH test laboratory Hamburg, Room 916
Start of test:	15 January 2013
End of test:	26 February 2013

Test standards[1]:

IEC 62320-2 (2008)
Maritime navigation and radiocommunication equipment and systems-
Automatic Identification System (AIS) -
Part 2: AIS AtoN Stations - Operational and performance requirements, methods of testing and required test results

This is an additional test report for the type 3 functions of the AtoN. It supplements the test report for the type 1 AtoN SRT Carbon with the number BSH/46162/4322093/12-1.
It is referenced in this test report.

[1] Numbers listed in the titles of the test sections of this report refer to the respective sections of IEC 61993-2 if not stated otherwise.

Summary of Section 8 Functional Tests

Test No.	Reference	Section	Result (passed/ not passed / not applicable / not tested)
1	IEC 62320-2	8.1 Tests for configuration method	Passed
2	IEC 62320-2	8.2 Tests for synchronisation accuracy	Passed
3	IEC 62320-2	8.3 Tests for EPFS	Not included
4	IEC 62320-2	8.4 Additional Messages	Passed
5	IEC 62320-2	8.5 Additional Functionality	Passed
6	IEC 62320-2	8.6 Tests for BIIT	Passed
7	IEC 62320-2	8.7 Transmitter shutdown procedure	Passed
8	IEC 62320-2	8.8 Tests for power supply	Passed
9	IEC 62320-2	8.9 Environmental tests	Not included
10	IEC 62320-2	8.10 Other tests	Passed

*

1 General

1.1 Equipment history

For each Transponder unit under test an numbered entry is provided here. For the two test environment it is recorded which EUT system is under test in that environment

1.1.1 EUT system no 1

Transponder				
Type	AIS AtoN		Part No.:	----
Delivery date	2013-01-14		Serial number	VER sentence: s03448120273 Label: S0170020
HW Version:	Delivery date	2013-01-14	Version no	---
	Installation date	2013-01-14		
SW Version:	Delivery date	2013-01-14	Version no	080200.01.01.03
	Installation date	2013-01-14		
SW Version:	Delivery date	2013-02-11	Version no	080200.01.02.01
	Installation date	2013-02-11		
SW Version:	Delivery date	2013-02-22	Version no	080200.01.02.03
	Installation date	2013-02-25		
SW Version:	Delivery date		Version no	
	Installation date			

GPS antenna				
Type	MA-700		Part No.:	
Delivery date	2012-03-05		Serial number	024016
HW Version:	Delivery date	2012-03-05	Version no	---
	Installation date	2012-03-05		

1.2 Test environment

Here it is intended to record for which time which EUT system is under test.

1.2.1 Test environment no 1

This Test environment is completely equipped as described in Annex A. Normally mainly VDL related tests and DSC tests are done in this environment

Room	BSH Room 916 (9th floor)
Test engineer	H. Bartels
Location	9°59,103 E 53°32,822 N

Equipment no	Start of test	End of test	Test engineer
1	2013-01-15	2013-01-18	Bartels
1	2013-02-12	2013-02-13	Bartels
1	2013-02-25	2013-02-26	Bartels

1.3 Composition

Type of AIS AtoN Station
☒ Type 1 ☐ Type 2 ☒ Type 3

Configuration method
☒ Standard PI sentences ☐ Proprietary manufacturer sentences

☐ Control receiver ☐ AIS Standard VDL messages

Positioning device
☒ EPFS and surveyed position ☐ Surveyed position only

Transmission
☐ Single channel transmission ☒ Tx message 21 for synthetic/ virtual AtoN

Transmit power: 12.5 W

Access mode msg 21
☒ FATDMA ☒ RATDMA (type 3 only)

Access mode other messages
☒ FATDMA ☒ RATDMA (type 3 only) ☐ CSTDMA (type 3 only)

Syncronisation:
☐ Indirect UTC (type 3 only) ☐ Semaphore station (type 3 only=

Chaining: ☐ chaining implemented (type 2 and 3 only)

Implemented alternatives
According to last column of table 1

Option	For AtoN type	Implemented	Remark
Tx of message 6	1, 2, 3	Yes	
Tx of message 7	3	No	
Tx of message 8	1, 2, 3	Yes	
Tx of message 12	1, 2, 3	Yes	
Tx of message 13	3	No	
Tx of message 14	1, 2, 3	Yes	
Tx of message 25	1, 2, 3	No	

External Interfaces: IEC 61162-1 (NMEA), USB

1.4 Legend

Result marking (in the "result" column)[2]:

Passed	Item is ok, test was successful
Not passed	Test of a required item was not successful, change required
N/T	Not tested
N/A	Not applicable

Specific remarks (in the "remark" column, marked "bold italic":)

REC	recommendation (in terms of IEC17025 "opinion"); an improvement or change is Recommended
Note	note or comment (in terms of IEC17025 "interpretation") ; rationale for specific results or interpretation of requirements as appropriate

Template for additional test notes (copy if required):

Date	Result	Status

Issue of this template: 2011-04-27

[2] Test items maybe colour marked in draft versions of the report as follows:

Passed	no colour marking
Not passed	yellow
N/T	blue
N/A	no colour marking
REC	green

1.5 General observations

General observations not specific to any test item of the test standard are listed here.

General problems			
Date	Item	Remark	Result
2013-01-18	Selection intervals	The selection intervals for channel A and B are in (randomly selected) different parts of the frame. I recommend to use for channel A and B of the same tx schedule the same selection interval to avoid larger differences of the interval between A...B and B...A. For 3 minutes interval it can be in worst case 2 min, 4 min, 2 min, 4 min ... For shorter intervals it is even worse. Retest 2013-02-26 Ba: For channel A and B the same selection interval is used.	Passed

2 8 Functional tests

2.1 8.1 Tests for configuration method

For all of the functional tests the setup for the method of measurement shall be as defined by the manufacturer:

- *using standard configuration sentences via direct connection to an interface, or*
- *using standard configuration sentences via VDL, or*
- *using the manufacturer's proprietary method.*

2013-01-17 Ba	Test details - Configuration methode	
Configuration methode	Remark	Result
Standard configuration sentences		Passed
Standard configuration sentences via VDL		N/A
Proprietary methode	With a special configuration tool using the USB port This configuration is not covered by this test report	N/A

2.1.1 8.1.1 Configure test Message 21

8.1.1.1 Purpose

The purpose of this test is to ensure that Message 21 parameters can be entered into the EUT and are retained after the power off/on cycle.

8.1.1.2 Method of measurement

Set-up the standard test environment.

a) Configure the EUT with the following parameters for transmission of Message 21:

- *MMSI number: 991234567;*
- *type of AtoN: "20" – Cardinal Mark North;*
- *name of AtoN: "TEST FLOATING AIS ATON STATION";*
- *position accuracy: to accuracy of EPFS;*
- *assigned position (longitude and latitude): "within off-position threshold of current EPFS position";*
- *dimension/reference for position: "A=B=C=D=5";*
- *type of EPFS: Enter EUT's EPFS type (for example "1" for GPS);*
- *off-position threshold: 200 m;*
- *set power level;*
- *channel 1 set to channel 2087; if receiver supported, set channel 1 receiver to same;*
- *channel 2 set to channel 2088; if receiver supported, set channel 2 receiver to same;*
- *Virtual AtoN Flag set to 0 = default = Real AtoN at indicated position;*
- *set AtoN status default (00000000);*
- *off-position behaviour set to "maintain current transmission schedule";*
- *set UTC lost behaviour as per manufacturer's declaration;*

Read configuration from EUT.

b) Remove power from the EUT for 5 min. Switch on the EUT. Read configuration from EUT.

NOTE Standard configuration sentences via configuration port: the Message 21 content is configured using the AID, ACF and ACE sentence combination.

Standard configuration sentences via VDL: the Message 21 content is configured via VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier and binary data.

8.1.1.3 Required results

Verify that configuration is:

a) accepted by EUT and that the parameters have been correctly set;

b) retained after power cycle.

2.1.1.1 Configuration using AID, ACF and ACE sentence combination

2013-01-15 Ba	Test details - Configuration using AID, ACF and ACE sentence combination Check by query for AID, ACF and ACE		
Test item	Check	Remark	Result
Apply AID, ACF and ACE sentence combination with an appropriate configuration.			
Query for AID	Check that there is an output of AID for each MMSI		Passed
	Check MMSI of AtoN		Passed
	Check create/ delete field = null		Passed
	Check MMSI		Passed
	Check virtual, real or chained	0 for destination MMSI	Passed
	Check Sentence status flag = “R”		Passed
Query for ACE	Check MMSI of AtoN		Passed
	Check AtoN status	0	Passed
	Check Off-position threshold	200	Passed
	Check Ackn. procedure (0/1)	0	Passed
	Check Off-positon behaviour (0/1)	0	Passed
	Check Synch lost behaviour (0/1)	0	Passed
	Check Name of AtoN		Passed
	Check dimensions	0050050505	Passed
	Check Sentence status flag = “R”		Passed
Query for ACF	Check that there is an output of ACE on response		Passed
	Check MMSI		Passed
	Check type of EPFS	1	Passed
	Check latitude – N/S		Passed
	Check longitude – E/W		Passed
	Check position accuracy (0/1)		Passed
	Check Rx channel 1		Passed
	Check Rx channel 2		Passed
	Check Tx channel 1		Passed
	Check Tx channel 2		Passed
	Check Power level	0	Passed
	Check Type of AtoN	20	Passed
	Check virtual flag	0	Passed
	Check Sentence status flag = “R”		Passed

2013-01-15 Ba	Test details - Configuration using AID, ACF and ACE sentence combination Check of message 21 transmission		
Test item	Check	Remark	Result
Apply AID, ACF and ACE sentences with an appropriate configuration.			
Check transmission of message 21	Check that message 21 is transmitted		Passed
	Check channels A and B		Passed
Check content of message 21	Check message ID		Passed
	Check Repeat indicator	0	Passed
	Check MMSI		Passed
	Check Type of AtoN		Passed
	Check Name of AtoN		Passed
	Check longitude		Passed
	Check latitude		Passed
	Check dimensions		Passed
	Check type of EPFS	1	Passed
	Check time stamp		Passed
	Check off position indicator		Passed
	Check AtoN status	0	Passed
	Check RAIM flag	1	Passed
	Check Virtual AtoN flag	0	Passed
	Check assigned mode flag	0	Passed
	Check Name of AtoN extension		Passed

2.1.1.2 Check that configuration is retained after power cycle

2013-01-16 Ba	Test details - Configuration using AID, ACF and ACE sentence combination Check by query for VDL response		
Test item	Check	Remark	Result
Remove the power for 5 min. Switch on the EUT and check the configuration			
Query for AID	Check that there is an output of AID for each MMSI	UTC 15:00	Passed
	Check MMSI of AtoN		Passed
	Check create/ delete field = null		Passed
	Check MMSI		Passed
	Check virtual, real or chained		Passed
	Check Sentence status flag = “R”		Passed
Query for ACE	Check MMSI of AtoN		Passed
	Check AtoN status		Passed
	Check Off-position threshold		Passed
	Check Ackn. procedure (0/1)		Passed
	Check Off-positon behaviour (0/1)		Passed
	Check Synch lost behaviour (0/1)		Passed
	Check Name of AtoN		Passed
	Check dimensions		Passed
	Check Sentence status flag = “R”		Passed
Query for ACF	Check that there is an output of ACE on response		Passed
	Check MMSI		Passed
	Check type of EPFS		Passed
	Check latitude – N/S		Passed
	Check longitude – E/W		Passed
	Check position accuracy (0/1)		Passed
	Check Rx channel 1		Passed
	Check Rx channel 2		Passed
	Check Tx channel 1		Passed
	Check Tx channel 2		Passed
	Check Power level		Passed
	Check Type of AtoN		Passed
	Check virtual flag		Passed
	Check Sentence status flag = “R”		Passed

2013-01-16 Ba	Test details - Configuration using AID, ACF and ACE sentence combination Check of message 21 transmission		
Test item	Check	Remark	Result
After power off for 5 minute check the content of message 21			
Check transmission of message 21	Check that message 21 is transmitted		Passed
	Check channels A and B		Passed
Check content of message 21	Check message ID		Passed
	Check Repeat indicator		Passed
	Check MMSI		Passed
	Check Type of AtoN		Passed
	Check Name of AtoN		Passed
	Check longitude		Passed
	Check latitude		Passed
	Check dimensions		Passed
	Check type of EPFS		Passed
	Check time stamp		Passed
	Check off position indicator		Passed
	Check AtoN status		Passed
	Check RAIM flag		Passed
	Check Virtual AtoN flag		Passed
	Check assigned mode flag		Passed
	Check Name of AtoN extension		Passed

2.1.2 8.1.2 Schedule mode A FATDMA Message 21 (single report, alternating channel operation)

This test is covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2.1.3 8.1.3 Schedule mode B FATDMA Message 21 (dual report, dual channel operation)

This test is covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2.1.4 8.1.4 Schedule mode C FATDMA Message 21 (Single report, single channel operation)

This test is covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2.1.5 8.1.5 Schedule mode A RATDMA Message 21 (Type 3) (single report, alternating channel operation)

8.1.5.1 Purpose

The purpose of this test is to ensure that the EUT can be configured to operate in accordance with 5.2.4.2, ensuring the slot selection is random within the 1 min interval and that the slot reuse algorithm is properly implemented.

8.1.5.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 with a VDL loading of 10 %.

a) Configure reporting of Message 21 with the following parameters:

- *FATDMA setup or RATDMA setup: RATDMA;*
- *UTC minute for CH1: 1;*
- *UTC minute for CH2: 4;*
- *time interval CH1: 360 (6 min);*
- *time interval CH2: 360 (6 min).*

b) Apply a VDL load that necessitates intentional slot reuse and repeat the test.

