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: **AMEC**

Type: **MANDO-303/301**

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

Test Report No.: BSH/46162/4321542/11

Applicant: Alltek Marine Electronics Corp.

7F, NO.605, Ruei Guang Rd., Neihu
Taipei
Taiwan, 114

Hamburg, 4 July 2011
Federal Maritime and
Hydrographic Agency

by order

Heinrich Bartels

Test engineer

by order

Hans-Karl von Arnim
Head of section

nach EN ISO/IEC 17025:2005
akkreditiertes Prüflaboratorium

Deutscher Akkreditierungs Rat
DAR
DAT-P-086/98

Federal Maritime and Hydrographic Agency
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Version 2.21

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Signatory of the Multilateral Agreement of EA and ILAC for the mutual recognition

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Federal Maritime and Hydrographic Agency
Department Shipping
Laboratory for Type Approvals
Bernhard-Nocht-Straße 78

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is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out testing in the fields of

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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:	Alltek Marine Electronics Corp. 7F, NO.605, Ruei Guang Rd., Neihu, Taipei, Taiwan, 114
Equipment under test:	
Type:	MANDO-303/301
Manufacturer:	Alltek Marine Electronics Corp. 7F, NO.605, Ruei Guang Rd., Neihu, Taipei, Taiwan, 114
Place of test:	BSH test laboratory Hamburg, Room 916
Start of test:	13 December 2010
End of test:	30 June 2011

Test standards[1]:

IEC 62320-2 Ed.1 (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
IEC 61162-1/ -2
Maritime navigation and radiocommunication equipment and systems Digital Interfaces
Part 1: single talker and multiple listeners (2000)
Part 2: single talker and multiple listeners, high speed transmission (1998)

[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	Passed
4	IEC 62320-2	8.4 Additional Messages	Passed
5	IEC 62320-2	8.5 Additional Functionality 8.5.6.4 Encryption has not been tested	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	Passed
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	MANDO-310	Part No.:	---	
Delivery date	2010-12-13	Serial number	10K310015	
HW Version:	Delivery date	2010-12-07	Version no	
	Installation date	2010-12-07		
SW Version:	Delivery date	2010-12-07	Version no	AtoN-1.3.6 (Type 3)
	Installation date	2010-12-07		
SW Version:	Delivery date	2010-01-31	Version no	AtoN-1.3.8.1
	Installation date	2010-02-07		
SW Version:	Delivery date		Version no	
	Installation date			

GPS antenna				
Type	AMEC	Part No.:	---	
Delivery date	2010-12-13	Serial number	---	
HW Version:	Delivery date	2010-12-13	Version no	---
	Installation date	2010-12-13		

The same GPS antenna is used also for the following equippment.

1.1.2 EUT system no 2

Transponder				
Type	MANDO-310	Part No.:	---	
Delivery date	2010-11-10	Serial number	10K310004	
HW Version:	Delivery date	2010-11-10	Version no	
	Installation date	2010-11-10		
SW Version:	Delivery date	2011-02-09	Version no	AtoN-1.3.8.3
	Installation date	2011-02-09		
SW Version:	Delivery date	2011-02-11	Version no	AtoN-1.3.8.4
	Installation date	2011-02-11		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.3 EUT system no 3

Transponder				
Type	MANDO-303	Part No.:	---	
Delivery date	2011-03-02	Serial number	A1K300002	
HW Version:	Delivery date	2011-03-02	Version no	
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-02	Version no	AtoN-1.3.8.8 (Type 3)
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-09	Version no	AtoN-1.3.8.10
	Installation date	2011-03-09		
SW Version:	Delivery date	2011-03-10	Version no	AtoN 1.3.8.11
	Installation date	2011-03-10		
SW Version:	Delivery date	2011-03-14	Version no	AtoN 1.3.8.12
	Installation date	2011-03-14		
SW Version:	Delivery date	2011-04-01	Version no	AtoN 1.3.8.13
	Installation date	2011-04-04		
SW Version:	Delivery date	2011-04-12	Version no	AtoN 1.4.0.0
	Installation date	2011-04-14		
SW Version:	Delivery date	2011-04-22	Version no	AtoN 1.4.1.0
	Installation date	2011-05-04		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.4 EUT system no 4

Transponder				
Type	MANDO-303	Part No.:	---	
Delivery date	2011-03-02	Serial number	A1K300003	
HW Version:	Delivery date	2011-03-02	Version no	
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-02	Version no	AtoN-1.3.8.8 (Type 3)
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-09	Version no	AtoN-1.3.8.10
	Installation date	2011-03-09		
SW Version:	Delivery date	2011-03-10	Version no	AtoN 1.3.8.11
	Installation date	2011-03-10		
SW Version:	Delivery date	2011-03-14	Version no	AtoN 1.3.8.12
	Installation date	2011-03-14		
SW Version:	Delivery date	2011-04-01	Version no	AtoN 1.3.8.13
	Installation date	2011-04-04		
SW Version:	Delivery date	2011-04-12	Version no	AtoN 1.4.0.0
	Installation date	2011-04-14		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.5 EUT system no 5

Transponder				
Type	MANDO-303	Part No.:	---	
Delivery date	2011-03-02	Serial number	A1K300004	
HW Version:	Delivery date	2011-03-02	Version no	
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-02	Version no	AtoN-1.3.8.8 (Type 3)
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-09	Version no	AtoN-1.3.8.10
	Installation date	2011-03-09		
SW Version:	Delivery date	2011-03-10	Version no	AtoN 1.3.8.11
	Installation date	2011-03-10		
SW Version:	Delivery date	2011-03-14	Version no	AtoN 1.3.8.12
	Installation date	2011-03-14		
SW Version:	Delivery date	2011-04-01	Version no	AtoN 1.3.8.13
	Installation date	2011-04-04		
SW Version:	Delivery date	2011-04-12	Version no	AtoN 1.4.0.0
	Installation date	2011-04-14		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.6 EUT system no 6

Transponder				
Type	MANDO-301	Part No.:	---	
Delivery date	2011-03-02	Serial number	No type label	
HW Version:	Delivery date	2011-03-02	Version no	
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-03-02	Version no	AtoN-1.3.8.8
	Installation date	2011-03-02		
SW Version:	Delivery date	2011-04-22	Version no	AtoN 1.4.1.0
	Installation date	2011-05-10		
SW Version:	Delivery date	2011-05-11	Version no	AtoN 1.4.3.0
	Installation date	2011-05-23		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.7 EUT system no 7

Transponder				
Type	MANDO-303	Part No.:	---	
Delivery date	2011-06-07	Serial number	A1K300030	
HW Version:	Delivery date	2011-06-07	Version no	CTLNC3RFNR2
	Installation date	2011-06-07		
SW Version:	Delivery date	2011-06-07	Version no	AtoN-1.4.4.0 (Type 3)
	Installation date	2011-06-07		
SW Version:	Delivery date		Version no	
	Installation date			

1.1.8 EUT system no 8

Transponder				
Type	MANDO-301	Part No.:	---	
Delivery date	2011-06-07	Serial number	A1K300031	
HW Version:	Delivery date	2011-06-07	Version no	CTLNC3RFNR2
	Installation date	2011-06-07		
SW Version:	Delivery date	2011-06-07	Version no	AtoN 1.4.4.0 (Type 1)
	Installation date	2011-06-07		
SW Version:	Delivery date		Version no	
	Installation date			

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	2010-12-13	2010-12-16	Bartels
1	2011-02-07	2010-02-14	Bartels
3-5	2011-03-09	2011-03-15	Bartels
3-5	2011-04-04	2011-04-08	Bartels
3-5	2011-04-08	2011-04-11	Bartels
3-5	2011-04-14	2011-04-18	Bartels
3	2011-05-04	2011-05-04	Bartels
6	2011-05-10	2011-05-11	Bartels
6	2011-05-23	2011-05-23	Bartels
7, 8	2011-06-22	2011-06-22	Bartels
Documents	2011-06-30	2011-06-30	Bartels

Remark:
This is a combined test report for the type 1 equipment Mando-301 and the type 3 equipment Mando-303.

Most tests have been performed with the type 3 equipment Mando-303 (equipment 1...5).

Additionally the most relevant tests for a type 1 unit (FATDMA transmission) have been performed with a type 1 unit (equipment 6).

The software for both the Mando-303 and the Mando-301 is identical. It is configured for type 1 and type 3 using a proprietary sentence.