NOTE Standard configuration sentences via configuration port: the schedule for Mode A RATDMA transmission is configured using the AAR sentence.

Standard configuration sentences via VDL: the schedule for Mode A RATDMA transmissions via VDL is configured using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.1.5.3 Required results

a) Verify that the EUT transmits Test Message 21:

- *using RATDMA so that the slot selection is random within the correct frames, and alternates the transmission channel between successive reports;*
- *with the correct reporting intervals;*
- *with the correct data.*

Verify that the EUT selects its slots randomly.

b) Verify that the EUT applies the slot reuse algorithm as defined in Recommendation ITU-R M.1371.

2.1.5.1 Configuration using AAR sentence

2013-01-16 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Generate 10% channel load Apply an AAR sentence with the appropriate configuration			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response		Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute	06:01	Passed
	Check slot interval	360	Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute	06:04	Passed
	Check slot interval	360	Passed
	Check Sentence Status Flag = “R”		Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55, Interval = 6 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58, Interval = 6 min		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmitted data	Check that the transmitted data are correct		Passed

Increase channel load to 100%			
Slot reuse	Check that slots of the most distant targets are used	• Single slot messages (6, 8, 12, 14): Most transmission use slots of distant targets but some transmissions use slots of near targets. • Message 21: For most transmissions at least one of the 2 slots re-uses a near target. <u>Retest 2013-02-12 Ba:</u> • Single slot messages (6, 8, 12, 14): Most transmission use slots of distant targets but some transmissions use slots of near targets. • Message 21: For all transmissions slots of distant targets are used. <u>Retest 2013-02-26 Ba:</u> Single slot messages (6, 8, 12, 14): All transmission use slots of distant targets	Passed Passed

2.1.6 8.1.6 Schedule mode B RATDMA Message 21 (Type 3) (dual report, dual channel operation)

8.1.6.1 Purpose

The purpose of this test is to ensure that the AIS AtoN Station can be configured to operate in accordance with 5.2.4.2.

8.1.6.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 with a VDL loading of 10 %.

Configure reporting of Message 21 with the following parameters:

- *FATDMA setup or RATDMA setup: RATDMA;*
- *UTC minute for CH1: 1;*
- *UTC minute for CH2: 4;*
- *time interval CH1: 180 (3 min);*
- *time interval CH2: 180 (3 min).*

NOTE Standard configuration sentences via configuration port: the schedule for Mode B RATDMA transmission is configured using the AAR sentence.

Standard configuration sentences via VDL: the schedule for Mode B RATDMA transmissions via VDL is configured using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.1.6.3 Required results

Verify that the EUT transmits Test Message 21:

- *using RATDMA so that the slot selection is random within the 1 min interval, with dual*
- *reports on both channels;*
- *sending in correct intervals;*
- *with correct transmitted data.*

2.1.6.1 Configuration using AAR sentence

2013-01-15 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 15:26	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute	12:01	Passed
	Check start slot	null	Passed
	Check slot interval	180	Passed

FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute	12:04	Passed
	Check start slot	null	Passed
	Check slot interval	180	Passed
	Check Sentence Status Flag = “R”		Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmitted data	Check that the transmitted data are correct		Passed

2.1.7 8.1.7 Schedule mode C RATDMA Message 21 (Type 3) (single channel operation)

8.1.7.1 Purpose

The purpose of this test is to ensure that the AIS AtoN Station can be configured to operate in accordance with 5.2.4.2.

8.1.7.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 with a VDL loading of 10 %.

Configure reporting of Message 21 with the following parameters:

- *FATDMA setup or RATDMA setup: RATDMA;*
- *UTC minute for CH1: 1;*
- *time interval CH1: 180 (3 min).*

NOTE Standard configuration sentences via configuration port: the schedule for Mode C RATDMA transmission is configured using the AAR sentence.

Standard configuration sentences via VDL: the schedule for Mode C RATDMA transmissions via VDL is configured using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.1.7.3 Required results

Verify that the EUT transmits Test Message 21:

- *using RATDMA so that the slot selection is random within the 1 min interval with single*
- *reports on a single channel;*
- *sending in correct intervals;*
- *with correct transmitted data.*

2.1.7.1 Configuration using AAR sentence

2013-01-16 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration, Tx on channel A only			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 10:03	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute	12:01	Passed
	Check start slot	null	Passed
	Check slot interval	180	Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed

Channel 2	Check no schedule	00	Passed
	Check no start slot	null	Passed
	Check no interval	0	Passed
	Check Sentence Status Flag = “R”		Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
	Check that the transmitted data are correct		Passed
Transmission on channel 2	Check no Tx on channel B		Passed

2.1.8 8.1.8 Addressed binary data Message 6

8.1.8.1 Purpose

The purpose of this test is to verify that the Message 6 operation of the EUT using the implemented access methods.

8.1.8.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 and transmission schedule for Message 21 as defined in 8.1.2 with an "intended recipient" MMSI.

The recipient shall acknowledge the message.

a) Configure the EUT as defined by manufacturer's documentation for transmission of a scheduled addressed binary data Message 6 with test binary data consisting of the bit pattern Hex "7E 3B 3C 3E 7E" forming a message by setting the parameters for the following operation modes, where implemented:

- *FATDMA (see 8.1.2 for Mode A setup; 8.1.3 for Mode B setup; 8.1.4 for Mode C setup);*
- *RATDMA (see 8.1.5 for Mode A setup; 8.1.6 for Mode B setup; 8.1.7 for Mode C setup);*
- *CSTDMA: time (hour, minute), channel(s), reporting interval.*

b) Repeat the test without an acknowledgement from the intended recipient.

c) If possible to use externally generated data, repeat the test exceeding the maximum length of Message 6.

d) Repeat the test for the maximum length of Message 6 by repeating the bit pattern Hex "7E 3B 3C 3E 7E" sequence in the binary data field.

8.1.8.3 Required results

Verify that the EUT continues transmitting Message 21 in all cases and that:

a) the message sent by the EUT conforms to message content, access method, channel, slot number and reporting interval;

b) the EUT behaves as configured;

c) the message is not sent;

d) the message is sent with the correct content.

NOTE CSTDMA access of Message 6 should comply with IEC 62287-1 with regard of VDL access and message length.

2.1.8.1 Configuration using AAR/MPR sentence

The FATDMA tests are covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2013-01-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode A			
Query for AAR sentence			
Check the contents of the AAR response	Check that there is an output of AAR on response		Passed
	Check message ID = 6		Passed
	Check message index (1)		Passed
	Check the test schedule setting	Minutes 2, 5	Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 6 is transmitted in minute 2, 8, 14, 20, 26, 32 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 6 is transmitted in minute 5, 11, 17, 23, 29, 35, ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 6		Passed

2013-01-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode B			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 6		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 6 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 6 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 6		Passed

2013-01-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode C			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 6		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 6 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that there is no transmission on channel A		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 6		Passed

2.1.9 8.1.9 Unscheduled transmission

8.1.9.1 Purpose

Unscheduled transmissions are those transmissions that are not planned, and the competent authority wishes the AtoN Station to broadcast autonomously such as an unexpected alarm condition. The VDL access method for these message types is as defined by manufacturer.

This test will verify the AtoN operation when such a message is input.

8.1.9.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 and transmission schedule for Message 21 as defined in 8.1.2 with an "intended recipient" MMSI.

a) Introduce a transmission of an unscheduled Binary Message as defined by the manufacturer's documentation using the access modes declared by the manufacturer.

b) For an Addressed Message repeat the test, but without an acknowledgment from the intended recipient.

NOTE Standard IEC 61162 sentences: an unscheduled message using standard format would be ABM, ABK or BBM.

8.1.9.3 Required results

Check that the EUT continues to transmit Message 21 in all cases.

a) Check the message transmitted by the EUT conforms to message content, access method.

b) Check that the EUT retransmits as configured.

2013-01-18 Ba	Test details - Unscheduled transmission		
Test item	Check	Remark	Result
Apply an BBM sentence with message 8			
Transmission of broadcast message	Check that the message 8 is transmitted	UTC 14:23	Passed
	Check the access methode	RATDMA	Passed
	Check the message content	The message content is not correct. Nearly all bits are set to 1, independent of the encapsulated data of the ABM input. The length of data is correct (40 bit -> 80 bit (40 + 40 bit) Retest 2013-02-13 Ba: UTC 07:39 • The content is correct. • The message is to long. It should be 80 bit but it is 88 bit. The bits of the addtional byte are set to 0 Retest 2013-02-26 Ba: The message length is correct	Passed Passed
Apply an BBM sentence with message 14			
Transmission of broadcast message	Check that the message 14 is transmitted		Passed
	Check the access methode	RATDMA	Passed
	Check the message content	The message content is not correct. Nearly all bits are set to 1, independent of the encapsulated data of the ABM input. The length of data is correct. (24 bit -> 64 bit (24 + 72 bit) Retest 2013-02-13 Ba: UTC 07:43 • The content is correct. • The message length is correct (64 bit)	Passed

Apply an ABM sentence with message 6			
Transmission of broadcast message	Check that the message 6 is transmitted	UTC 14:06	Passed
	Check the access methode	RATDMA	Passed
	Check the message content	The message content is not correct. Nearly all bits are set to 1, independent of the encapsulated data of the ABM input. The length of data is correct (40 bit -> 112 bit (40 + 72 bit) <u>Retest 2013-02-13 Ba:</u> UTC 07:39 • The content is correct. • The message is too long. It should be 112 bit but it is 120 bit. The bits of the addtional byte are set to 0 <u>Retest 2013-02-26 Ba:</u> • The message length is correct	Passed Passed
	Check that the acknowledgement message has been received	The acknowledgement has not been received <u>2013-02-26 Ba:</u> The manufacturer has declared that acknowledgement of addressed messages is not supported	Passed
Apply an ABM sentence with message 6, no ackn from recipient			
Transmission of broadcast message	Check that the message 6 is transmitted	UTC 14:11	Passed
	Check the access methode	RATDMA	Passed
	Check that the message is repeated according to the configuration ???	The message 6 is not repeated. There is no configuration methode to define the repeating behaviour	Passed

Apply an ABM sentence with message 12			
Transmission of broadcast message	Check that the message 12 is transmitted	UTC 14:19	Passed
	Check the access methode		Passed
	Check the message content	The message content is not correct. Nearly all bits are set to 1, independent of the encapsulated data of the ABM input. The length of data is correct. (24 bit -> 96 bit (24 + 72 bit) Retest 2013-02-13 Ba: UTC 07:54 • The content is correct. • The message length is correct (96 bit)	Passed
	Check that the acknowledgement message has been received	The acknowledgement has not been received 2013-02-26 Ba: The manufacturer has declared that acknowledgement of addressed messages is not supported	Passed
Apply an ABM sentence with message 12, no ackn from recipient			
Transmission of broadcast message	Check that the message 12 is transmitted	UTC 14:12	Passed
	Check the access methode	RATDMA	Passed
	Check that the message is repeated according to the configuration ???	The message 6 is not repeated. There is no configuration methode to define the repeating behaviour	Passed

2.1.10 8.1.10 Test Message 8

8.1.10.1 Purpose

The purpose of this test is to verify that Message 8 can be entered into the EUT.

8.1.10.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 and transmission schedule for Message 21 as defined in 8.1.2.

a) Configure the EUT as defined by the manufacturer's documentation for transmission of a scheduled binary data Message 8 with test binary data consisting of the bit pattern Hex "7E 3B 3C 3E 7E" forming a message by setting the parameters for the following operation modes, where implemented:

- *FATDMA (see 8.1.2 for mode A setup; 8.1.3 for mode B setup; 8.1.4 for mode C setup);*
- *RATDMA (see 8.1.5 for mode A setup; 8.1.6 for mode B setup; 8.1.7 for mode C setup);*
- *CSTDMA: time (hour, minute), channel(s), reporting interval.*

b) If possible, use externally generated data, repeat the test exceeding the maximum length of Message 8.

c) Repeat the test for the maximum length of Message 8 by repeating the bit pattern Hex "7E 3B 3C 3E 7E" sequence in the binary data field.

8.1.10.3 Required results

Verify that:

a) the message sent by the EUT conforms to message content, access method, channel, slot number and reporting interval;

b) message is not sent;

c) message is sent with the correct content.

In all cases, the EUT should continue transmitting Message 21.

NOTE CSTDMA access of Message 6 should comply with IEC 62287-1 with regard to VDL access and message length.

The FATDMA tests are covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2013-01-16 Ba	Test details a) - RATDMA Mode A		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode A			
Query for AAR sentence			
Check the contents of the AAR response	Check that there is an output of AAR on response		Passed
	Check message ID = 8		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 8 is transmitted in minute 2, 8, 14, 20, 26, 32 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 8 is transmitted in minute 5, 11, 17, 23, 29, 35, ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 8		Passed

2013-01-15 Ba	Test details a) - RATDMA Mode B		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode B			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 8		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 8 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 8 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 8		Passed

2013-01-16 Ba	Test details a) - RATDMA Mode C		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode C			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 6		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 8 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that there is no transmission on channel A		Passed
Message content	Check the content of message 8		Passed

2.1.11 8.1.11 AIS AtoN configuration Messages 12

Repeat tests 8.1.10 for Message 12.