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)

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	Monitoring of AtoN latern, power supply, etc
Tx of message 7	3	Yes	Ackn. of message 6
Tx of message 8	1, 2, 3	Yes	Meteorological and hydrological data
Tx of message 12	1, 2, 3	Yes	Warn AtoN malfunctioning
Tx of message 13	3	Yes	Ackn. of message 12
Tx of message 14	1, 2, 3	Yes	Warn AtoN malfunctioning
Tx of message 25	1, 2, 3	No	Status report

External Interfaces: External Interfaces: Four RS-232, one RS-422, two digital IN, two digital Out, two analogue IN

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: 2007-12-19

[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
2011-02-14 Ba	Query responses on VDL queries (message 6 and 25)	In case of multiple responses on one query with FATDMA slots one response is transmitted in the defined response slot. The other responses are transmitted in RATDMA mode immediately after the query message. If the defined slots are are some time after the query there may be a long time between the RATDMA responses and the FATDMA message. It seems to be more appropriate to transmit the further responses after the defined slots. The base station expects the responses at the time defined by the FATDMA slots, and it seems to be appropriate to receive all messages of the response nearly at the same time, starting with the defined FATDMA slot Therefore we recommend not to start the RATDMA interval after reception of the query but to transmit the first response message in the defined FATDMA slot and the further response messages in RATDMA mode in a RATDMA interval starting with the FATDMA slot,. Retest 2011-03-09 Ba: The sequence of response messages starts at the defined transmission slot Retest 2011-04-11 Ba: In case of multiple responses the EUT transmits all message in RATDMA mode immediately after receiving the request. It should start transmission with the transmission slot in the request, as it has been successfully tested in the retest 2011-03-09. See logfile Retest 2011-04-15 Ba: The sequence of response messages starts at the defined transmission slot	Passed
2011-04-18 Ba	Receiving probability	It has been observed, also in previous tests, that the receiver A has some receiving problems with the VDL tester. On channel A about 80 to 90% of the transmitted are received. The problem was found in the 90% load test but it is not a proble of the load performance. A test with 2 s reporting interval got the same result. This problem did not occur with a Class A transponder as transmitter. The relevant test for receiving performance is the physical radio test, but we'd like to attract your attention to this possible problem.	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.*

2010-12-09 Ba	Test details - Configuration methode	
Configuration methode	Remark	Result
Standard configuration sentences	Implemented	Passed
Standard configuration sentences via VDL	Implemented	Passed
Proprietary methode	Not implemented	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

2011-01-04 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	= R	Passed
	Check Sentence status flag = “R”	= 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	UTC 12.38	Passed
	Check MMSI		Passed
	Check type of EPFS		Passed
	Check latitude – N/S	The output value is different to the input value: Input: 5332.8200 Output: 5332.81982 Input: 5332.8300 Output: 5332.83012 Retest 2011-02-07 Ba: The output values are correct.	Passed

	Check longitude – E/W	The output value is different to the input value: Input: 00958.1000 Output: 00958.09993 Input: 00958.1200 Output: 00958.11996 Retest 2011-02-07 Ba: The output values are correct.	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

2011-01-04 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		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

2.1.1.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration using VDL message 6 Check by query for VDL response		
Test item	Check	Remark	Result
Apply via VDL message 6 an AID (FI=0), and ACF/ACE messages (FI = 3 to 8) with an appropriate configuration.			
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	UTC 14:43	Passed
	Check MMSI of AtoN		Passed
	Check create/ delete field = null		Passed
	Check MMSI	990000001	Passed
	Check virtual, real or chained	V	Passed
	Check Sentence status flag = “R”		Passed
	Delete virtual target		Passed
Query for ACE	Check MMSI of AtoN		Passed
	Check AtoN status	= 0	Passed
	Check Off-position threshold	120	Passed
	Check Ackn. procedure (0/1)	= 1	Passed
	Check Off-positon behaviour (0/1)	= 1	Passed
	Check Synch lost behaviour (0/1)	= 1	Passed
	Check Name of AtoN		Passed
	Check dimensions	0050040302	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	= 7	Passed
	Check latitude – N/S	Old value Retest 2011-03-09 Ba: The old value is output on query for ACF. The new value is used for the transmitted message 21. After a restart of the unit the new value is output on query. Retest 2011-04-05 Ba: UTC 12:40 The new value is immediately output in ACF	Passed
	Check longitude – E/W	Old value Retest 2011-03-09 Ba: Same as latitude Retest 2011-04-05 Ba: The new value is immediately output in ACF	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	= 2	Passed
	Check Type of AtoN	= 06	Passed
	Check virtual flag	= 0	Passed
	Check Sentence status flag = “R”		Passed
Send an AID query message (FI=1) .			
Evaluate the AID response message (FI=2)	Check that the AID response message is received	Test 2011-02-11 Ba	Passed
	Check message ID = 6		Passed
	Check repeat indicator	= 0	Passed
	Check source ID	990123456	Passed
	Check sequence number = 0	= 0	Passed
	Check destination ID	001000005	Passed
	Check retransmit flag = 0	= 0	Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 2		Passed

AIS encrypted binary data of AID response	Check DAC = 990		Passed
	Check check FI = 2		Passed
	Check MMSI of AtoN	001000005 = parent MMSI There should be the MMSI of AtoN (for the EUT 990123456) Retest 2011-03-09 Ba: MMSI = 990123456 = MMSI of AtoN	Passed
	Check number of MMSIs	= 3	Passed
	Check first MMSI	990123456	Passed
	Check MMSI type (0...3)	0 = real	Passed
	Check second MMSI	1000005	Passed
	Check MMSI type (0...3)	2 = chained parent	Passed
	In a second message 6		
	Check third MMSI	990123457	Passed
	Check MMSI type (0...3)	3 (chained child)	Passed
Send an ACF/ACE query message (FI=9)			
Evaluate the ACF/ACE response part 1 (FI=10)	Check that the ACF/ACE response message part 1 is received	UTC 11:54	Passed
	Check message ID = 6		Passed
	Check repeat indicator		Passed
	Check source ID		Passed
	Check sequence number = 0		Passed
	Check destination ID		Passed
	Check retransmit flag = 0		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 2		Passed
AIS encrypted binary data of ACF/ACE response part 1	Check DAC = 990		Passed
	Check check FI = 10		Passed
	Check MMSI of the AtoN	1000005 See above Retest 2011-03-09 Ba: MMSI = 990123456 = MMSI of AtoN	Passed
	Check Off-position threshold	= 200	Passed
	Check lat		Passed
	Check lon	58.0998 min instead of 58.1000	Passed
	Check behaviour for sync loss	= 1	Passed
	Check power level	= 0	Passed

Evaluate the ACF/ACE response part 2 (FI=11)	Check that the ACF/ACE response message part 2 is received		Passed
	Check message ID = 6		Passed
	Check repeat indicator		Passed
	Check source ID		Passed
	Check sequence number = 0		Passed
	Check destination ID		Passed
	Check retransmit flag = 0		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 11		Passed
AIS encrypted binary data of ACF/ACE response part 1	Check DAC = 990		Passed
	Check check FI = 11		Passed
	Check MMSI of the AtoN	1000005 See above Retest 2011-03-09 Ba: MMSI = 990123456 = MMSI of AtoN	Passed
	Check Off-position behaviour	= 0	Passed
	Check Rx channel 1		Passed
	Check Rx channel 2		Passed
	Check Tx channel 1		Passed
	Check Tx channel 2		Passed

2011-02-17 Ba	Test details - Configuration using VDL message 6 Check of message 21 contents		
Test item	Check	Remark	Result
Send a query for message 21 content (FI = 32)			
Check the response message (FI = 33), Header	Check that the message 21 content response message is received	Not implemented Remark: The list of implemented VDL configuration functions should be included in the manual	Passed
	Check message ID = 6		N/A
	Check repeat indicator		N/A
	Check source ID		N/A
	Check sequence number = 0		N/A
	Check destination ID		N/A
	Check retransmit flag = 0		N/A
Application identifer in binary data	Check DAC = 990		N/A
	Check check FI = 2		N/A
Application identifer in encrypted data	Check DAC = 990		N/A
	Check check FI = 2		N/A
Check content of message 21 Not encrpted	Check message ID		N/A
	Check MMSI		N/A
	Check Repeat indicator		N/A
	Check MMSI		N/A
	Check Type of AtoN		N/A
	Check Name of AtoN		N/A
	Check longitude		N/A
	Check latitude		N/A
	Check dimensions		N/A
	Check type of EPFS		N/A
	Check time stamp		N/A
	Check off position indicator		N/A
	Check AtoN status		N/A
	Check RAIM flag		N/A
	Check Virtual AtoN flag		N/A
	Check assigned mode flag		N/A
	Check Name of AtoN extension		N/A
	Check Sentence status flag = “R”		N/A

2.1.1.3 Configuration using VDL message 25

2011-02-11 Ba	Test details - Configuration using VDL message 25 Check by query for VDL response		
Test item	Check	Remark	Result
Apply via VDL message 6 an AID (FI=0), and ACF/ACE messages (FI = 3 to 8) with an appropriate configuration.			
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		Passed
	Check Sentence status flag = “R”		Passed
	Delete virtual target		Passed
Query for ACE	Check MMSI of AtoN		Passed
	Check AtoN status	= 3	Passed
	Check Off-position threshold		Passed
	Check Ackn. procedure (0/1)	= 0	Passed
	Check Off-positon behaviour (0/1)	= 1	Passed
	Check Synch lost behaviour (0/1)	= 0	Passed
	Check Name of AtoN		Passed
	Check dimensions	0060050403	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	Old value Retest 2011-03-09 Ba: The old value is output on query for ACF. The new value is used for the transmitted message 21. After a restart of the unit the new value is output on query. Retest 2011-04-05 Ba: UTC 12:48 The new value is immediately output in ACF	Passed
	Check longitude – E/W	Old value Retest 2011-03-09 Ba: Same as latitude Retest 2011-04-05 Ba: The new value is immediately output in ACF	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	= 1	Passed
	Check Type of AtoN	= 21	Passed
	Check virtual flag	= 0	Passed
	Check Sentence status flag = “R”		Passed
Send an AID query message (FI=1) .			
Evaluate the AID response message (FI=2)	Check that the AID response message is transmitted		Passed
	Check message ID = 25		Passed
	Check repeat indicator		Passed
	Check source ID		Passed
	Check destination indicator	= 0	Passed
	Check Binary data flag	= 0	Passed

AIS encrypted binary data of AID response	Check DAC = 990		Passed
	Check check FI = 2		Passed
	Check MMSI of AtoN		Passed
	Check number of MMSIs	= 4	Passed
	Check first MMSI	First: 990123456 Third: 001000005	Passed
	Check MMSI type (0...3)	First: 0 = real Third: 2 = chained Parent	Passed
	Check second MMSI	Second: 990111111 fourth: 990123457	Passed
	Check MMSI type (0...3)	First: 1 = virtual Third: 3 =chained Child	Passed
Send an ACF/ACE query message (FI=9)			
Evaluate the ACF/ACE response part 1 (FI=10)	Check that the ACF/ACE response message part 1 is received	UTC 14:12	Passed
	Check message ID = 25		Passed
	Check repeat indicator	= 0	Passed
	Check source ID		Passed
	Check destination indicator	= 0	Passed
	Check Binary data flag	= 0	Passed
AIS encrypted binary data of ACF/ACE response part 1	Check DAC = 990		Passed
	Check check FI = 10		Passed
	Check MMSI of the AtoN	001000005 = parent MMSI There should be the MMSI of AtoN (for the EUT 990123456) Retest 2011-03-09 Ba: MMSI = 990123456 = MMSI of AtoN	Passed
	Check Off-position threshold		Passed
	Check lat	The actual position from the internal GNSS is reported. Because this is a query for the configuration the configured position should be reported. Retest 2011-03-09 Ba: The configured value is responded	Passed
	Check lon		Passed
	Check behaviour for sync loss		Passed
	Check power level		Passed

Evaluate the ACF/ACE response part 2 (FI=11)	Check that the ACF/ACE response message part 2 is received		Passed
	Check message ID = 25		Passed
	Check repeat indicator		Passed
	Check source ID		Passed
	Check destination indicator	= 0	Passed
	Check Binary data flag	= 0	Passed
AIS encrypted binary data of ACF/ACE response part 1	Check DAC = 990		Passed
	Check check FI = 11		Passed
	Check MMSI of the AtoN	001000005 = parent MMSI see above Retest 2011-03-09 Ba: MMSI = 990123456 = MMSI of AtoN	Passed
	Check Off-position behaviour	= 1	Passed
	Check Rx channel 1		Passed
	Check Rx channel 2		Passed
	Check Tx channel 1		Passed
	Check Tx channel 2		Passed

2011-02-21 Ba	Test details - Configuration using VDL message 25 Check of message 21 contents		
Test item	Check	Remark	Result
Send a message 25 with query for message 21 content (FI = 32)			
Check the response message (FI = 33), Header	Check that the message 21 content response message is received	Not implemented	Passed
	Check message ID = 25		N/A
	Check repeat indicator		N/A
	Check source ID		N/A
	Check destination indicator = 0		N/A
	Check binary data flag = 0		N/A
Application identifer in encrypted data	Check DAC = 990		N/A
	Check check FI = 2		N/A
Check content of message 21 Not encrpted	Check message ID		N/A
	Check MMSI		N/A
	Check Repeat indicator		N/A
	Check MMSI		N/A
	Check Type of AtoN		N/A
	Check Name of AtoN		N/A
	Check longitude		N/A
	Check latitude		N/A
	Check dimensions		N/A
	Check type of EPFS		N/A
	Check time stamp		N/A
	Check off position indicator		N/A
	Check AtoN status		N/A
	Check RAIM flag		N/A
	Check Virtual AtoN flag		N/A
	Check assigned mode flag		N/A
	Check Name of AtoN extension		N/A
	Check Sentence status flag = “R”		N/A

2.1.1.4 Check that configuration is retained after power cycle

2011-01-04 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		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

2011-01-04 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

2.1.1.5 Configuration using AID, ACF and ACE for Mando-301

This test has been performed with unit 6

2011-05-10 Ba	Test details - Configuration using AID, ACF and ACE sentence combination		
Test item	Check	Remark	Result
Apply AID, ACF and ACE sentence combination with an appropriate configuration. Check by query for AID, ACF and ACE			
Query for AID	Check that there is an output of AID for each MMSI	1 real, 4 virtual and 1 synthetic AtoNs have been configured	Passed
	Check MMSI of AtoN		Passed
	Check create/ delete field = null		Passed
	Check MMSI		Passed
	Check virtual, real or chained	= R for real AtoN and = V for virtual and synth.AtoN	Passed
	Check Sentence status flag = “R”	= 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	1 for real AtoN, 7 for virtual and synthetic AtoNs	Passed
	Check latitude – N/S		Passed
	Check longitude – E/W		Passed
	Check position accuracy (0/1)	0 for real and synth. AtoN 1 for virtual AtoNs	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	0 for the real AtoN, 1 for the virtual AtoNs 2 for synthetic AtoNs	Passed
	Check Sentence status flag = “R”		Passed

2011-05-10 Ba	Test details - Configuration using AID, ACF and ACE sentence combination		
Test item	Check	Remark	Result
Apply AID, ACF and ACE sentences with an appropriate configuration. Check of message 21 transmission			
Check transmission of message 21	Check that message 21 is transmitted	Message 21 is transmitted for the real AtoN and the 4 virtual AtoNs	Passed
	Check channels A and B		Passed
Check content of message 21	Check message ID		Passed
	Check Repeat indicator	= 0 for real and virtual AtoN = 3 for synthetic AtoN	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)

8.1.2.1 Purpose

Test that the AIS AtoN Station operates in accordance with the configured reporting schedule (see 5.2.4.1).

8.1.2.2 Method of measurement

Set-up the standard test environment and use the configuration as defined in 8.1.1.

a) Configure reporting of Message 21 to have the following parameters:

- *start on Channel 2;*
- *start slot: 512;*
- *reporting interval: 3 min;*
- *frame for the first transmission in every UTC hour: UTC minute: 1;*
- *start the EUT 2 min ahead of a schedule transmission.*

b) Run the test over the hour and day boundary.

If Synthetic and Virtual AIS AtoN Message 21 reports are implemented (see 5.2.1.1.2):

c) Change the configuration of the EUT to be a Synthetic AIS AtoN. Repeat the test.

d) Change the configuration of the EUT to be a Virtual AIS AtoN. Repeat the test.

NOTE *Standard configuration sentences via configuration port: the Schedule for Mode A FATDMA transmission is configured using the AAR sentence.*

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

8.1.2.3 Required results

Verify that the:

a) EUT transmits Test Message 21 in the configured slots on both channels. EUT starts transmission in the correct UTC frames and alternates channels at the reporting intervalwithin one reporting interval (3 min in this case), and should not wait until UTC minute 1.(The channel 1 transmissions shall occur in minutes 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58 with an increment of 6 min, The channel 2 transmissions shall occur in minutes 1, 7, 13, etc. with an increment of 6 min.);

b) reporting behaviour is consistent through the hour and day boundaries and transmitted data is correct;

If Synthetic and Virtual AIS AtoN Message 21 reports are implemented:

c) Message 21 repeat indicator is 3;

d) Message 21 Virtual flag is set.

2.1.2.1 Configuration using AAR sentence

2010-12-16	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		Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 512		Passed
Check transmission over hour boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed

If Synthetic and Virtual AIS AtoN Message 21 reports are implemented:			
c) Apply ACF sentence with Virtual flag set to 2 = synthetic AtoN	Check that repeat indicator > 0	RI = 3	Passed
	Check that virtual flag in message 21 = 0		Passed
d) Apply ACF sentence with Virtual flag set to 1 = virtual AtoN	Check that virtual flag in message 21 = 1		Passed
Check for other problems	Test 2011-02-10 Ba: The VDO output of the virtual/synthetic targets is incorrect, depending on the length of the Name of AtoN there is an additional incorrect line. This may not be a problem of virtual/ synthetic AtoN message but a problem depending of the Name lenght only. It seems that the last part of the encapsulated data is put in an additional line but without construction a second correct VDM line with the correct handling of "Total number of sentences" and "Sentence number". Retest 2011-03-09 Ba: UTC 14:40 The VDOs are output correctly.		Passed

2.1.2.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for FATDMA (FI = 12) with the appropriate configuration for each channel (2 messages)			
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		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
	Check Sentence Status Flag = "R"		Passed

Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	Test 2011-02-17 Ba: There are 14 response messages	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 15		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	= 14 This corresponds with 7 AAR settings output on PI port, one message for each channel.	Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour and minute	Channel A: 6, 4 Channel B: 6, 1	Passed
	Check start slot	515	Passed
	Check slot interval	13500	Passed
	Check Enable/ disable	1	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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 512		Passed

2.1.2.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 12) with the appropriate configuration for each channel (2 messages)			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	UTC 13:30	Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	06:04	Passed
	Check start slot	515	Passed
	Check slot interval	13500	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	06:01	Passed
	Check start slot	515	Passed
	Check slot interval	13500	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 512		Passed

2.1.2.4 Configuration using AAR sentence, Mando-301

This test has been performed with unit 6.