The FATDMA tests are covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2013-01-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode A			
Query for AAR sentence			
Check the contents of the AAR response	Check that there is an output of AAR on response		Passed
	Check message ID = 12		Passed
	Check message index (1)		Passed
	Check the test schedule setting	3, 6	Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 12 is transmitted in minute 3, 9, 15, 21, 27, 33 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 12 is transmitted in minute 6, 12, 18, 24, 30, 36, ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 12		Passed

2013-01-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode B			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 12		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 12 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 12 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 12		Passed

2013-01-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode C			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 12		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 12 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that there is no transmission on channel A		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 12		Passed

2.1.12 8.1.12 AIS AtoN configuration Messages 14

Repeat tests 8.1.10 for Message 14.

The FATDMA tests are covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2013-01-16 Ba	Test details a) - RATDMA Mode A		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode A			
Query for AAR sentence			
Check the contents of the AAR response	Check that there is an output of AAR on response		Passed
	Check message ID = 14		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Start of transmission	Check that EUT starts transmission in the next scheduled slot, not waiting for the UTC hour/minute defined in AAR		Passed
Transmission on channel 1	Check that message 14 is transmitted in minute 3, 9, 15, 21, 27, 33 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 14 is transmitted in minute 6, 12, 18, 24, 30, 36, ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 14		Passed

2013-01-15 Ba	Test details a) - RATDMA Mode B		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode B			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 14		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 14 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 14 is transmitted in minute 1, 4, 7, 10,..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 14		Passed

2013-01-16 Ba	Test details a) - RATDMA Mode C		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode C			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 14		Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 14 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that there is no transmission on channel A		Passed
Message content	Check the content of message 14		Passed

2.2 8.2 Tests for synchronisation accuracy

2.2.1 8.2.1 Implemented synchronisation modes and synchronisation error

8.2.1.1 Purpose

The purpose is to verify the implemented synchronisation modes and measure the synchronisation error of the EUT.

8.2.1.2 Method of measurement

Set up the standard test environment and operate EUT in normal mode. Set the EUT reporting interval to 1 min for Message 21 and all other implemented messages.

Operate the EUT in all implemented synchronisation modes:

- *EUT using UTC direct synchronisation;*
- *EUT using UTC indirect synchronisation;*
- *EUT using semaphore synchronisation.*

Record VDL messages and measure the time between the nominal beginning of the slot interval and the initiation of the 'transmitter on' function by evaluating the start flag and calculating back to T_0.

8.2.1.3 Required results

The synchronisation error with its additive jitter shall not exceed:

- *± 104 µs using UTC direct synchronisation;*
- *± 312 µs using UTC indirect synchronisation;*
- *± 312 µs referenced to the semaphore's synchronisation.*

2013-01-17 Ba	Test details - Synchronisation Jitter		
Test item	Check	Remark	Result
Set EUT to an reporting interval of 1 min for message 21 Set other implemented messages to an reporting interval of 1 min			
UTC Direct synchronisation	Check that T2 is in the range of 3.328 ms ± 104 µs		Passed
Disconnect the GPS antenna. Provide other AIS station with UTC direct on the VDL	Check that T2 is in the range of 3.328 ms ± 312 µs	UTC indirect is not implemented (E-mail from manufacturer 2013-01-17)	N/A
Set other station without UTC	Check that T2 is in the range of 3.328 ms ± 312 µs		N/A

2.2.2 8.2.2 Synchronisation test without UTC (Types 2 and 3)

8.2.2.1 Purpose

The purpose of this test is to verify that the EUT can synchronise without UTC.

8.2.2.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1. Choose test conditions in a way that EUT receives messages from a synchronisation source with the following synchronisation states:

a) Base Station direct acting as a semaphore synchronisation and no stations with direct or UTC indirect synchronisation. Disable internal synchronisation source;

b) mobile direct acting as a semaphore synchronisation and no stations with direct or UTC indirect synchronisation. Disable internal synchronisation source;

c) mobile station indicating UTC indirect synchronisation and receiving no stations with direct synchronisation or Base Stations with UTC indirect synchronisation. Disable internal synchronisation source;

d) enable internal synchronisation source.

Record transmitted messages.

8.2.2.3 Required results

Verify that the EUT transmits according to its implemented synchronisation modes in each case.

a) Verify that the EUT synchronises to the Base Station acting as semaphore.

b) Verify that the EUT synchronises to the mobile station acting as semaphore.

c) Verify that the EUT does not synchronise to any station.

d) Verify that the EUT returns to UTC direct synchronisation.

2012-01-17 Ba	Test details - Synchronisation Jitter		
Test item	Check	Remark	Result
Set EUT to an reporting interval of 1 min for message 21 Disconnect internal synchronisation source			
Provide base station in semaphore mode	Check by evaluation of T2 timing that the EUT synchronises to the base station	Only UTC direct is implemented (E-mail from manufacturer 2013-01-17)	N/A
Provide Class A mobile station in semaphore mode	Check by evaluation of T2 timing that the EUT synchronises to the mobile station		N/A
Provide Class A mobile or base station in UTC indirect mode	Check by evaluation of T2 timing that the EUT does not synchronise to the mobile station		N/A
Enable internal synchronisation source	Check by evaluation of T2 timing that the EUT returns to UTC direct synchronisation		N/A

2.3 8.3 Tests for EPFS

This test is covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2.3.1 8.3.1 Position source

2.3.2 8.3.2 Invalid position

2.3.3 8.3.3 Off-position monitor

2.4 8.4 Additional messages

2.4.1 8.4.1 Receive addressed message (Types 2 and 3)

8.4.1.1 Purpose

The purpose of this test is to verify that the EUT correctly receives and, if so configured, processes an addressed message.

8.4.1.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1 and transmission schedule for Message 21 as defined in 8.1.2. Record received messages and frame structure.

a) Apply an addressed binary message (Message 6; EUT as destination) to the VDL.

b) Apply an addressed binary message (Message 6; other station as destination) to the VDL.

8.4.1.3 Required results

Verify that:

a) EUT receives and processes the message in accordance with the manufacturer's specification;

b) EUT does not process the received message.

2013-01-18 Ba	Test details - Receive addressed message		
Test item	Check	Remark	Result
Set "Acknowledgment procedure" field of ACE to 0			
a) Message 6 to EUT	Check that there is a VDM output		Passed
	Check that ackn. message 7 is transmitted	An ackn. Message 7 is not transmitted. According to manufacturer the optional transmission of an acknowledgement is not implemented	Passed
	Check the content of message 7		N/A
b) message to other ID	Check there is no VDM output	There is an VDM output Retest 2013-02-13 Ba: There is no VDM output	Passed
Set "Acknowledgment procedure" field of ACE to 1			
a) Message 6 to EUT	Check that there is a VDM output		Passed
	Check that no ackn. message 7 is transmitted		Passed
b) message to other ID	Check there is no VDM output	There is an VDM output Retest 2013-02-13 Ba: There is no VDM output	Passed

2.5 8.5 Additional functionality

Tests for additional functionality as implemented by the manufacturer.

2.5.1 8.5.1 Test for configuration of the receiver turn-on times (Types 2 and 3)

8.5.1.1 Purpose

The purpose of this test is to ensure that the operational time period for the receivers can be configured using the configuration port of the EUT or the appropriate VDL message.

8.5.1.2 Method of measurement

Set up the standard test environment and operate EUT in normal mode.

a) Configure the receiver turn-on times of the EUT with the following parameters:

- *MMSI of the AtoN Station,*
- *receiver on or interval,*
- *time of first turn on period,*
- *duration of receiver wake up,*
- *interval between receiver activation.*

Using the implemented methods (one or both) enter the appropriate data with the parameter "receiver on or interval".

b) Enter the appropriate data with a definition of a turn on interval.

c) Query the ARW configuration of the receiver turn-on times via the configuration port using the query sentence or other means provided by the manufacturer.

d) Query the ARW configuration of the receiver turn-on times via the VDL and define a FATDMA slot for the VDL replay.

NOTE *Standard configuration sentences via configuration port: the receiver turn-on times are configured using the ARW sentence.*

Standard configuration sentences via VDL: the receiver turn-on times are configured via the VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data

8.5.1.3 Required results

Verify that:

a) the EUT receiver is turned on all the time;

b) the EUT receiver is turned on during the defined time period and interval;

c) the EUT returns on a query with the appropriate message content via PI using the ARW sentence;

d) the EUT returns on a query via the VDL with the appropriate VDL message on the assigned slot and channel using the appropriate application identifier and binary data.

2013-02-26 Ba:	Test details - Receiver turn-on times		
Test item	Check	Remark	Result
		According to the manufacturers declaration there is no special control of the receiver turn on times. The receivers are automatically switched on when they are required (RATDMA)	Passed

2.5.2 8.5.2 Test for configure proprietary AtoN control

This test is covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2.5.3 8.5.3 Test for configuration of payload re-broadcast

8.5.3.1 Purpose

The purpose of this test is to ensure that the EUT can be commanded to rebroadcast the payload or to define a new message for autonomous, continuous transmission. The payload or new message type can be entered into the EUT using the configuration port of the EUT or the appropriate VDL message.

If standard sentences are used, the AAR configuration with message type/id for a specific MPR must precede the MPR to identify it as autonomous continuous transmission. If it is a single transmission, this payload will be broadcast using the slots reserved by the AAR with message id/type = 0, otherwise it will use the schedule defined by the AAR for this message id/type.

8.5.3.2 Method of measurement

Set up the standard test environment and operate the EUT in normal mode. Configure the payload re-broadcast function of the EUT with the following parameters:

- *message type;*
- *message identifier;*
- *total number of sentences;*
- *sequence number;*
- *payload (encapsulated data, as defined by IEC 61162-1).*
- *Using the implemented methods (one or both):*
- *enter the appropriate AAR data to configure broadcast rates for AtoN Station messages*
- *for the following payload re-broadcast.*
- *enter the appropriate payload re-broadcast data.*

NOTE Standard configuration sentences via configuration port: the payload re-broadcast data is configured using the MPR sentence.

Standard configuration sentences via VDL: the payload re-broadcast data is configured via the VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.5.3.3 Required results

Verify that the EUT re-broadcasts the appropriate VDL message with the correct data content.

Remark: The payload configuration using the MPR sentence is tested in section 8.1.8 (msg 6), 8.1.10 (msg 8), 8.1.11 (msg 12) and 8.1.12 (msg 14).

2.5.4 8.5.4 Test for forced broadcast

8.5.4.1 Purpose

The purpose of this test is to ensure that the EUT can be forced to broadcast a specified VDL message via the PI or the VDL.

8.5.4.2 Method of measurement

Set up the standard test environment and operate the EUT in normal mode. Enter the forced broadcast data to the EUT with the following parameters:

- *message type;*
- *message identifier;*
- *VDL channel for message transmission;*
- *time and slot message transmission;*
- *number of consecutive slots for message transmission.*

Using the implemented methods (one or both) enter the appropriate forced broadcast data to the EUT.

NOTE Standard configuration sentences via configuration port: the forced broadcast data is configured using the AFB sentence.

Standard configuration sentences via VDL: the forced broadcast data is configured via the VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.5.4.3 Required results

Verify that the EUT transmits the requested VDL message at the defined time and slot.

The FATDMA tests are covered by the test report BSH/46162/4322093/12-1 for the type 1 AtoN.

2013-01-18 Ba	Test details - Forced broadcast in RATDMA mode		
Test item	Check	Remark	Result
Send AFB sentence to PI port			
Send AFB sentence for message 21	Check that message 21 is transmitted	UTC 12:02	Passed
	Check Tx channel		Passed
	Check that the slot is randomly selected in the defined minute		Passed
Send AFB sentence for message 6	Check that message 6 is transmitted	UTC 12:20	Passed
	Check that the slot is randomly selected in the defined minute		Passed
Send AFB sentence for message 8	Check that message 8 is transmitted	UTC 12:25, 12:27	Passed
	Check that the slot is randomly selected in the defined minute		Passed
Send AFB sentence for message 12	Check that message 12 is transmitted	UTC 12:25, 12:28	Passed
	Check that the slot is randomly selected in the defined minute		Passed

Send AFB sentence for message 14	Check that message 14 is transmitted	Utc 12:26, 12:29	Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
General remark	The message initiated by the AFB sentence is transmitted only if there is an active transmission schedule for the same message type and message index, incl. MPR definition. According to A.5.2 Description this seems to be correct. “already know ... through AAR/MPR or ACE/ACF/AAR configuration”		Passed

2.5.5 8.5.5 Test for version information

8.5.5.1 Purpose

The purpose of this test is to ensure that the EUT can provide version information.

8.5.5.2 Method of measurement

Set up the standard test environment and operate the EUT in normal mode. Enter the query for version information to the EUT using the manufacturer implemented methods.

NOTE Standard configuration sentences via configuration port: the version information is queried using the QVER sentence and the response is provided using VER.

Standard configuration sentences via VDL: the version information is queried via VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data

8.5.5.3 Required results

Verify that the EUT provides with the requested version information.

2013-01-17 Ba	Test details - Version information		
Test item	Check	Remark	Result
Query for VER	Check that there is a VER sentence response		Passed
Device type	Note the Device type Check it for allowed values	AN	Passed
Vendor Id	Note the vendor Id	SMT	Passed
Unique Identifier	Note the Unique Identifier	990123456	Passed
Manufacturers serial number	Note serial number	S03448120273	Passed
Model code	Note the model code	null	Passed
Software revision	Note the software revision	080200.01.01.03	Passed
Hardware revision	Note the software revision	null	Passed

2.5.6 8.5.6 Test for AFC – AtoN function ID capability

2.5.6.1 8.5.6.4 Test for assigning an encryption key for VDL configuration

Not implemented

2.5.7 8.5.7 Test for VDL configuration using chaining (Types 2 and 3)

Not implemented

2.6 8.6 Test for BIIT

8.6.1 Purpose

The purpose of this test is to prove the correct response by the EUT to its BIIT.