2011-05-11	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	Remark: the real AtoN, 1 virtual AtoN and the synthetic AtoN are configured for FATDMA Mode A	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 512	Real: 512 Virtual: 1512	Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 512	Real: 512 Virtual: 1512	Passed
Check transmission over hour boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed

If Synthetic and Virtual AIS AtoN Message 21 reports are implemented:			
c) Apply ACF sentence with Virtual flag set to 2 = synthetic AtoN	Check that repeat indicator > 0	RI = 3	Passed
	Check that virtual flag in message 21 = 0		Passed
d) Apply ACF sentence with Virtual flag set to 1 = virtual AtoN	Check that virtual flag in message 21 = 1		Passed

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

8.1.3.1 Purpose

Test that the AIS AtoN Station operates in accordance with configured reporting schedule 5.2.4.2.1 and transmits correct data.

8.1.3.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1.

a) Configure reporting of Message 21 to have the following parameters:

- *start Channel 1: start slot 512;*
- *Channel 2: start slot: 612;*
- *reporting interval: 3 min,*
- *frame for the first transmission in every UTC hour: UTC minute 2;*
- *start the EUT 2 min ahead of a schedule transmission.*

b) Run the test over the hour and day boundary.

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

8.1.3.3 Required results

Verify that the:

a) EUT transmits Test Message 21 in the configured slots on both channels. EUT starts transmission in the correct UTC frame and continues with the correct increment within one reporting interval and should not wait until UTC minute 2;

b) reporting behaviour is consistent through the hour and day boundaries and transmitted data is correct.

2.1.3.1 Configuration using AAR sentence

2010-12-15 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		Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC our and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 612		Passed
Check transmission over hour boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed

2.1.3.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for FATDMA (FI = 12) with the appropriate configuration for each channel (2 messages)			
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 our and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
	Check Sentence Status Flag = “R”		Passed
Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	Test 2011-02-17 Ba: UTC 11:30	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 15		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	14	Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour and minute	Both channels: 06,02	Passed
	Check start slot	Channel A: 520, Channel B: 620	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 520		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 620		Passed

2.1.3.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 12) with the appropriate configuration for each channel (2 messages)			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	UTC 13:38	Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	520	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	620	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 612		Passed

2.1.3.4 Configuration using AAR sentence, Mando-301

2011-05-11 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	Remark: This transmission schedule has been configured for a virtual AtoN	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC our and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1512		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1612		Passed
Check transmission over hour boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check that transmission continues in the configured schedule		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed

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

8.1.4.1 Purpose

The purpose is to test that the AIS AtoN Station operates in accordance with the configured reporting.

8.1.4.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1.

a) Configure reporting of Message 21 to have the following parameters:

- *transmit channel: A or B;*
- *start slot: 512;*
- *reporting interval: 3 min;*
- *frame for the first transmission in every UTC hour: UTC minute: 1;*
- *start the EUT 2 min ahead of a schedule transmission;*

b) Run the test over the hour and day boundary.

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

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

8.1.4.3 Required results

Verify that the:

a) EUT transmits test Message 21 in the configured slots on the designated transmit channel, EUT starts transmission in the correct UTC frame on the designated transmit channel at the reporting interval within one reporting interval and should not wait until UTC minute 1;

b) reporting behaviour is consistent through the hour and day boundaries and transmitted data is correct.

2.1.4.1 Configuration using AAR sentence

2010-12-15 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration, transmission on channel B			
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 no schedule		Passed
	Check no start slot		Passed
	Check no interval		Passed

FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 612		Passed
Check transmission over hour boundary			
Channel 1	Check no transmission	Test 2011-02-10 Ba	Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check no transmission	Test 2011-02-10 Ba	Passed
Channel 2	Check that transmission continues in the configured schedule	Test 2011-03-10 Ba	Passed

2.1.4.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for FATDMA (FI = 12) with the appropriate configuration for channel B.			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 13:40	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check no schedule		Passed
	Check no start slot		Passed
	Check no interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
	Check Sentence Status Flag = “R”		Passed
Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel B	Test 2011-02-17 Ba: UTC 11:43	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 15		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	14	Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour and minute	Ch. A and B: 06,02	Passed
	Check start slot	Channel A: 0 Channel B: 620	Passed
	Check slot interval	Both channels: 6750	Passed
	Check Enable/ disable	Ch. A: 0 = disable Ch. B: 1 = enable	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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 600		Passed

2.1.4.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 12) with the appropriate configuration for channel B			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel B	UTC 14:46	Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	0	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	0 = disable	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	620	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1 = enable	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 620		Passed

2.1.4.4 Configuration using AAR sentence, Mando-301

2011-05-11 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration, transmission on channel B			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	Remark: This transmission schedule has been configured for a virtual AtoN	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check no schedule		Passed
	Check no start slot		Passed
	Check no interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1812		Passed
Check transmission over hour boundary			
Channel 1	Check no transmission		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed
Check transmission over day boundary			
Channel 1	Check no transmission		Passed
Channel 2	Check that transmission continues in the configured schedule		Passed

The test has also been successfully performed with transmission on channel A only.

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

2010-12-16 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		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check slot interval		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	The Tx slot is randomly selected within a selection interval of 150 slots = 4 s	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	Test 2011-02-21 Ba: Only slots of most distant targets are re-used	Passed

2.1.5.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for RATDMA (FI = 13) with the appropriate configuration for each channel (2 messages)			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 14:12	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check slot interval		Passed
	Check Sentence Status Flag = “R”		Passed
Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel B	Test 2011-02-17 Ba: UTC 11:50	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 15		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	14	Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour = 24	= 24	Passed
	Check UTC minute	Channel A: 1 Channel B: 4	Passed
	Check slot interval	13500 (= 360 s)	Passed
	Check Enable/ disable	1	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
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

2.1.5.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 13) with the appropriate configuration for each channel (2 messages)			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel B		Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	24:01	Passed
	Check start slot	0	Passed
	Check slot interval	13500 (= 360 s)	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	24:04	Passed
	Check start slot	0	Passed
	Check slot interval	13500 (= 360 s)	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
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
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

2.1.5.4 Configuration using AAR sentence, Mando-301

2011-05-11 Ba	Test details - Configuration by AAR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with an RATDMA 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 that the setting has not been changed		Passed
	Check start slot = -1		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)	Value = 1 Retest 2011-05-23 Ba: Value = 0	Passed
Channel 2	Check that the setting has not been changed		Passed
	Check start slot = -1		Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that there is no transmission on channel 1		Passed
Transmission on channel 2	Check that there is no transmission on channel 2		Passed
Apply an AAR sentence with FATDMA configuration, verify the configuration by query for AAR			
Apply an AAR sentence with an RATDMA 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 that the setting has not been changed	The setting has been changed to a RATDMA definition of the FATDMA schedule (same interval and UTC hour and minutes as the FATDMA setting Retest 2011-05-23 Ba: Setting is not changed	Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 0 (FATDMA)	Value = 1 Retest 2011-05-23 Ba: Value = 0	Passed
Channel 2	Check that the setting has not been changed	Same as channel 1 Retest 2011-05-23 Ba: Setting is not changed	Passed

Check transmission schedule on VDL			
Transmission on channel 1	Check that the FATDMA transmission schedule continues.		Passed
Transmission on channel 2	Check that the FATDMA transmission schedule continues.		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

2010-12-16 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		Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		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

2.1.6.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for RATDMA (FI = 13) with the appropriate configuration for each channel (2 messages)			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 14:19	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
	Check Sentence Status Flag = “R”		Passed
Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	Test 2011-02-17 Ba: UTC 12:00	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 15		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	=14	Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour = 24	= 24	Passed
	Check UTC minute	Channel A: 1 Channel B: 1	Passed
	Check slot interval	6750 (= 180 s)	Passed
	Check Enable/ disable	1	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
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		Passed

2.1.6.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 12) with the appropriate configuration for each channel (2 messages)			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for each channel	UTC 14:00	Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	24:01	Passed
	Check start slot	0	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	24:01	Passed
	Check start slot	0	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		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

2010-12-16 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		Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed

Channel 2	Check no schedule		Passed
	Check no start slot		Passed
	Check no interval		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

2.1.7.2 Configuration using VDL message 6

2011-02-09 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 6 with AAR for FATDMA (FI = 13) with the appropriate configuration for channel A			
Query for AAR sentence			
Check the contents of the AAR	Check that there is an output of AAR on response	UTC 14:26	Passed
	Check MMSI		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
Channel 1	Check UTC hour and minute		Passed
	Check start slot		Passed
	Check slot interval		Passed
FATDMA or RATDMA/CSTDMA setup	Check value = 1 (RATDMA)		Passed
Channel 2	Check no schedule		Passed
	Check no start slot		Passed
	Check no interval		Passed
	Check Sentence Status Flag = “R”		Passed
Send message 6 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel A	Test 2011-02-17 Ba:	Passed
	Check message ID = 6		Passed
Application identifer in binary data	Check DAC = 990		Passed
	Check check FI = 14		Passed
Encrypted binary data of AAR response	Check DAC = 990		Passed
	Check check FI = 14		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
	Check channel selection		Passed
	Check UTC hour = 24	= 24	Passed
	Check UTC minute	Channel A: 1 Channel B: 60	Passed
	Check slot interval	Channel A: 6750 (= 180 s) Channel B: 0	Passed
	Check Enable/ disable	Channel A:1 Channel B: 0	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
Transmission on channel 2	Check no Tx on channel B		Passed