8.6.2 Method of measurement

Set up the standard test environment and operate the EUT in normal mode.

a) Disconnect the antenna from the EUT.

b) Apply fault to the Channel 1 receiver.

c) Apply fault to the Channel 2 receiver.

d) Disable the augmentation system, if fitted.

8.6.3 Required results

Verify that:

a) the EUT shall cease transmissions;

b) RATDMA and CSTDMA transmissions shall cease on Channel 1;

c) RATDMA and CSTDMA transmissions shall cease on Channel 2;

d) he EUT shall continue to operate.

2013-01-18 Ba	Test details - BIIT		
Test item	Check	Remark	Result
Disconnect VHF antenna	Check that EUT ceases transmission	EUT continues transmission (VDO output, VDL transmission) This is accepted to enable the unit to detect that the antenna is connected again.	Passed
Channel 1 receiver fault	Check documentation for receiver fault detection	2013-02-26 Ba:	Passed
Channel 2 receiver fault	Check documentation for receiver fault detection	2013-02-26 Ba:	Passed
Augmentation system	Disable augmentation system	No Augmentatin system implemented	Passed

2.7 8.7 Transmitter shutdown procedure

8.7.1 Purpose

The purpose of this test is to verify that the transmitter has an automatic shutdown.

8.7.2 Method of measurement

Review the manufacturer's declaration.

8.7.3 Required results

The manufacturer shall provide a declaration in the documentation that states the EUT will function as required.

2012-07-24 Ba	Test details - Transmitter shutdown procedure		
Test item	Check	Remark	Result
Check documentation	According to the document "SRT Marine Technology, Carbon Transceiver, TX Hardware Timeout Operation" there is an software independent transmitter shutdown procedure. The document includes a circuit diagram and a function description.		Passed

2.8 8.8 Tests for power supply

2.8.1 8.8.1 Average power consumption

8.8.1.1 Purpose

The purpose of this test is to ensure that the power consumption of the AIS AtoN Station is as stated in the manufacturer's documentation.

8.8.1.2 Method of measurement

Set up the standard test environment and operate the EUT in normal mode. Configure reporting of Message 21 to have the following parameters:

- *transmit power level: 12,5 W, or the manufacturer's declared level;*
- *Channel 1 slots: 512 and 513;*
- *Channel 2 slots: 612 and 613;*
- *reporting interval: 3 min.*

The test shall be run for 30 min with 10 full duty cycles to measure the average power consumption.

Optionally, repeat the test for RATDMA for the same transmit power and reporting interval.

8.8.1.3 Required results

Verify that for 10 full duty cycles, the average power consumption of the EUT does not exceed 110 % of the value stated in the manufacturer's documentation.

2013-03-01 Ba	Test details - Average power consumption		
Test item	Check	Remark	Result
Average power consumption			
RATDMA mode	Measured value	12 V: 35 mA, 24 V: 19 mA	Passed
	Compare measured values with the average power consumption	Manual: 12 V, 1.0 Ah/day = 42 mA 35 mA = 83 % of 42 mA	Passed

2.9 8.9 Environmental tests

Tests shall be done in accordance with IEC 60945, 'Durability and resistance to environmental conditions'; Protected or Exposed, or as defined by manufacturer.

The environmental tests are handled in a separate assessment report.

2.10 8.10 Other tests

2.10.1 8.10.1 Quality assurance

The manufacturer shall declare the quality assurance standard to which the EUT is manufactured.

2012-08-30 Ba	Test details - Quality assurance		
Test item	Check	Remark	Result
Check manufacturers documentation	A ISO 9001:2008 certificate for the Quality management system has been provided		Passed

2.10.2 8.10.2 Additional features

The manufacturer shall declare any additional features of the EUT. These features are not tested in accordance with this standard. The manufacturer's declaration shall confirm that additional features, including position accuracy augmentation, do not adversely affect Message 21 transmissions.

2013-02-26 Ba	Test details - Additional fieatures		
Test item	Check	Remark	Result
Check documentation	The manufacturer declares in document LD4167, issue: 5, 14 February 2013, that no additional features are implemented		Passed

2.10.3 8.10.3 Manual

The manual shall include information concerning:

- *external connectors, if applicable;*
- *correct installation of the unit and antennae;*
- *configuration;*
- *power consumption;*
- *firmware upgrades, if applicable;*
- *configuration interface, including hardware and electrical details.*

2013-02-26 Ba	Test details – Requirements of IEC 62320-2		
Test item	Check	Remark	Result
Connectors	Check that a description of the external connectors is included		Passed
	Check that information about the pin-out is provided		Passed
Installation information	Check that information about siting the GPS antenna is included		Passed
	Check that information about siting the VHF antenna is included		Passed
	Check that mechanical dimension drawings of transponder are available		Passed
Configuration	Check that information about configuration is included	A short discription how to use the configuration sentences and a detailled list of the configuration sentences.	Passed

Power consumption	Check that information about power consumption in FATDMA mode is provided	The average power consumption for 12 V input voltage is provided	Passed
	Check that information about power consumption in RATDMA mode is provided	The average power consumption for 12 V input voltage is provided	Passed
Firmware upgrade	Check that information about firmware upgrade is provided		Passed
Configuration interface	Check that information about configuration sentences is provided		Passed
	Check that information about configuration interface hardware is provided		Passed
	Check that electrical details of the configuration interface is provided.		Passed

2.10.4 8.10.4 Marking and identification

Verify that marking and identification complies with 5.4.3.

2013-02-26 Ba	Test details - Marking and identification		
Test item	Check	Remark	Result
Check that the marking and labeling includes:	Identification of the manufacturer	On a separate label on the opposite side of the AtoN	Passed
	Model identification	Carbon TR AtoN	Passed
	Serial number	As Barcode and plain text	Passed
	Operating voltage	12/24 V DC Nominal	Passed
	Software version	The software version is not provided on the label. This is accepted because the software version is provide with a VER sentence	Passed

Annex A Test equipment

A.1 Test equipment summary

#	description	type	identification
1	VDL Analyser / Generator	AIS Test unit MKII	S/N AA08PN Bund BSH/2012, 7200002112 BSH PC10745 SW AISterm V1.0rev47 AISmain V1.47011120R
2	Target simulator software	Furuno Navintra	BSH PC 9169
3	Presentation Interface Monitor	BSH	BSH PC 8441 BSH PC 9457 SW NewMoni V3.1
4	GMDSS-AIS-Testbox (DSC)	Futronic I/S	200 30 405
5	16 Port Serial Device Server	Moxa DE-303	06698, BSH Nr. 6084
6	Connection box for Moxa serial server With 8 converters RS 232 to RS 422	----	----
7	Active retransmitting GPS antenna	RA - 48	4800199
8	Trimble GPS reference receiver	4000RS, Part number 21000-76	S/N 3428A06700
	Auxiliaries:		
9	True RMS Multimeter DMM 916	Tektronix	S/N 138531
10	2-Kanal-Digital-Oszilloskop	Le Croy Wavesurfer 422	LCRY 0301 J 15673
11	Unbalanced Standard Attenuator	Rhode & Schwarz DPR BN 18024/50	BUND KK 11201
12	2 fixed voltage power supply (24 V/10A)	SITOP	BUND 102452, 102453
13	1 fixed voltage power supply (12 V/4,5A)	Siemens	
14	2 adjustable power supplies (30 V/5 A)	PS 405 D	S/N 2737, 2768

Reserve equipment

#	description	type	identification
15	VDL Analyser / Generator	AIS equipment tester	S/N 218 Bund 102710/2002 Prüfgerät Nr. 1
16	VDL Analyser / Generator	AIS equipment tester	Prüfgerät Nr. 2

A.1.1 VDL Analyser / Generator

The VDL analyser/generator:

- receives the radio data telegrams transmitted by the AIS under test, slotwise evaluates their radio parameters (field strength, SNR, etc.) and provides a transparent display of the decoded radio data telegrams (VDL messages).
- transmits radio data telegrams which have been entered/edited via a control panel. The AIS under test receives these messages and either passes the received data to it's presentation interface and/or responds as appropriate.
- records all data contained in the received radio telegrams and radio parameters in a data base for offline evaluation and documentation purposes.
- simulates AIS targets by transmitting position reports of virtual targets up to the maximum channel capacity of 100% channel load on both channels (4500 messages / minute). The data are provided via serial interface to the VDL analyser/ Generator.

A.1.2 Target simulator

The target simulator consists of a standard PC with a special AIS Target Simulator software.

For tests of AIS transponders the data of up to 75 moving targets defined in text file in plain language are transferred to the „TS" input of the VDL Analyser/ Generator as VDM sentences and transmitted on the VHF data link (VDL) . Thus the AIS VHF data link is loaded with simulated AIS targets in fixed slots or in slots selected by the VDL Analyser/ Generator.

A.1.3 Presentation Interface Monitor

The Presentation Interface Monitor is a PC software running on four standard PCs.
It is used to

- analyse the AIS high speed input / output
- analyse the AIS long range function
- generate DSC calls for the DSC test box and to display, log and evaluate the received DSC calls from EUT.

For that purpose it includes the functions:

- coding / decoding of NMEA 6-bit data fields
- online AIS message filtering
- online AIS message editing
- load and transmit predefined sequences
- online modification of transmitted sequences

A.1.4 Sensor Data Simulator

The Sensor Data Simulator provides simulated sensor data to the serial sensor data inputs of the EUT. The sensor data are provided in text files to the Sensor Data Simulator which modifies the sensor data sentences e.g. adding the actual UTC time, modify some time-varying data and by adding a checksum.

The Sensor Data Simulator is basically the same software as the Presentation Interface Monitor using a special part of the functionality of the software.

A.1.5 DSC Testbox

The DSC test box is a standard GMDSS-AIS Test box used for the survey of ship stations.

For the DSC testing of AIS equipment in includes a software extension that provides a remote control input/output facility

- to transmit DSC calls according to ITU 825-3 generated in an external PC on DSC channel 70 and
- to output received DSC calls from the EUT to the external PC.

A special PC software is used to generate the DSC calls and to display, log and evaluate received DSC calls. It communicates via the serial remote control interface to the DSC Testbox.

A.1.6 Serial Interface Server

The Serial Interface Server provides 16 serial lines which can be connected in a flexible way to the EUT and to equipment of the test environment like the DSC Testbox.

The Serial Interface Server is connected to the controlling PCs via Ethernet Network. It includes:

- 8 serial lines according to RS-422 and IEC 61162-1/2
- 8 serial lines according to RS-232

A.1.7 Laboratory Network

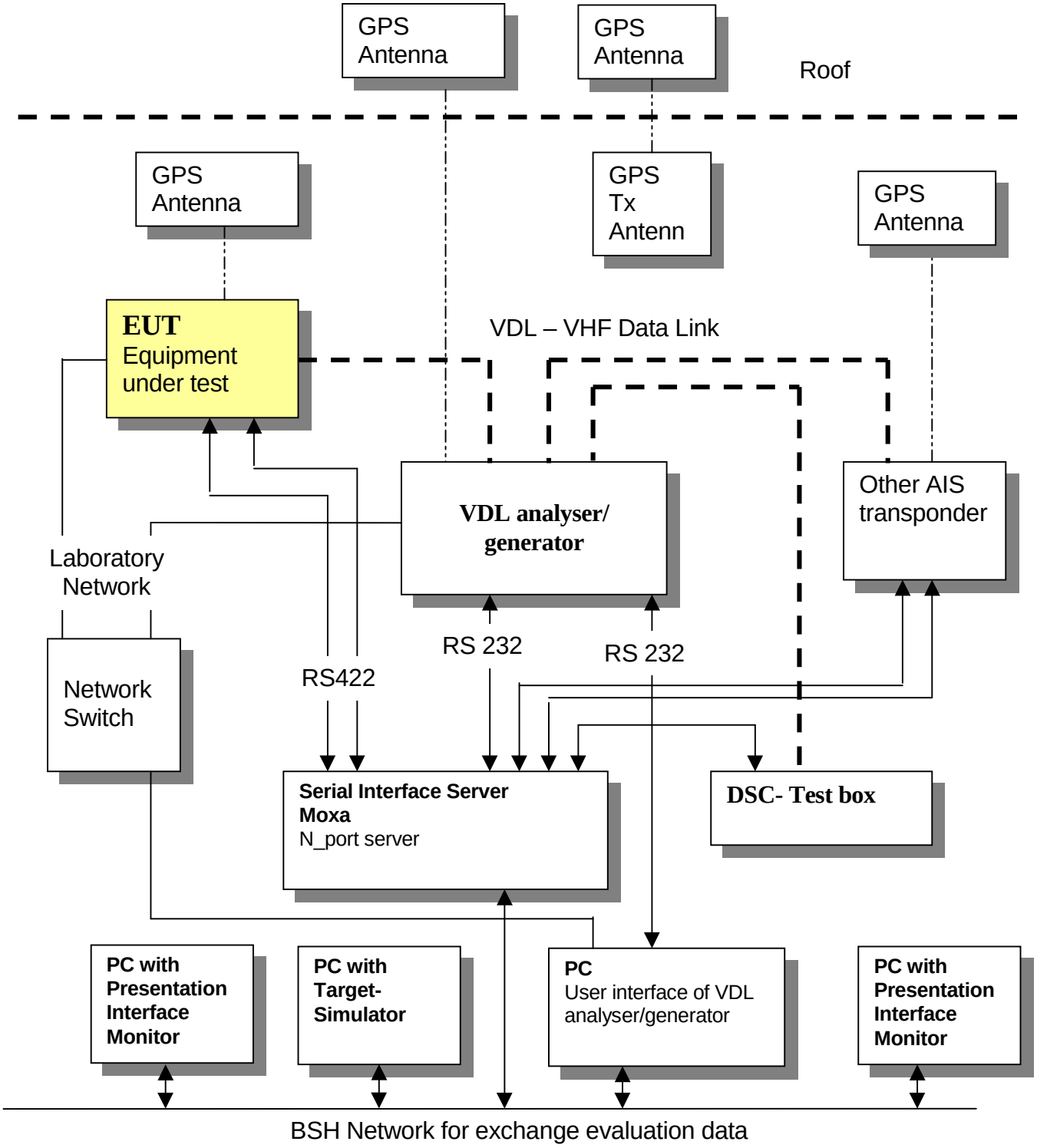
A special laboratory network connect controlling PCs with equipment of the test environment (VDL Generator/ analyser) and with EUT if equipped with an ethernet interface.

A.1.8 GPS Retransmitter

All AIS equipment includes a GPS receiver for the exact timing and for getting position and speed information.

To avoid the need to connect all AIS equipment to GPS antennas outside the laboratory a re-transmitting GPS antenna is installed in the lab. It amplifies and radiates a GPS signal in the laboratory which is received by active GPS antenna on the roof.

A.2 Test environment overview



Annex B Test sentences

B.1 IEC 61162 test sentences

Many of the test sentences are modified manually during the test according to the requirements of the actual test items.
Mainly the MMSI in all addressed sentences are adapted to the actual MMSI of the EUT or of the unit the EUT communicates with.

B.1.1 General configuration

General configuration sentences	
File name	Description
Sentences	
Test_8_1_1_AID.SST	Setting real AtoN MMSI
$VTAID,000000000,1,990123456,R,C	
Test_8_1_2_AID_virtual_MMSI_4.SST	Setting 4 virtual AtoN MMSIs
$VTAID,990123456,1,990111111,V,C $VTAID,990123456,1,990222222,V,C $VTAID,990123456,1,990333333,V,C $VTAID,990123456,1,990444444,V,C	
Test_8_1_2_AID_virtual_MMSI_4_delete.SST	Deleting the 4 virtual AtoNs
$VTAID,990123456,0,990111111,V,C $VTAID,990123456,0,990222222,V,C $VTAID,990123456,0,990333333,V,C $VTAID,990123456,0,990444444,V,C	
Test_8_1_1_ACF_ACE.SST	Standard ACF/ACE config of real AtoN
$VTACF,990123456,1,5332.8200,N,00958.1000,E,0,2084,2086,2084,2086,0,20,0,C $VTACE,990123456,00,0200,0,0,1,TEST_FLOATING_AIS_ATON_STATION,0050050505,C	
Test_8_1_1_ACF_ACE_synthetic.SST	ACF/ACE config of a syntheticl AtoN
$VTACF,990111111,7,5332.0000,N,01000.0000,E,0,2084,2086,2084,2086,0,21,2,C $VTACE,990111111,00,0200,0,0,1,SYNTHETIC_ATON_STATION,0040040404,C	
Test_8_1_1_ACF_ACE_virtual.SST	ACF/ACE config of a virtual AtoN
$VTACF,990111111,7,5332.0000,N,01000.0000,E,0,2084,2086,2084,2086,0,21,1,C $VTACE,990111111,00,0200,0,0,1,VIRTUAL_ATON_STATION,0040040404,C	
Test_8_3_1_ACF_surveyed.SST	Setting surveyed position source
$VTACF,990123456,7,5332.8200,N,00958.1000,E,1,2084,2086,2084,2086,0,20,0,C	

B.1.2 Transmission schedules

Message 21 configuration sentences	
File name	Description
Sentences	
Test_8_1_2_AAR_FATDMA_A.SST	FATDMA Mode A transmission schedule, 3 min interval
VTAAR,990123456,21,01,06,04,512,13500,0,06,01,512,13500,C	
Test_8_1_3_AAR_FATDMA_B.SST	FATDMA Mode B transmission schedule, 3 min interval
$VTAAR,990123456,21,01,06,02,512,6750,0,06,02,612,6750,C	
Test_8_1_4_AAR_FATDMA_C.SST	FATDMA Mode C transmission schedule, 3 min interval
$VTAAR,990123456,21,01,,,-1,,0,10,01,612,6750,C	
Test_8_1_5_AAR_RATDMA_A.SST	RATDMA Mode A transmission schedule, 3 min interval
$VTAAR,990123456,21,01,06,01,,360,1,06,04,,360,C	
Test_8_1_6_AAR_RATDMA_B.SST	RATDMA Mode B transmission schedule, 3 min interval
$VTAAR,990123456,21,01,12,01,,180,1,12,04,,180,C	
Test_8_1_7_AAR_RATDMA_C.SST	RATDMA Mode C transmission schedule, 3 min interval
VTAAR,990123456,21,01,12,01,,180,1,,,,0,C	
AAR_Remove_21_1.SST	Deleting Message 21 transmission schedule
$VTAAR,990123456,21,01,12,02,-1,,0,12,01,-1,,C	

Message 6 configuration sentences	
File name	Description
Sentences	
Test_8_1_8_AAR_FATDMA_A.SST	FATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,06,01,06,04,600,13500,0,06,01,600,13500,C`	
Test_8_1_8_AAR_FATDMA_B.SST	FATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,06,01,06,02,600,6750,0,06,02,700,6750,C`	
Test_8_1_8_AAR_FATDMA_C	FATDMA Mode C transmission schedule, 3 min interval
`$VTAAR,990123456,06,01,,,-1,,0,06,01,600,6750,C`	
Test_8_1_8_AAR_RATDMA_A.SST	RATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,06,01,06,02,,360,1,06,05,,360,C`	
Test_8_1_8_AAR_RATDMA_B.SST	RATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,06,01,06,01,,180,1,06,04,,180,C`	
Test_8_1_8_AAR_RATDMA_C.SST	RATDMA Mode C transmission schedule, 3 min interv
`$VTAAR,990123456,06,01,12,01,,180,1,,,,0,C`	
Test_8_1_8_MPR.SST	Providing content of message 6 using MPR
`$VTMPR,990123456,06,01,0,01,01,OSfGjwp,C`	
Test_8_1_8_MEB.SST	Providing content of message 6 using MEB
`$VTMEB,1,1,3,0,990123456,06,01,0,000001028,1,C,OSfGjwp,0`	
Test_8_1_8_AAR_delete_6.SST	Deleting Message 6 transmission schedule
`VTAAR,990123456,06,01,06,04,-1,,0,06,01,-1,,C`	
Test_8_1_8_MPR_long_65byte.SST	Content for a too long message 6

`$VTMPR,990123456,06,01,0,03,01,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,06,01,0,03,02,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,06,01,0,03,03,OSdt?W,C`	

Message 8 configuration sentences	
File name	Description
Sentences	
Test_8_1_10_AAR_FATDMA_A.SST	FATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,08,01,06,04,800,13500,0,06,01,800,13500,C`	
Test_8_1_10_AAR_FATDMA_B.SST	FATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,08,01,06,02,800,6750,0,06,02,900,6750,C`	
est_8_1_10_AAR_FATDMA_C.SST	FATDMA Mode C transmission schedule, 3 min interval
`$VTAAR,990123456,08,01,,,-1,,0,06,01,800,6750,C`	
Test_8_1_10_AAR_RATDMA_A.SST	RATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,08,01,06,02,,360,1,06,05,,360,C`	
Test_8_1_10_AAR_RATDMA_B.SST	RATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,08,01,06,01,,180,1,06,04,,180,C`	
Test_8_1_10_AAR_RATDMA_C.SST	RATDMA Mode C transmission schedule, 3 min interv
`$VTAAR,990123456,08,01,12,01,,180,1,,,,0,C`	
Test_8_1_10_AAR_delete.SST	Deleting Message 8 transmission schedule
`$VTAAR,990123456,08,01,06,04,-1,,0,06,01,-1,,C`	
Test_8_1_10_MPR.SST	Providing content of message 8 using MPR
`$VTMPR,990123456,08,01,0,01,01,OSfGjwp,C`	
Test_8_1_10_MEB.SST	Providing content of message 8 using MEB
`$VTMEB,1,1,3,0,990123456,08,01,0,,1,C,OSfGjwp,0`	
Test_8_1_10_MPR_long_69.SST	Content for a too long message 8

`$VTMPR,990123456,08,01,0,03,01,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,08,01,0,03,02,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,08,01,0,03,03,OSdt?Wqv>khv,C`	

Message 12 configuration sentences	
File name	Description
Sentences	
Test_8_1_11_AAR_FATDMA_A.SST	FATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,12,01,06,04,1200,13500,0,06,01,1200,13500,C`	
Test_8_1_11_AAR_FATDMA_B.SST	FATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,12,01,06,02,1200,6750,0,06,02,1300,6750,C`	
Test_8_1_11_AAR_FATDMA_C.SST	FATDMA Mode C transmission schedule, 3 min interval
`$VTAAR,990123456,12,01,,,-1,,0,06,01,1200,6750,C`	
Test_8_1_11_AAR_RATDMA_A.SST	RATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,12,01,06,03,,360,1,06,06,,360,C`	
Test_8_1_11_AAR_RATDMA_B.SST	RATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,12,01,12,01,,180,1,12,04,,180,C`	
Test_8_1_11_AAR_RATDMA_C.SST	RATDMA Mode C transmission schedule, 3 min interv
`$VTAAR,990123456,12,01,12,01,,180,1,,,,0,C`	
Test_8_1_11_AAR_delete_12.SST	Deleting Message 12 transmission schedule
`$VTAAR,990123456,12,01,06,04,-1,,0,06,01,-1,,C`	
Test_8_1_11_MPR.SST	Providing content of message 12 using MPR
`$VTMPR,990123456,12,01,0,01,01,=5CC175P6B?=P1D?>,C`	
Test_8_1_11_MEB.SST	Providing content of message 12 using MEB
`$VTMEB,1,1,3,0,990123456,12,01,0,000001028,0,C,=5CC175P6B?=P1D?>,0`	
Test_8_1_11_MPR_too_long_88_char.SST	Content for a too long message 12

`$VTMPR,990123456,12,01,0,03,01,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,12,01,0,03,02,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,12,01,0,03,03,OSdt?Wqv,C`	

Message 14 configuration sentences	
File name	Description
Sentences	
Test_8_1_12_AAR_FATDMA_A.SST	FATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,14,01,06,04,1400,13500,0,06,01,1400,13500,C`	
Test_8_1_12_AAR_FATDMA_B.SST	FATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,14,01,06,02,1400,6750,0,06,02,1500,6750,C`	
Test_8_1_12_AAR_FATDMA_C.SST	FATDMA Mode C transmission schedule, 3 min interval
`$VTAAR,990123456,14,01,,,-1,,0,10,01,1400,6750,C`	
Test_8_1_12_AAR_RATDMA_A.SST	RATDMA Mode A transmission schedule, 3 min interval
`$VTAAR,990123456,14,01,06,03,,360,1,06,06,,360,C`	
Test_8_1_12_AAR_RATDMA_B.SST	RATDMA Mode B transmission schedule, 3 min interval
`$VTAAR,990123456,14,01,12,01,,180,1,12,04,,180,C`	
Test_8_1_12_AAR_RATDMA_C.SST	RATDMA Mode C transmission schedule, 3 min interv
`$VTAAR,990123456,14,01,12,01,,180,1,,,,0,C`	
Test_8_1_12_AAR_delete.SST	Deleting Message 14 transmission schedule
`$VTAAR,990123456,14,01,06,04,-1,,0,06,01,-1,,C`	
Test_8_1_12_MPR.SST	Providing content of message 14 using MPR
`$VTMPR,990123456,14,01,0,01,01,=5CC175P6B?=P1D?>P6?BP1<<,C`	
Test_8_1_12_MEB.SST	Providing content of message 146 using MEB
`$VTMEB,1,1,3,0,990123456,14,01,0,,0,C,=5CC175P6B?=P1D?>P6?BP1<<,0`	
Test_8_1_12_MPR_long_92_char.SST	Content for a too long message 14

`$VTMPR,990123456,14,01,0,03,01,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,14,01,0,03,02,OSdt?Wqv>khvOWps?3qvOSdt?Wqv>khvOWps?3qv,C`
`$VTMPR,990123456,14,01,0,03,03,OSdt?Wqv>khv,C`	

B.1.3 Virtual/synthetic targets

Configuration of virtua/synthetic targets	
File name	Description
Sentences	
Test_8_1_2_AID_synth_MMSI.SST	Configuration of a synthetic AtoN MMSI
`$VTAID,990123456,1,990555555,V,C`	
Test_8_1_2_AID_virtual_MMSI.SST	Configuration of a virtual AtoN MMSI
`$VTAID,990123456,1,990111111,V,C`	
Test_8_1_2_AID_virtual_MMSI_4.SST	Configuration of 4 virtual AtoN MMSIs

`$VTAID,990123456,1,990111111,V,C`
`$VTAID,990123456,1,990222222,V,C`
`$VTAID,990123456,1,990333333,V,C`
`$VTAID,990123456,1,990444444,V,C`	