2.1.7.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA (FI = 13) with the appropriate configuration for channel A			
Send message 25 with query for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel A		Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 21		Passed
	Check message index (1)		Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	24:01	Passed
	Check start slot	0	Passed
	Check slot interval	6750 (= 180 s)	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	24:60	Passed
	Check start slot	0	Passed
	Check slot interval	0	Passed
	Check Enable/ disable	0	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 1, 4, 7, ..., reporting interval = 3 min.		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

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 6 payload			
Apply an AID ??? sentence to set the destination MMSI			
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		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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 600		Passed
Transmission on channel 2	Check that message 6 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 600		Passed
Message content	Check destination MMSI	The destination MMSI is configured using the AID sentence with AtoN type “D” (Destination).	Passed
	Check the content of message 6		Passed

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 600		Passed
Transmission on channel 2	Check that message 6 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 700		Passed
Message content	Check destination MMSI	= 0	Passed
	Check the content of message 6		Passed

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 6 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 600		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 6		Passed

2010-12-16 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		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

2010-12-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode 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 2, 5, 8, ..., 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 2, 5, 8, ..., 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

2010-12-16 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

2011-02-21 Ba	Test details b) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 6 payload			
Apply an AID sentence to set the destination MMSI			
Apply an ??? sentence to configure the acknowledgement behaviour			
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			
	Check that the EUT behaves as configured	There is no configuration of the acknowledgement behaviour. The EUT does not repeat message 6 if there is no acknowledgement	Passed

2011-02-21 Ba	Test details c) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 6 payload, exceeding the maximum length of Message 6.			
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			
	Check that message 6 is not transmitted	Message 6 is transmitted Tested with 80 and 90 Byte data content (MPR payload). The maximum length of a AtoN message is 3 slots (see Table 11 of IEC 62320-2) which are maximum 64 data bytes according to table 52 of ITU-R M.1371-4 Retest 2011-03-10 Ba Message 68 Byte payload: The MPR is ignored. If there is already an short MPR the EUT continues using this MPR setting	Passed

2011-03-10 Ba	Test details d) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 6 payload, with the maximum length of Message 6.			
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			
	Check that message 6 is transmitted		Passed
	Check message content		Passed

2.1.8.2 Configuration using VDL message 6

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply a message 6 with AAR for FATDMA Mode B (FI = 12) with the appropriate configuration for each channel (2 messages) Apply a message 6 with MPR (FI 23) to define the content of message 6			
Verify the configuration setting by query for AAR or VDL query request for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel A		Passed
	Check message ID = 06		Passed
	Check DAC = 990		Passed
	Check check FI = 15		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages	14	Passed
	Check message ID = 6	6	Passed
	Check message index (1)	1	Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	600	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	06:02	Passed
	Check start slot	700	Passed
	Check slot interval	6750	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 600		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 700		Passed
Data content	Check the content of message 6 according to the FI 23 payload data	There content of message 6 is different to the payload setting by message 6 FI 23 Retest 2011-03-15 Ba: The payload data are transmitted correctly in message 6	Passed

2.1.8.3 Configuration using VDL message 25

2011-02-17 Ba	Test details - Configuration by VDL message		
Test item	Check	Remark	Result
Apply an message 25 with AAR for FATDMA mode A (FI = 12) with the appropriate configuration for each channel (2 messages)			
Verify the configuration setting by query for AAR or VDL query request for AAR (FI = 14)			
Evaluate the AAR response message (FI=15)	Check that the AAR response message is received for channel A		Passed
	Check message ID = 25		Passed
AAR response	Check DAC = 990		Passed
	Check check FI = 15		Passed
	Check MMSI of AtoN		Passed
	Check number of messages		Passed
	Check message ID = 6	6	Passed
	Check message index (1)	1	Passed
AAR setting Channel A	Check channel selection A		Passed
	Check UTC hour and minute	06:04	Passed
	Check start slot	600	Passed
	Check slot interval	13500	Passed
	Check Enable/ disable	1	Passed
AAR setting Channel B	Check channel selection A		Passed
	Check UTC hour and minute	06:01	Passed
	Check start slot	600	Passed
	Check slot interval	13500	Passed
	Check Enable/ disable	1	Passed
Check transmission schedule on VDL			
Transmission on channel 1	Check that message 21 is transmitted in minute 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 600		Passed
Transmission on channel 2	Check that message 21 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 600		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.

2011-02-21 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 11:52	Passed
	Check the access methode	RATDMA	Passed
	Check the message content		Passed
Apply an BBM sentence with message 14			
Transmission of broadcast message	Check that the message 14 is transmitted	UTC 11:54	Passed
	Check the access methode	RATDMA	Passed
	Check the message content	The BBM data are transmitted first but there are about 80 further characters in message 14 Retest 2011-03-10 Ba: Message 14 is transmitted correctly	Passed

Apply an ABM sentence with message 6			
Transmission of broadcast message	Check that the message 6 is transmitted	UTC 12:00	Passed
	Check the access methode	RATDMA	Passed
	Check the message content	• The Sequence number is 0. It should be set according to the "Sequential message identifier" of the ABM input sentence (= 2). • The rest of the content is correct Retest 2011-03-10 Ba: The sequence number is set according to the ABM input sentence	Passed
	Check that the acknowledgement message has been received		Passed
Apply an ABM sentence with message 12			
Transmission of broadcast message	Check that the message 12 is transmitted	UTC 12:01	Passed
	Check the access methode	RATDMA	Passed
	Check the message content	• The Sequence number is 0. It should be set according to the "Sequential message identifier" of the ABM input sentence (= 2). • The BBM data are transmitted first but there are about 80 further characters in message 14 Retest 2011-03-10 Ba: • The sequence number is set according to the ABM input sentence. • The content is correct	Passed
	Check that the acknowledgement message has been received		Passed
Apply an ABM sentence with message 6, no ackn from recipient			
Transmission of broadcast message	Check that the message 12 is transmitted		Passed
	Check the access methode	RATDMA	Passed
	Check that the message is repeated according to the configuration ???	The message 12 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.

2010-12-15 Ba	Test details a) - FATDMA Mode A		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 8 payload			
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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 800		Passed
Transmission on channel 2	Check that message 8 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 800		Passed
Message content	Check the content of message 8		Passed

2010-12-15 Ba	Test details a) - FATDMA Mode B		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 800		Passed
Transmission on channel 2	Check that message 8 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 900		Passed
Message content	Check the content of message 8		Passed

2010-12-15 Ba	Test details a) - FATDMA Mode C		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode C			
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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 8 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 800		Passed
Message content	Check the content of message 8		Passed

2010-12-16 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

2010-12-16 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 2, 5, 8, ..., 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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 8		Passed

2010-12-16 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

2011-02-21 Ba	Test details b) - Too long sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 8 payload, exceeding the maximum length of Message 8.			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 8	UTC 12:30	Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
	Check that message 8 is not transmitted	Message 8 is transmitted Tested with 80 and 90 Byte data content (MPR payload). The maximum length of a AtoN message is 3 slots (see Table 11 of IEC 62320-2) which are maximum 68 data bytes according to table 55 of ITU-R M.1371-4 Retest 2011-03-10 Ba UTC 12:25 Message 69 Byte payload: The MPR is ignored. If there is already an short MPR the EUT continues using this MPR setting	Passed

2011-03-10 Ba	Test details c) - Maximum length sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 8 payload, with the maximum length of Message 8.			
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			
	Check that message 8 is transmitted	Payload 68 Byte	Passed
	Check message content		Passed

2.1.11 8.1.11 AIS AtoN configuration Messages 12

Repeat tests 8.1.8 and 8.1.9 for Message 12.

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 6 payload			
Apply an AID sentence to set the destination MMSI			
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		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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 1200		Passed
Transmission on channel 2	Check that message 12 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 1200		Passed

Message content	Check destination MMSI	The destination MMSI is configured using the AID sentence with AtoN type “D” (Destination).	Passed
	Check the content of message 12	Test 2011-02-21 Ba: UTC 12:45 The last character of the test message is missing. MPR data: 17 characters Message length: 168 bit. Message length should be: 72 bit header + 102 bit data = 174 bit. If the message matches byte boundary the content is correct. Retest 2011-03-10 Ba: UTC 11:40 Same result See Note) Retest 2011-04-05 Ba: UTC 12:52 The message 12 is transmitted correctly	Passed

Note)
For text messages it cannot be guaranteed that the message length matches byte boundaries. The normal user who generates the text normally does not take care of byte boundaries.

Therefore the equipment should take care that all characters are transmitted. If necessary it has to fill up the message with fill bits to the next byte boundary. It is not ok if it cuts the message down to the next byte boundaries. In this case the last character would not be transmitted.

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1200		Passed
Transmission on channel 2	Check that message 12 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1300		Passed
Message content	Check destination MMSI	= 0	Passed
	Check the content of message 12		Passed

2010-12-15 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 12 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1200		Passed
Message content	Check destination MMSI		Passed
	Check the content of message 12		Passed

2010-12-16 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		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 2, 8, 14, 20, 26, 32 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 2 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 12		Passed

2010-12-16 Ba	Test details - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for RATDMA mode 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 2, 5, 8, ..., 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 2, 5, 8, ..., 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

2010-12-16 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

2011-02-21 Ba	Test details b) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 12 payload			
Apply an AID sentence to set the destination MMSI			
Apply ??? sentence to configure the acknowledgement behaviour			
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			
	Check that the EUT behaves as configured	There is no configuration of the acknowledgement behaviour. The EUT does not repeat message 6 if there is no acknowledgement	Passed

2011-02-21 Ba	Test details c) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 12 payload, exceeding the maximum length of Message 12.			
Query for AAR sentence			
Check the contents of the AAR response	Check message ID = 12	UTC 12:58	Passed
	Check message index (1)		Passed
	Check the test schedule setting		Passed
Check transmission schedule on VDL			
	Check that message 12 is not transmitted	Message 12 is transmitted Tested with 90 Byte data content (MPR payload). The maximum length of a AtoN message is 3 slots (see Table 11 of IEC 62320-2) which are maximum 85 characters according to table 59 of ITU-R M.1371-4 Retest 2011-03-10 Ba UTC 11:43 Message 88 characters payload: The MPR is ignored. If there is already an short MPR the EUT continues using this MPR setting	Passed

2011-03-10 Ba	Test details d) - Configuration by AAR/ MPR sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 12 payload, with the maximum length of Message 12.			
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			
	Check that message 6 is transmitted	Payload lenght = 85 char	Passed
	Check message content		Passed

2.1.12 8.1.12 AIS AtoN configuration Messages 14

Repeat tests 8.1.10 for Message 14.

2010-12-15 Ba	Test details a) - FATDMA Mode A		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 8 payload			
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 4, 10, 16, 22, 28, 34, 40, 46, 52 or 58		Passed
	Check Tx slot = 1400		Passed
Transmission on channel 2	Check that message 14 is transmitted in minute 1, 7, 13, 19, 25, 31, 37, 43, 49, 55		Passed
	Check Tx slot = 1400		Passed
Message content	Check the content of message 14		Passed

2010-12-15 Ba	Test details a) - FATDMA Mode B		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 8 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1400		Passed
Transmission on channel 2	Check that message 14 is transmitted in minute 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1500		Passed
Message content	Check the content of message 14		Passed

2010-12-15 Ba	Test details a) - FATDMA Mode C		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA 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 there is no transmission on channel A		Passed
Transmission on channel 2	Check that message 14 is transmitted in minute 1,4,7 ..., reporting interval = 3 min.		Passed
	Check Tx slot = 1400		Passed
Message content	Check the content of message 14		Passed

2010-12-16 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 2, 8, 14, 20, 26, 32 ...		Passed
	Check Tx slot is randomly selected within the minute		Passed
Transmission on channel 2	Check that message 14 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 14		Passed

2010-12-16 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 2, 5, 8, ..., 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 2, 5, 8, ..., reporting interval = 3 min.		Passed
	Check Tx slot is randomly selected within the minute		Passed
Message content	Check the content of message 14		Passed

2010-12-16 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

2011-02-21 Ba	Test details b) - Too long sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 14 payload, exceeding the maximum length of Message 14.			
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			
	Check that message 14 is not transmitted	Message 14 is transmitted Tested with 96 byte content (MPR payload). The maximum length of a AtoN message is 3 slots (see Table 11 of IEC 62320-2) which are maximum 90 characters according to table 61 of ITU-R M.1371-4 Retest 2011-03-10 Ba UTC 11:43 Message 92 characters payload: The MPR is ignored. If there is already an short MPR the EUT continues using this MPR setting	Passed

2011-03-10 Ba	Test details c) - Maximum length sentence		
Test item	Check	Remark	Result
Apply an AAR sentence with the appropriate configuration for FATDMA mode A			
Apply a MPR sentence with the message 8 payload, with the maximum length of Message 8.			
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			
	Check that message 8 is transmitted	Payload length 90 char	Passed
	Check message content		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.*

2010-12-15 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	The timing is about 250 µs too late. In the slot reuse test (100% channel load on one channel and no load on the other channel) the timing for many messages is about 2.4 ms too late <u>Retest 2011-02-07 Ba:</u> The timing has been improved but is still about 100 µs too late. <u>Retest 2011-02-21 Ba:</u> In the slot reuse test (100% channel load on one channel) the timing for many messages is still about 2.4 ms too late <u>Retest 2011-03-10 Ba:</u> - Test without VDL load: The timing is still about 100 µs too late. - With 90% VDL load the timing delay increases up to about 4.5 ms <u>Retest 2011-04-05 Ba:</u> - The timing without load is within the limits - The timing with 90% VDL load has been improved but is still sometimes about 100 µs out of the limits. Additionally after about 7 minutes the unit stopped operation and required a manual restart. A second test showed similar results, with a stop after about 8 minutes. <u>Retest 2011-04-12 Ba:</u> • Without VDL load The timing is about 60 µs too early. So some transmission exceed the limit in direction „too early“. The timing should be delayed by at least 20...30 µs to keep the transmissions within the limits • With 90% VDL load 95% (3 of 60) of the message are within the limits at 90% VDL load (test 1: 57 of 60 = 95%, test 2 263 of 270 = 98%). We can just accept this deviation because 90% channel load is not the normal situation but strongly recommend to improve it. The EUT did not stop operation during the tests. <u>Retest 2011-05-04 Ba:</u> • Without VDL load The timing without VDL load is now perfect, between – 50 µs and + 20 µs. • With 90% VDL load There are a few message which exceed the limits up to about 100µs above the limit. Because this test under load condition is not required by the standard, this high load is in reality rather seldom and the timing is still much less than the limit for UTC indirect sync we can accept this sync jitter. Nevertheless we recommend to improve the diming delays under high load conditions.	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	Test 2011-02-10 Ba: There is a jitter of about 0.5 ms. So the limit is exceeded. The timing is drifting downwards to a certain limit, then it is pulled up to a timing of about 0.1 ms and drifting down again. Similar to a sawtooth. Retest 2011-03-10 Ba: Similar result. The timing is drifting upwards to a certain limit up to 0.9 ms, then it is pulled down to a timing of about 0.2 ms and drifting up again again. Retest 2011-04-05 Ba: - The in-slot timing is in the range of 3.328 ms ± 312 µs - Many scheduled messages are not transmitted - Many of the transmitted messages are transmitted in wrong slots. - The other transmitted messages are transmitted in the correct slot. Retest 2011-04-14 Ba: - The in-slot timing is in the range of 3.328 ms ± 312 µs - All scheduled messages are ransmitted - All messages are transmitted in the correct slots.	Passed
Set other station without UTC	Check that T2 is in the range of 3.328 ms ± 312 µs	Test 2011-04-14 Ba: The slot timing is in the range of 3.328 ms ± 312 µs Remark: The EUT does not syncronize to a sync source which does not provide a valid position	Passed

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.

2011-04-15 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	UTC 07:20	Passed
Provide Class A mobile station in semaphore mode	Check by evaluation of T2 timing that the EUT synchronises to the mobile station	Test 2011-04-14 Ba:	Passed
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	UTC 08:40	Passed
Enable internal synchronisation source	Check by evaluation of T2 timing that the EUT returns to UTC direct synchronisation	UTC 08:50	Passed

2.3 8.3 Tests for EPFS

2.3.1 8.3.1 Position source

8.3.1.1 Purpose

The purpose of this test is to verify that the position source correctly populates the fields in Message 21.

8.3.1.2 Method of measurement

Set up the standard test environment and use the configuration as defined in 8.1.1.

a) Using the transmission schedule for Message 21 as defined in 8.1.2, record the EUT transmissions.

b) Repeat the test with a surveyed position.

8.3.1.3 Required results

Verify that:

a) the position and time stamp fields are valid;

b) the EUT has the correct parameter settings for "type of electronic position fixing device" and "RAIM-flag".

2011-02-10 Ba	Test details - Position source		
Test item	Check	Remark	Result
Set EUT to an reporting interval of 1 min for message 21 Set the Type of EPFS to 1 (GPS)			
Internal GNSS position available	Check that Latitude in msg 21 is correct		Passed
	Check that Longitude in msg 21 is correct		Passed
	Check that time stamp in msg 21 is correct		Passed
	Check that the Type of EPFS in msg 21 is correct		Passed
	Check PA flag		Passed
	Check the RAIM flag		Passed

Valid internal position Provide an ACF sentence with a valid position and "Type of EPFS" set to 7 = surveyed			
Surveyed position	Check that Latitude in msg 21 is correct	Retest 2011-04-15 Ba: The internal position is used Retest 2011-05-04 Ba: The surveyed position is used	Passed
	Check that Longitude in msg 21 is correct	Retest 2011-04-15 Ba: The internal position is used Retest 2011-05-04 Ba: The surveyed position is used	Passed
	Check that time stamp in msg 21 is correct	Time stamp = aktual time Time stamp = 61 (manual input) would also be appropriate Retest 2011-04-15 Ba: Time stamp = 63 This is not correct because it uses the available internal position. Retest 2011-05-04 Ba: Time stamp = 61 (manual input)	Passed
	Check that the Type of EPFS in msg 21 is correct	= 1 Retest 2011-04-15 Ba: Type of EPFS is 7. This would be correct if the surveyed position would be used but is not correct for the actually used internal position Retest 2011-05-04 Ba: Type of EPFS = 7	Passed
	Check PA flag	= 0 Retest 2011-04-15 Ba: The PA flag is set according to the ACF setting This would be correct if the surveyed position would be used but is not correct for the actually used internal position Retest 2011-05-04 Ba: The PA flag is set according to the ACF setting	Passed
	Check the RAIM flag	= 0	Passed