Test_8_1_2_AID_virtual_MMSI_4_delete.SST	Removing of 4 virtual AtoN MMSIs
$VTAID,990123456,0,990111111,V,C $VTAID,990123456,0,990222222,V,C $VTAID,990123456,0,990333333,V,C $VTAID,990123456,0,990444444,V,C	
Test_8_1_1_ACF_ACE_synthetic.SST	ACF/ ACE configuration of a synthetic AtoN
$VTACF,990555555,7,5332.0000,N,01000.0000,E,0,2084,2086,2084,2086,0,03,2,C $VTACE,990555555,00,0200,0,0,1,SYNTHETIC_ATON_STATION,0050050505,C	
Test_8_1_1_ACF_ACE_virtual.SST	ACF/ ACE configuration of a virtual AtoN
$VTACF,990111111,7,5332.0000,N,01000.0000,E,0,2084,2086,2084,2086,0,21,1,C $VTACE,990111111,00,0200,0,0,1,VIRTUAL_ATON_STATION,0040040404,C	
Test_8_1_1_ACF_ACE_4_virt.SST	ACF/ ACE configuration of 4 virtual AtoNs
$VTACF,990111111,7,5332.1000,N,01000.1000,E,1,,,,,21,1,C $VTACE,990111111,00,0000,0,0,1,TEST_VIRTUAL_AIS_ATON_STATION1,0010010101,C $VTACF,990222222,7,5332.2000,N,01000.2000,E,1,,,,,22,1,C $VTACE,990222222,00,0000,0,0,1,TEST_VIRTUAL_AIS_ATON_STATION2,0020020202,C $VTACF,990333333,7,5332.3000,N,01000.3000,E,1,,,,,23,1,C $VTACE,990333333,00,0000,0,0,1,TEST_VIRTUAL_AIS_ATON_STATION3,0030030303,C $VTACF,990444444,7,5332.4000,N,01000.4000,E,1,,,,,24,1,C $VTACE,990444444,00,0000,0,0,1,TEST_VIRTUAL_AIS_ATON_STATION4,0040040404,C	
Test_8_1_7_AAR_FATDMA_synth_target.SST	FATDMA Tx schedule of a synthetic AtoN
$VTAAR,990555555,21,01,06,02,2012,4500,0,06,03,2012,4500,C	
Test_8_1_7_AAR_FATDMA_4_virt_targets.SST	FATDMA Tx schedule 4 virtual AtoNs, diff. modes
$VTAAR,990111111,21,01,06,04,1512,13500,0,06,01,1512,13500,C $VTAAR,990222222,21,01,06,02,1512,6750,0,06,02,1612,6750,C $VTAAR,990333333,21,01,06,03,1712,6750,0,,,-1,,C $VTAAR,990444444,21,01,,,-1,,0,06,03,1812,6750,C	
Test_8_1_7_AAR_RATDMA_4_virt_targets.SST	RATDMA Tx schedule 4 virtual AtoNs, diff. modes
$VTAAR,990111111,21,01,06,01,,360,1,06,04,,360,C $VTAAR,990222222,21,01,06,02,,180,1,06,02,,180,C $VTAAR,990333333,21,01,06,03,,180,1,06,03,-1,,C $VTAAR,990444444,21,01,06,03,-1,,1,06,03,,180,C	
Test_8_1_7_AAR_delete_4_virt_targets.SST	Deleting Tx schedules of 4 virtual AtoNs
$VTAAR,990111111,21,01,12,01,-1,,0,12,01,-1,,C $VTAAR,990222222,21,01,12,01,-1,,0,12,01,-1,,C $VTAAR,990333333,21,01,12,01,-1,,0,12,01,-1,,C $VTAAR,990444444,21,01,12,01,-1,,0,12,01,-1,,C	

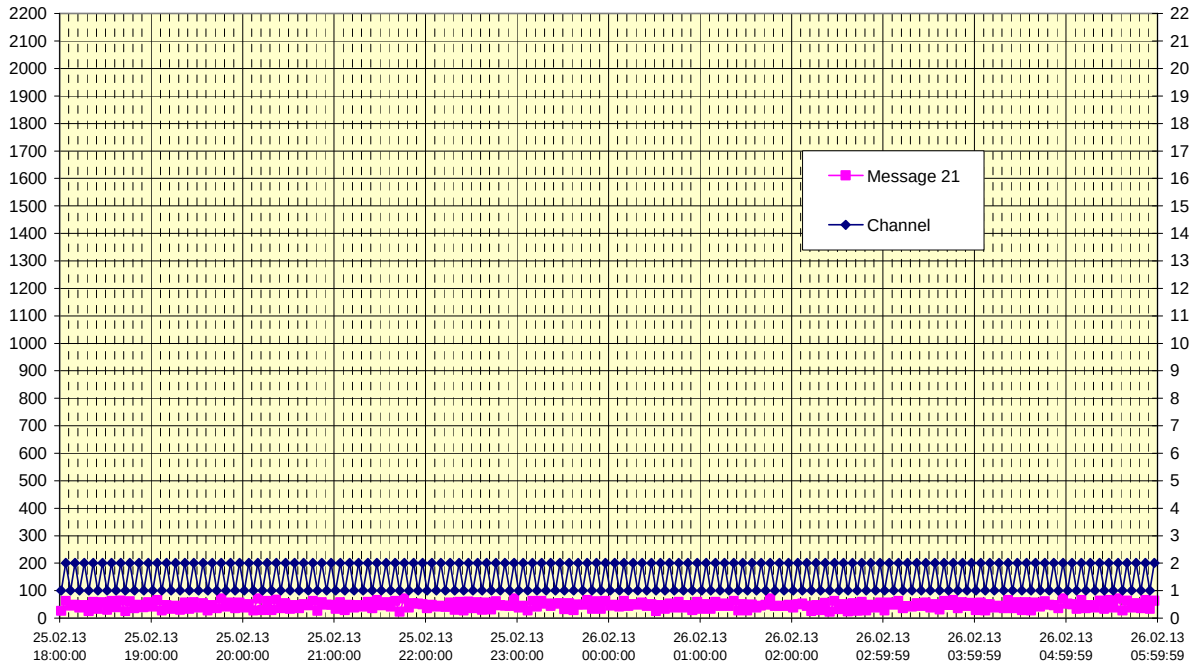
B.1.4 Chaining configuration

Configuration of chaining	
File name	Description
Sentences	
AID_main_parent_Base.SST	MMSI configuration of the parent of the main AtoN
`$VTAID,990123456,1,001000005,P,C`	
AID_main_child_1.SST	MMSI configuration of the child 1 of the main AtoN
`$VTAID,990123456,1,990123457,C,C`	
AID_main_child_2.SST	MMSI configuration of the child 2 of the main AtoN
`$VTAID,990123456,1,990123458,C,C`	
AID_child1_parent.SST	MMSI configuration of the parent of the child 1 AtoN
`$VTAID,990123457,1,990123456,P,C`	
AID_child1_own.SST	MMSI configuration of the child 1 AtoN
`$VTAID,000000000,1,990123457,R,C`	
AID_child1_child.SST	MMSI configuration of the child of the child 1 AtoN
`$VTAID,990123457,1,990123458,C,C`	
AID_child1_child_delete.SST	Delete the MMSI of the child AtoN in the Child 1
`$VTAID,990123457,0,990123458,C,C`	
AID_child2_parent.SST	MMSI configuration of the parent of the child 2 AtoN
`$VTAID,990123458,1,990123457,P,C`	
AID_child2_own.SST	MMSI configuration of the child 2 AtoN
`$VTAID,000000000,1,990123458,R,C`	
AAR_FATDMA_ID0_main.SST	FATDMA Tx schedule for the chaining in the main AtoN
`$VTAAR,990123456,0,01,06,01,100,2250,0,06,01,110,2250,C`	
AAR_FATDMA_ID0_child1.SST	FATDMA Tx schedule for the chaining in the child 1 AtoN
`$VTAAR,990123457,0,01,06,01,1100,2250,0,06,01,1110,2250,C`	
AAR_FATDMA_ID0_delete.SST	Delete the chaining transmission schedule
`$VTAAR,990123456,0,01,06,01,-1,2250,0,06,01,-1,2250,C`	

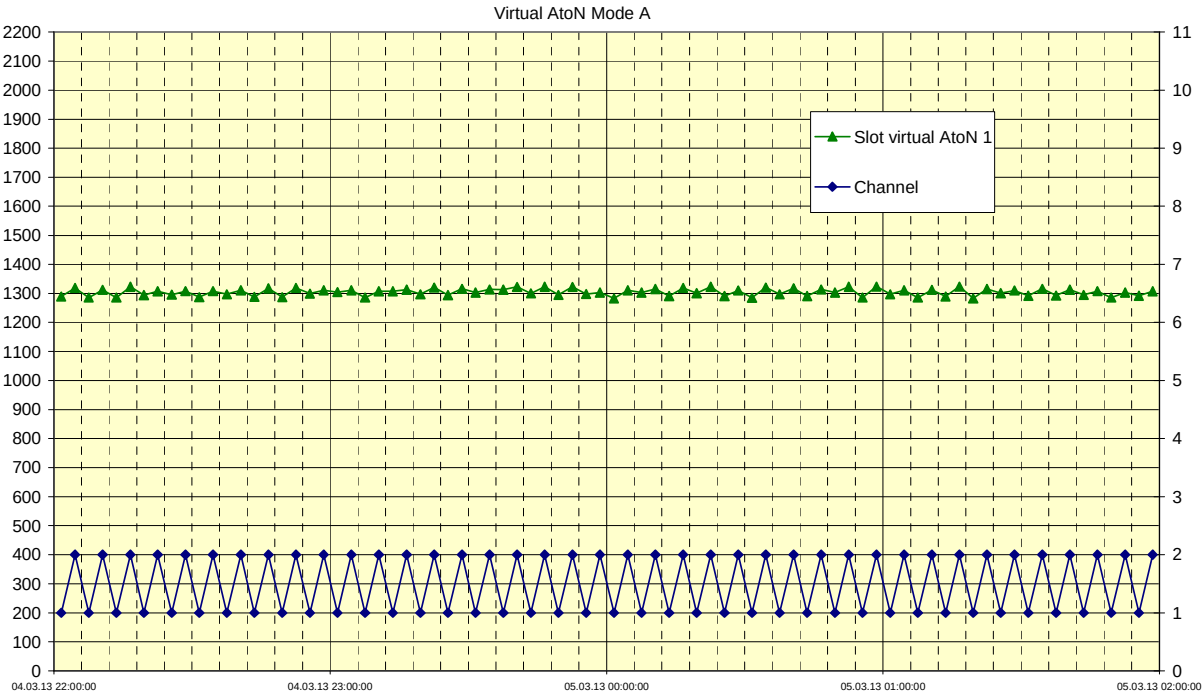
Annex C test diagrams

C.1 Test 8.1.5 Message 21 RATDMA mode A

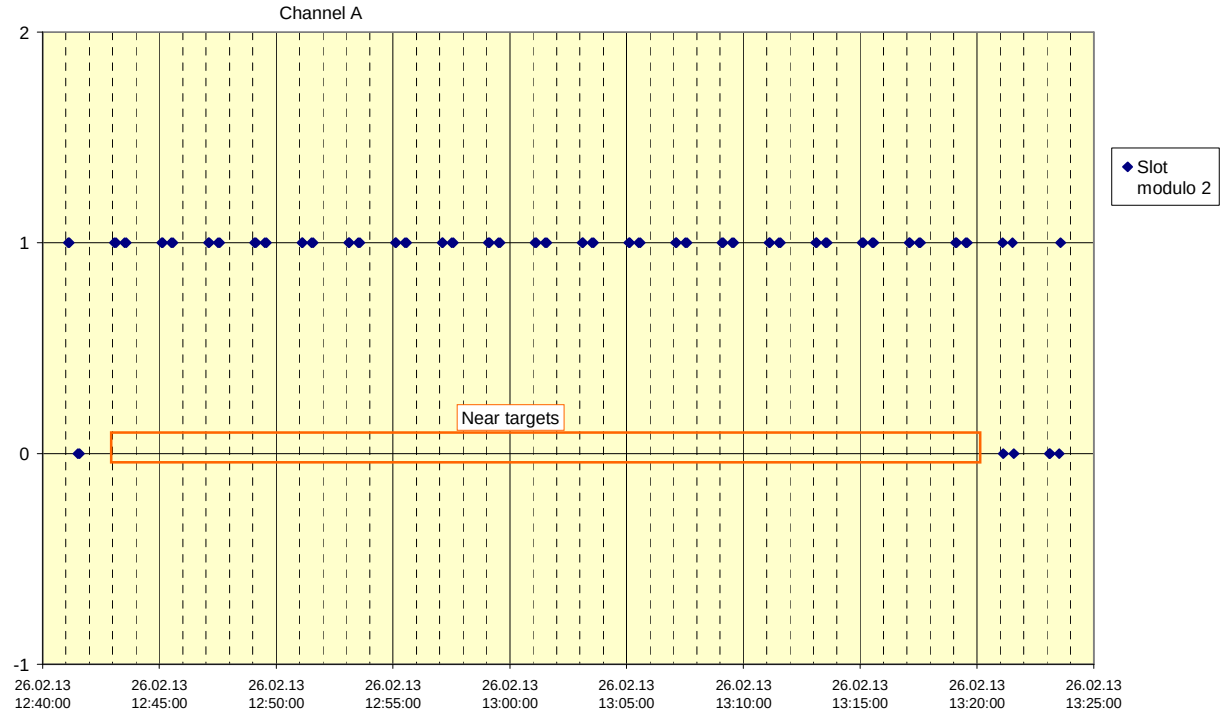
2013-02-26 SRT proAtoN - 8.1.5-12 Schedule RATDMA mode A