Internal position not available Provide an ACF sentence with a valid position and "Type of EPFS" set to 7 = surveyed			
Surveyed position	Check that Latitude in msg 21 is correct	Lat = default Retest 2011-03-10 Ba: The surveyed latitude is used in message 21 Retest 2011-04-05 Ba: UTC 12:34 If the internal position is not available: Lat = default. The surveyed latitude is used only if the internal position is available. Retest 2011-04-15 Ba: The surveyed position is used when the internal position is not available	Passed Passed
	Check that Longitude in msg 21 is correct	Lon = default Retest 2011-03-10 Ba: The surveyed latitude is used in message 21 Retest 2011-04-05 Ba: UTC 12:34 Same problem as for longitude Retest 2011-04-15 Ba: The surveyed position is used when the internal position is not available	Passed Passed
	Check that time stamp in msg 21 is correct	Time stamp = 63 Retest 2011-03-10 Ba: Time stamp = 63 Accepted but 60 (time stamp not available) or 61 (Manual input) seems to be more appropriate	Passed
	Check that the Type of EPFS in msg 21 is correct	= 7	Passed
	Check PA flag	= 0 Retest 2011-03-10 Ba: The value set by ACF sentence is 1, therefore the PA flag in message 21 should also be 1 Retest 2011-04-05 Ba: UTC 12:34 The PA flag is transmitted as set by ACF.	Passed
	Check the RAIM flag	= 0	Passed

2.3.2 8.3.2 Invalid position

8.3.2.1 Purpose

The purpose of this test is to verify that the EUT responds correctly when the EPFS outputs an invalid position.

8.3.2.2 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. Prevent the EPFS receiver from generating position fixes.

8.3.2.3 Required results

If the EUT is configured to continue transmission, verify the EUT transmits Message 21 with the parameters latitude and longitude set to "not available" and the time stamp is set to "63".

2011-02-10 Ba	Test details - Invalid position		
Test item	Check	Remark	Result
Set EUT to an reporting interval of 1 min for message 21 Set ACF to use internal position source			
Disable internal position source	Check that Latitude in msg 21 is 91°		Passed
	Check that Longitude in msg 21 is 181 °		Passed
	Check that time stamp in msg 21 is 63		Passed
	Check that PA flag = 0		Passed
	Check the RAIM flag = 0		Passed

2.3.3 8.3.3 Off-position monitor

8.3.3.1 Purpose

The purpose of this test is to verify that the EUT responds correctly when it is off position.

8.3.3.2 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) Set the EUT EPFS antenna at its assigned position and with off-position behaviour set to maintain current broadcast schedule.

b) After verification of the off-position indicator in Message 21, the EUT EPFS antenna shall be moved to off-position.

c) Move the EUT EPFS antenna to be on-position.

d) If implemented, configure the EUT with off-position behaviour set to a new reporting interval and the EUT EPFS antenna shall be moved to off-position.

e) After verification of the off-position indicator in Message 21, the EUT EPFS antenna shall be moved to on-position.

8.3.3.3 Required results

Verify that:

a) message 21 has the off-position indicator field set to "0";

b) message 21 has the off-position indicator field set to "1" within a time period stated by the manufacturer and that the original reporting schedule has not changed;

c) message 21 has the off-position indicator field set to "0" within a time period stated by the manufacturer;

d) message 21 has the off-position indicator field set to "1" within a time period stated by the manufacturer and that the original reporting schedule has changed to the new reporting interval;

e) message 21 has the off-position indicator field set to "0" within a time period stated by the manufacturer and the reporting interval returns to the original reporting schedule.

2011-02-11 Ba	Test details - Off position monitor		
Test item	Check	Remark	Result
a) Set reference position with GPS position inside threshold, Off-position behaviour = 0, off-position threshold = 100. Set Tx schedule to: FATDMA mode A, interval = 3 min Set alternative schedule to: FATDMA mode A, interval = 1 min			
Check configuration	Check off-position behaviour = 0	UTC 08:09	Passed
	Check off-position threshold = 100		Passed
	Check position: EPFS position within threshold		Passed
a) Position on-position	Check off-position flag in msg 21 = 0		Passed
	Check that the normal transmission schedule is used		Passed
b) Position off-position	Check off-position flag in msg 21 = 1	UTC 08:20 set off-pos UTC 08:22 flag = 0 UTC 08:25 flag = 1	Passed
	Check that the normal transmission schedule is used		Passed
c) Position on-position	Check off-position flag in msg 21 = 0	UTC 08:26 set on-pos UTC 08:28 Flag = 0	Passed
	Check that the normal transmission schedule is used		Passed
Off-position behaviour = 1			
Query configuration	Check msg 21, index 1: FATDMA mode A, 3 min	UTC 08:29	Passed
	Check msg 21, index 2: FATDMA mode A, 1 min		Passed
d) Position off-position	Check off-position flag in msg 21 = 1		Passed
	Check that the alternativ transmission schedule is used		Passed
e) Position on-position	Check off-position flag in msg 21 = 0	UTC 09:56	
	Check that the normal transmission schedule is used		
	Remark		

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.

2011-02-10 Ba	Test details -		
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	If implemented There is no transmission of message 7 Remark: Sometimes there is a transmission of message 6. It could not yet be recognized under which condition message 7 is transmitted. Retest 2011-03-10 Ba: Message 7 is transmitted	Passed
	Check the content of message 7	Retest 2011-03-10 Ba: The content is correct	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 a VDM output Retest 2011-03-10 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.

2011-06-30 Ba	Test details - Test for configuration of the receiver turn-on times (Types 2 and 3)		
Test item	Check	Remark	Result
Check documentation	According to the document: “Comment Checklist for AIS_Testreport_AMEC_8, Mando-301/-303 AIS AtoN”, Date: June 28,2011 this function is not implemented in the Mando-301/-303.		N/A

2.5.2 8.5.2 Test for configure proprietary AtoN control

8.5.2.1 Purpose

The purpose of this test is to ensure that the payload of this sentence is used to control the AtoN. The payload can be entered into the EUT using the configuration port of the EUT or the appropriate VDL message.

8.5.2.2 Method of measurement

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

a) Configure the proprietary AtoN control function of the EUT with the following parameters:

- *MMSI of the AtoN Station,*
- *payload for proprietary AtoN control.*

Using the implemented methods (one or both) enter the appropriate proprietary AtoN control data.

b) Query the proprietary AtoN control data via configuration port using the query sentence or other means provided by the manufacturer.

c) Query the proprietary AtoN control data via the VDL and define a FATDMA slot for the VDL replay.

NOTE Standard configuration sentences via configuration port: the proprietary AtoN control data is configured using the MCR sentence.

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

8.5.2.3 Required results

Verify that:

a) the EUT acts upon the received proprietary AtoN control data;

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

c) 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.

2011-06-30 Ba	Test details -		
Test item	Check	Remark	Result
Check documentation	According to the document: “Comment Checklist for AIS_Testreport_AMEC_8, Mando-301/-303 AIS AtoN”, Date: June 28,2011 this function is not implemented in the Mando-301/-303.		N/A

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 tested in section 8.1.8 (msg 6), 8.1.10 (msg 8), 8.1.11 (msg 12) and 8.1.12 (msg 14).

The payload configuration using message 6 and message 25 FI23 is tested in 8.1.8 for transmission of message 6.

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.

2011-02-21 Ba	Test details - Forced broadcast		
Test item	Check	Remark	Result
Send AFB sentence to PI port			
Send AFB sentence for message 21	Check that message 21 is transmitted		Passed
	Check Tx channel		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
Send AFB sentence for message 6	Check that message 6 is transmitted		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
Send AFB sentence for message 8	Check that message 8 is transmitted		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
Send AFB sentence for message 12	Check that message 12 is transmitted		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed

Send AFB sentence for message 14	Check that message 14 is transmitted		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed

2011-02-21 Ba	Test details - Forced broadcast via VDL		
Test item	Check	Remark	Result
Message 6			
Send Message 6 FI 24 to force broadcast of message 21, Tx on channel A	Check that message 21 is transmitted		Passed
	Check Tx channel = A		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
Send Message 6 FI 24 to force broadcast of message 21, Tx on channel B	Check that message 21 is transmitted		Passed
	Check Tx channel = B		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		Passed
Message 25			
Send Message 25 FI 24 to force broadcast of message 21, Tx on channel A	Check that message 21 is transmitted		Passed
	Check Tx channel = A		Passed
	Check that the correct slot (UTC hour, minute and slot number) is used for transmission		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.