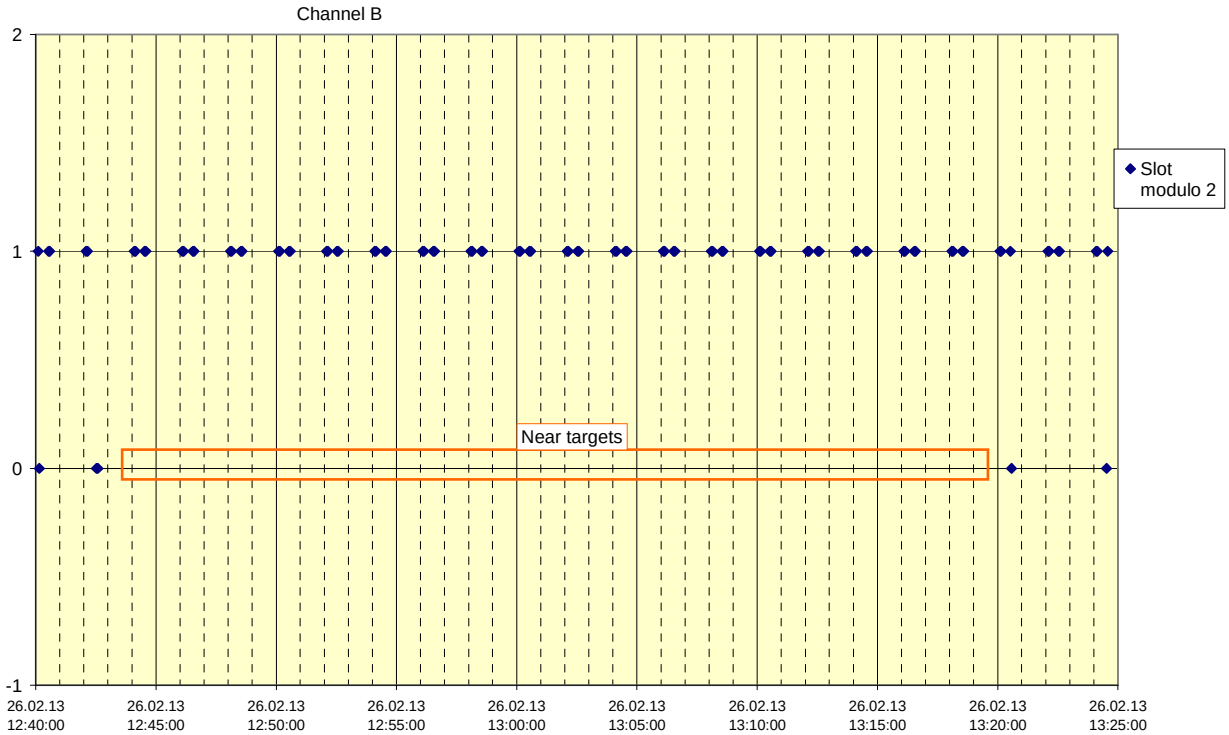
2013-03-05 SRT Carbon AtoN type 3 - 8.1.5-7 Tx schedule RATDMA virtual AtoNs



2013-02-26 Ba - SRT proAtoN - 8.1.5 Slot reuse, 1 slot messages

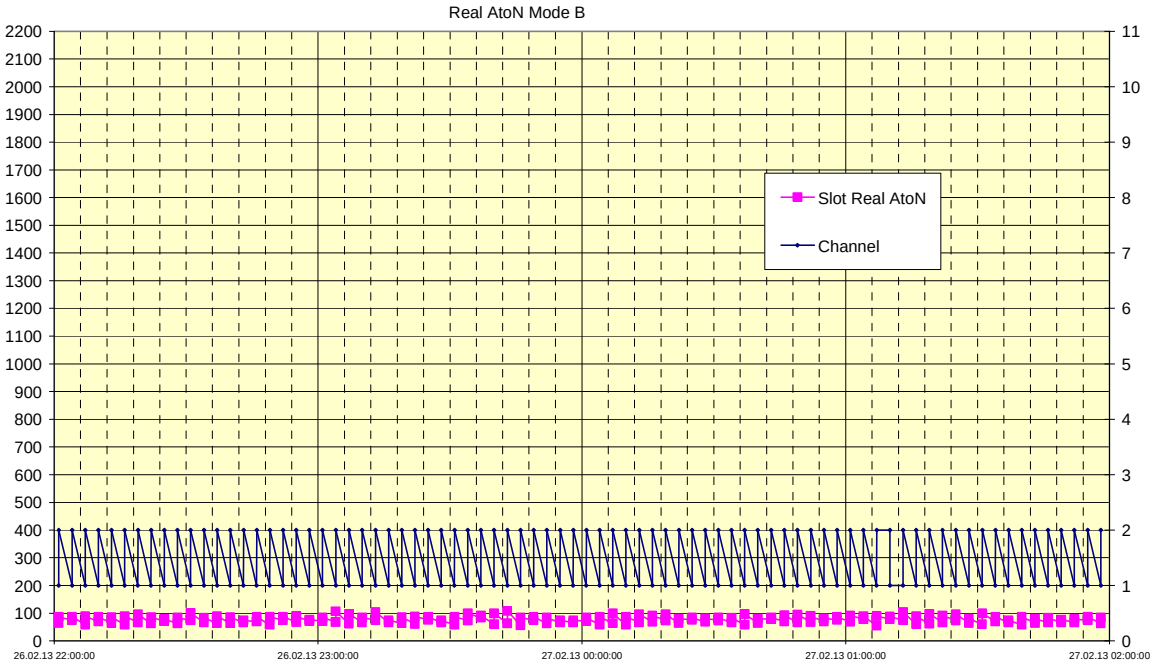


2013-02-26 Ba - SRT proAtoN - 8.1.5 Slot reuse, 1 slot messages

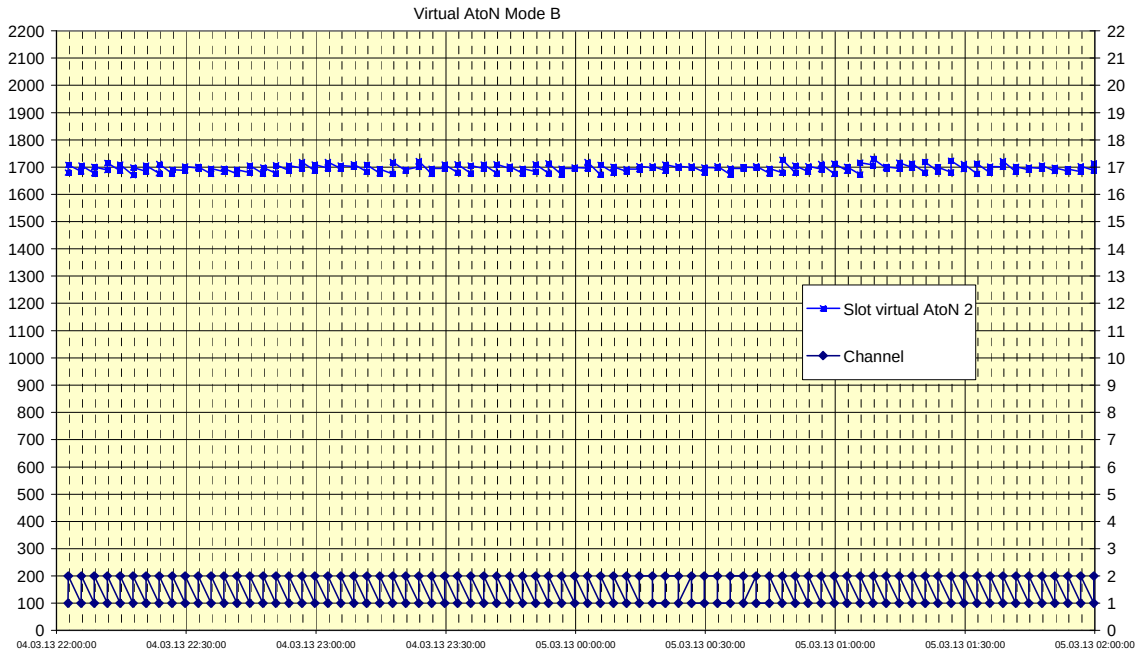


C.2 Test 8.1.6 Message 21 RATDMA mode B

2013-02-27 SRT Carbon AtoN type 3 - 8.1.5-7 Tx schedule RATDMA virtual AtoNs

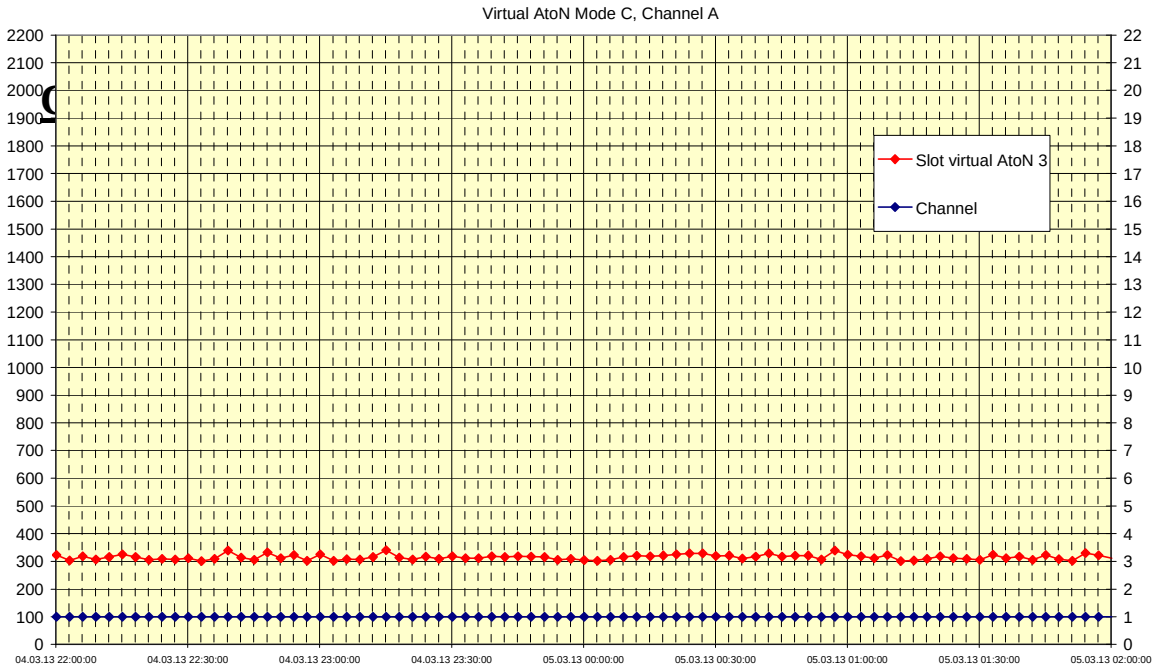


2013-03-05 SRT Carbon AtoN type 3 - 8.1.5-7 Tx schedule RATDMA virtual AtoNs

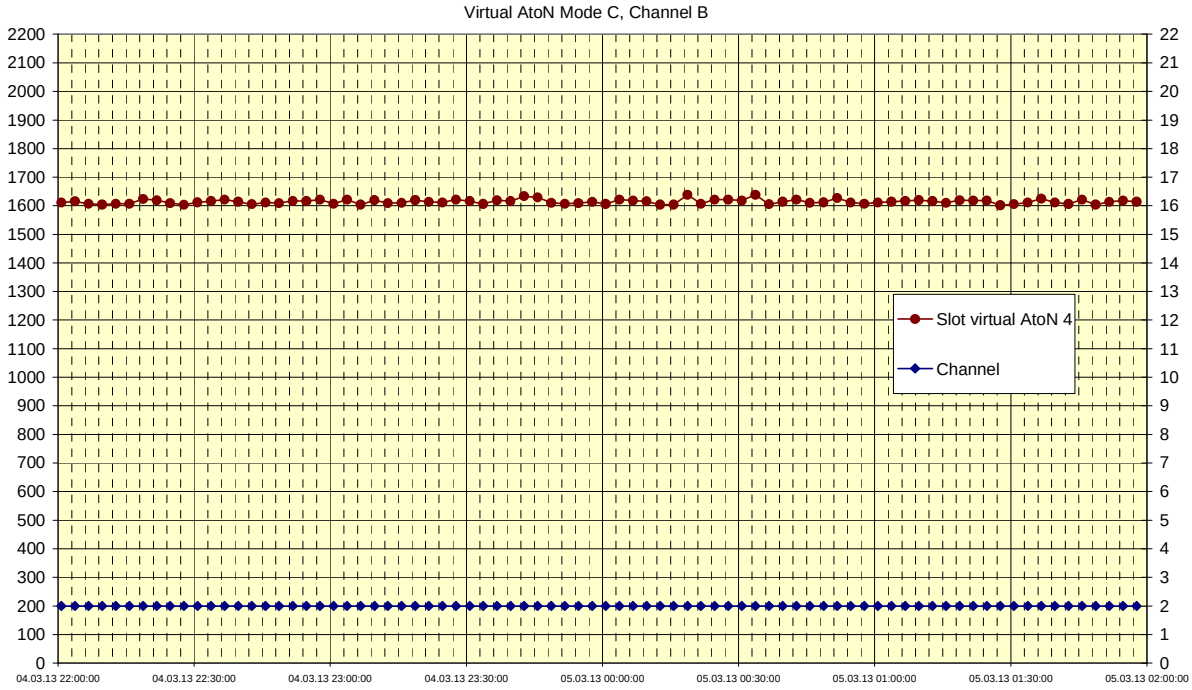


C.3 Test 8.1.7 Message 21 RATDMA mode C

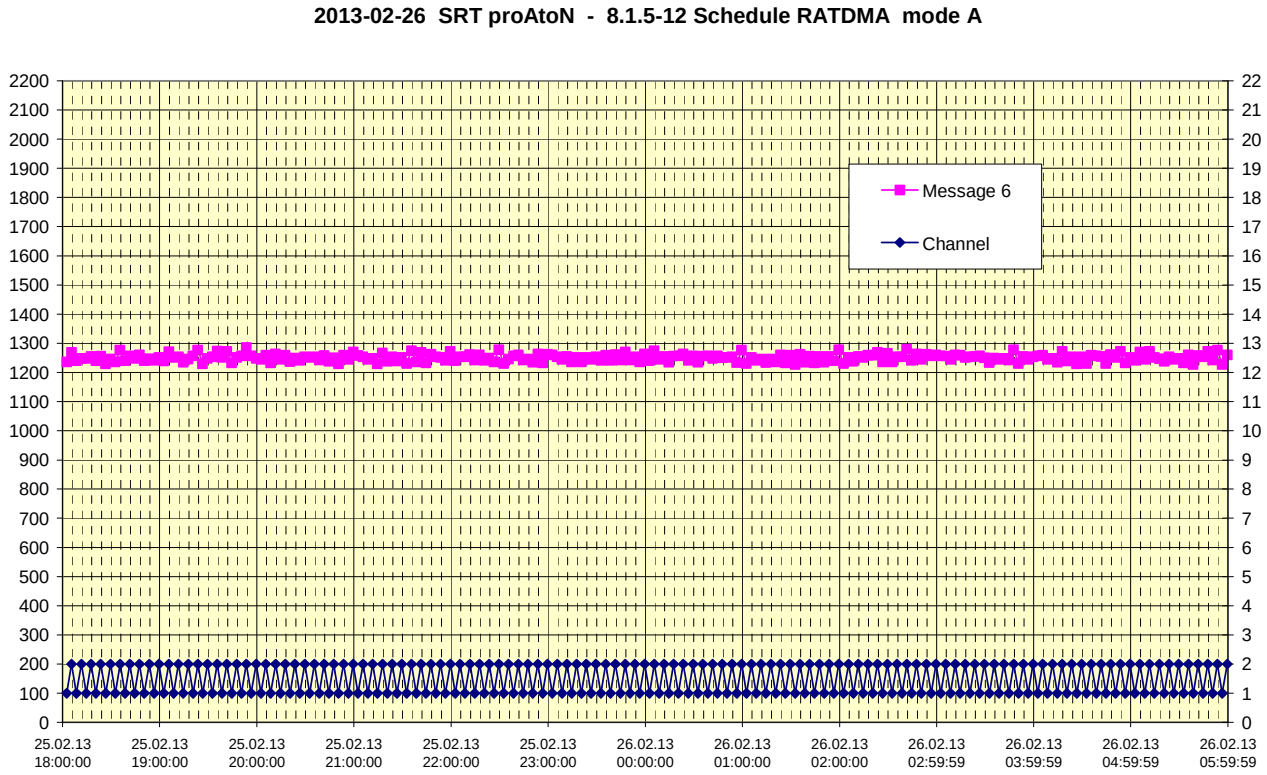
2013-03-05 SRT Carbon AtoN type 3 - 8.1.5-7 Tx schedule RATDMA virtual AtoNs



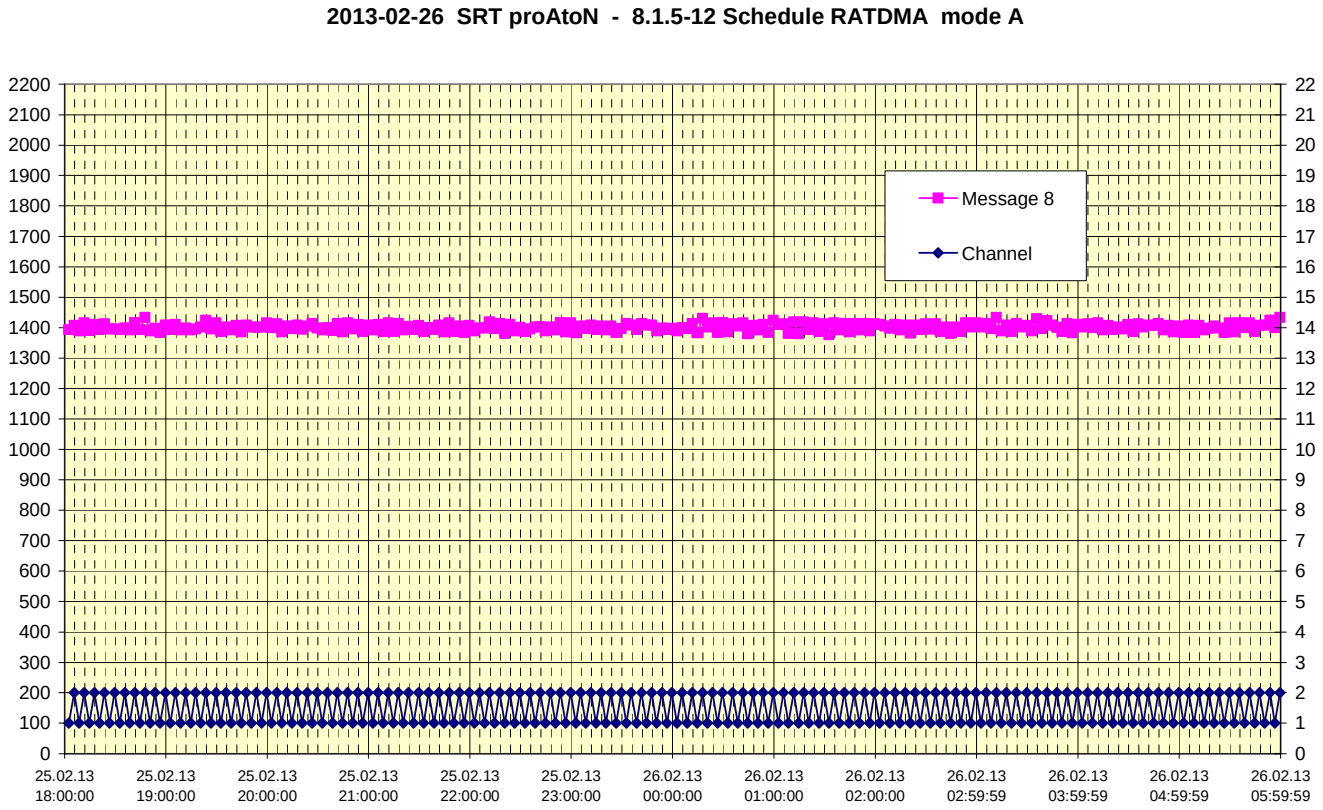
2013-03-05 SRT Carbon AtoN type 3 - 8.1.5-7 Tx schedule RATDMA virtual AtoNs



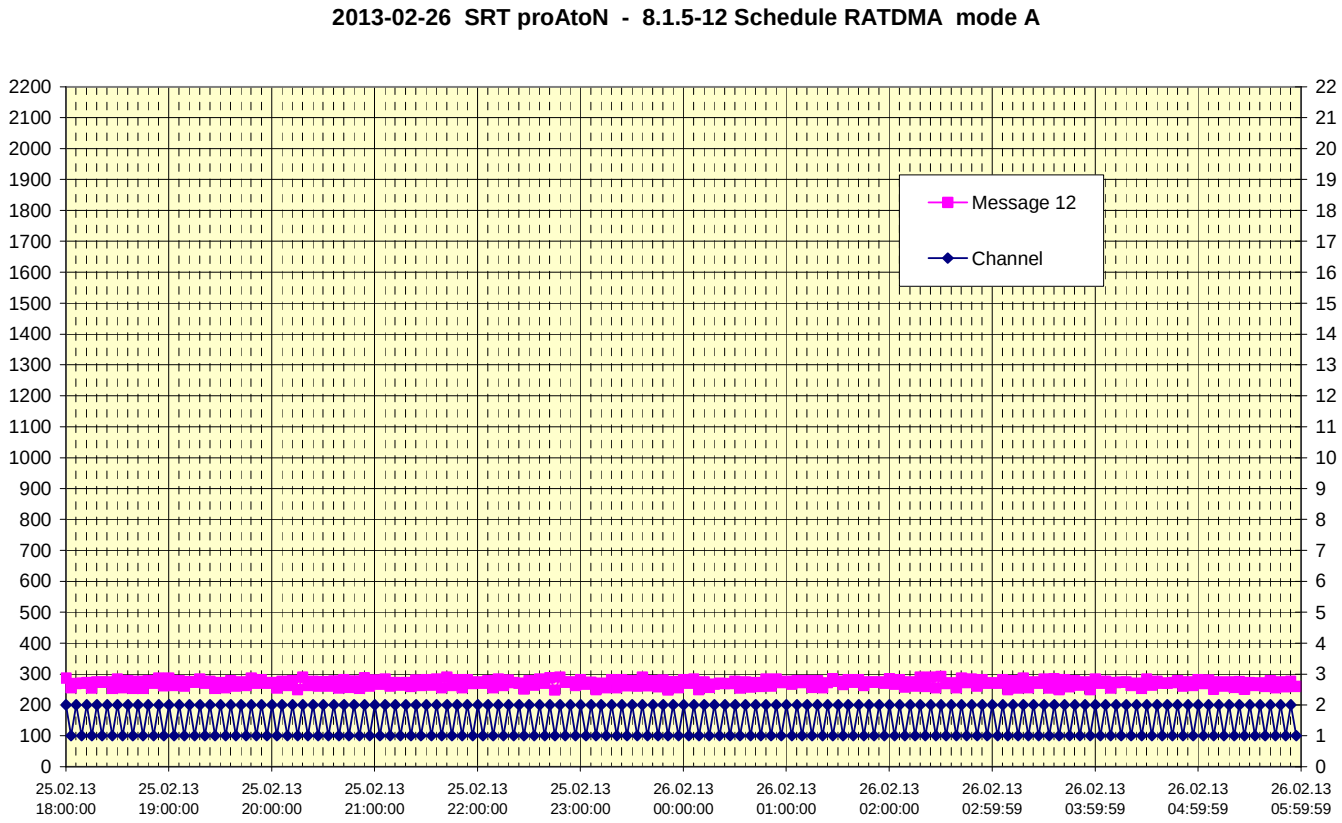
Test 8.1.8 Message 6 RATDMA mode A



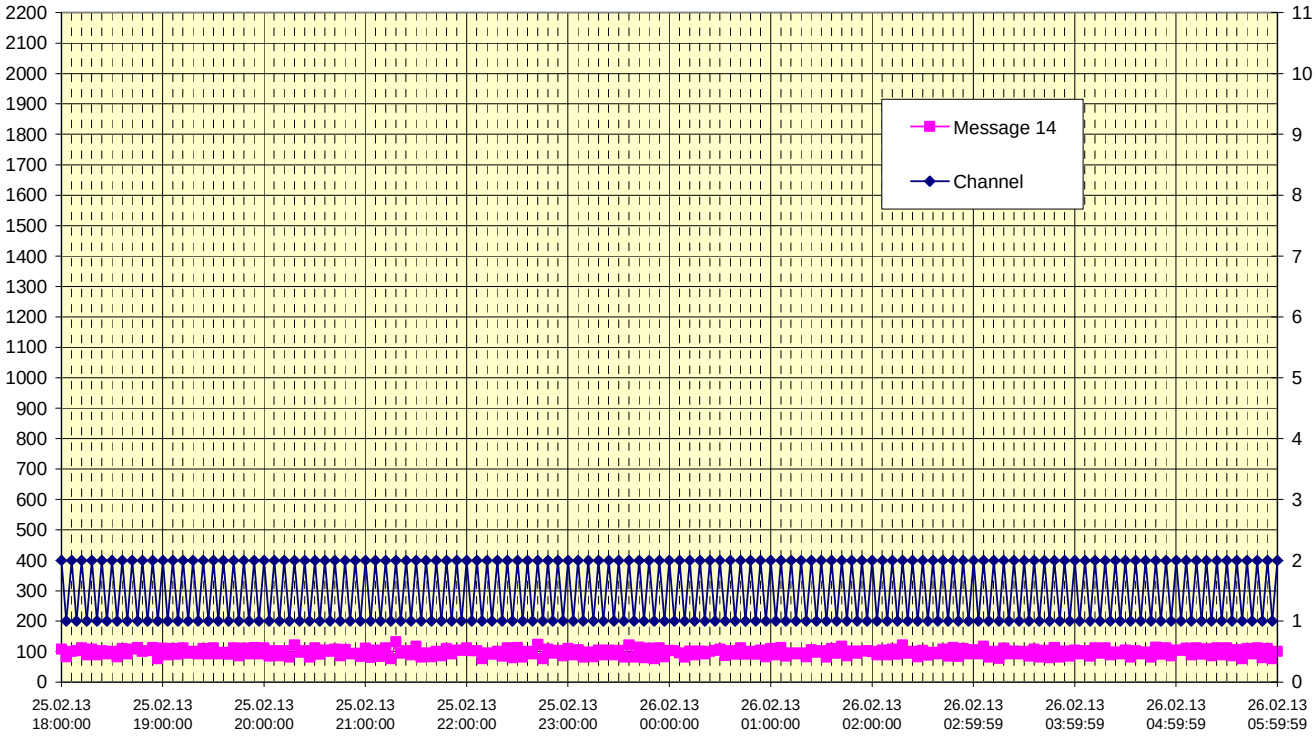
C.5 Test 8.1.10 Message 8 RATDMA mode A



C.6 Test 8.1.11 Message 12 RATDMA mode A



C.7 Test 8.1.12 Message 14 RATDMA mode A



Annex D Photos of equip m ent under test

D.1 Transponder Unit


SRT
Marine Technology
AIS
AtoN

D.2 GPS antenna


GPS ANTENNA
Model:MA-700
S/N:0024016
Made in Taiwan