2011-02-07 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	AMC	Passed
Unique Identifier	Note the Unique Identifier	990123456 = MMSI	Passed
Manufacturers serial number	Note serial number	10K310015	Passed
Model code	Note the model code	Not provided	Passed
Software revision	Note the software revision	AtoN-1.3.8.1 (Type3)	Passed
Hardware revision	Note the software revision	Not provided	Passed

2011-02-23 Ba	Test details - Version information, VDL request		
Test item	Check	Remark	Result
Send message 6 with FI = 25 (query for version information)			
Request 0 = Device type	Check the response Check it for allowed values	UTC 09:27 There is no response Retest 2011-03-10 Ba: UTC 15:26 No response Retest 2011-04-05 Ba: UTC 13:02 Response, device type = AN	Passed
Request 1 = Vendor Id	Check the response Note the vendor Id	There is no response Retest 2011-03-10 Ba: UTC 15:29 No response Retest 2011-04-05 Ba: Response, Vendor ID = AMC	Passed
Request 2 = Unique Identifier	Check the response Note the Unique Identifier	Retest 2011-04-05 Ba: Response, Unique identifier = 990123456 = MMSI	Passed
Request 3 = Manufacturers serial number	Check the response Note serial number	Retest 2011-04-05 Ba: Response, serial number = @@@@@@@@@@@ This is identical to the VER output (null field)	Passed
Request 4 = Model code	Check the response Note the model code	Retest 2011-04-05 Ba: Response, Model code = MANDO-303	Passed
Request 5 = Software revision	Check the response Note the software revision	There is no response Retest 2011-03-10 Ba: UTC 15:24 No response Retest 2011-04-05 Ba: Response, Software revision = “ATON-1.3.8.” See Note)	Passed
Request 6 = Hardware revision	Check the response Note the software revision	Retest 2011-04-05 Ba: Response, Hardware revision = @@@@@@@@@@@. This is identical to the VER output (null field)	Passed

Send message 25 with FI = 25 (query for version information)			
Request 0 = Device type	Check the response Check it for allowed values	Test 2011-04-05 Ba: UTC 14:30 Values see message 6	Passed
Request 1 = Vendor Id	Check the response Note the vendor Id		Passed
Request 2 = Unique Identifier	Check the response Note the Unique Identifier		Passed
Request 3 = Manufacturers serial number	Check the response Note serial number		Passed
Request 4 = Model code	Check the response Note the model code		Passed
Request 5 = Software revision	Check the response Note the software revision	For message 25 the total data length is limited to 128 bit according to B.12.3 We recommend to omitt the "ATON" and provide the full number of the software version. E.g: instead of: " ATON-1.3.8." the text "AN 1.3.8.13" or "1.3.8.13 T3" Retest 2011-04-15 Ba: The software version in the response is "1.4.0.0 T3".	Passed
Request 6 = Hardware revision	Check the response Note the software revision		Passed

Note)
There is a discrepancy in the standard:
B.12.3 defines af total bits of the VER response 128 bit. The requested information is definde with „up to 192" bits. This would result in total bits of 192 + 58 = 220 bit which is in conflict with the defined 128 total bits.

The EUT response uses the 192 bits for the response (Requested version information). The BSH decoding software decodes only the 128 total bits. Therefore only the first 11 characters are verified. It is assumed that the other characters are also correct.

2.5.6 8.5.6 Test for AFC – AtoN function ID capability

8.5.6.1 Purpose

The purpose of this test is to ensure that the EUT can provide a list of supported functionality.

8.5.6.2 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. Enter the query for the function supported.

NOTE Standard configuration sentences via configuration port: the list of supported functions is queried usingthe QAFC sentence and the response is provided using AFC.

Standard configuration sentences via VDL: the list of supported functions is queried via the VDL using Message 25 or Message 6 with the appropriate application identifier/function identifier, and binary data.

8.5.6.3 Required results

Verify that the EUT provides the list of functions that are supported by the AtoN Station.

2011-02-22 Ba	Test details - AFC request		
Test item	Check	Remark	Result
Query on PI port			
Query for AFC	Check the AFC response	AFC status = FFFFFFF8 00000000 This corresponds with the list of implemented Function IDs provided by the manufacturer	Passed
Send message 6 with FI = 27 (Query for AtoN function ID capability)			
Send message 6	Check the VDL response message 6	No response Retest 2011-03-10 Ba: UTC 15:30 No response Retest 2011-04-05 Ba: UTC 13:28 Response, Data: 11111111 11111111 11111111 11111000 00000000 00000000 00000000 00000000 00000000 This is according to the AFC output	Passed
Send message 25 with FI = 27 (Query for AtoN function ID capability)			
Send message 25	Check the VDL response message 25	No response Retest 2011-04-05 Ba: UTC 13:25 Response, Data: 11111111 11111111 11111111 11111000 00000000 00000000 00000000 00000000 00000000 This is according to the AFC output	Passed

2.5.6.1 8.5.6.4 Test for assigning an encryption key for VDL configuration

8.5.6.4.1 Purpose

The purpose of this test is to ensure that the encryption key for VDL configuration can be entered into the EUT using the configuration port or the appropriate VDL message.

In order to reset this key via the PI, the user must know the current encryption key. The initial encryption key, when shipped from the manufacturer, will be all 0's.

8.5.6.4.2 Method of measurement

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

a) Configure the encryption key of the EUT with the following parameters:

- *MMSI of the AtoN Station;*
- *current AES encryption key;*
- *new AES encryption key.*

Using the implemented methods (one or both) enter the appropriate data with the correct MMSI and the correct current AES encryption key.

b) Enter the appropriate data with the correct MMSI and false current AES encryption key.

c) Query the AES encryption key via configuration port using the query sentence or other means provided by the manufacturer.

NOTE Query via the VDL for the encryption key is not allowed.

NOTE Via configuration port: enter the encryption key via the configuration port using the AKE PI sentence or any other means provided by the manufacturer. The sentence used on the configuration port allows for the entire 128 bit encryption key to be entered.

Via VDL: enter the encryption key via the VDL using Message 25 or Message 6 with the appropriate application identifier and binary data. The VDL message only allows the least significant 56 bits to be modified.

8.5.6.4.3 Required results

Verify that:

a) the new encryption key is accepted by changing the transmission behaviour of the EUT using an encrypted VDL configuration message;

b) the new encryption key is not accepted by changing the transmission behaviour of the EUT using an encrypted VDL configuration message;

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

2011-02-22 Ba	Test details -		
Test item	Check	Remark	Result
		Encryption has not been tested because this is not in the scope of approval testing at BSH There will be a remark in the certificate that it has not been tested.	N/T

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

8.5.7.1 Purpose

The purpose of this test is to verify that, if chaining is implemented, the AtoN Station supports receiving information from a Base Station via intermediate AtoN Stations and then transmits the response back through the intermediate AtoN Stations to the Base Station.

8.5.7.2 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. Introduce a Base Station that will be issuing the configuration VDL sentences and at least two other AtoN Stations transmitting Message 21, one of which is the EUT.

Using the implemented method(s) establish a chain by configuring each AtoN Station with the MMSI numbers for the parent and all child AtoN Stations. (for example the first AtoN in the chain would have the Base Station as its "parent" and all other AtoN stations in the chain would be "child" AtoN stations, the next AtoN in the chain would have that first AtoN Station as the parent and all other AtoN Stations in the chain would be "child" AtoN Stations, and so on).

Query the AtoN stations to verify the chain has been correctly established.

Introduce, via the Base Station, a Message 25 with configuration information addressed to the last AtoN Station in the chain.

Query the last AtoN Station to verify configuration.

NOTE *Standard configuration sentences via configuration port: using the AID sentence, a chain is established by defining the parent and all known children within each AtoN station in the link.*

Standard configuration sentences via VDL: a chain is established by defining the parent and all known children within each AtoN station in the link via VDL using Message 25 or Message 6 with the appropriate application/function identifier and binary data.

8.5.7.3 Required results

Verify that:

a) the chain is established;

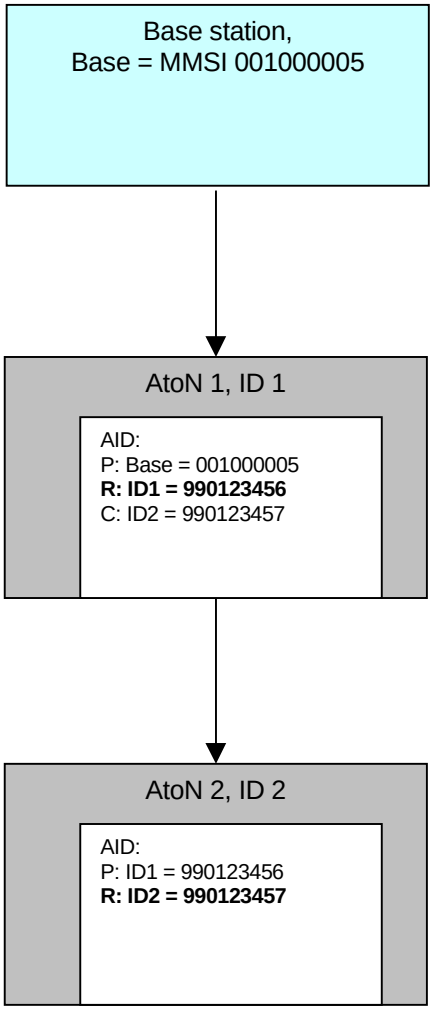
b) the EUT functions correctly within the chain and at the end of the chain, for transferring, receiving and initiating messages.

Result summary:
The chaining works rather well. The following items should be changed:

- Not processing message 6 if it is not addressed to the own station. Destination ID = 0 is handled as a broadcast to AtoN stations and therefore generally processed.

See details in the below test results.

2.5.7.1 Test with two AtoN stations in chain.



2011-03-14 Ba	Test details - Test with two AtoN stations, Destionation ID not 0		
Test item	Check	Remark	Result
Test is performed with a base station and two AtoN stations in a chain.			
Configure AtoN station 1	Set and verify own MMSI	990123456	Passed
	Set and verify parent MMSI = Base station	001000005	Passed
	Set and verify child MMSI = AtoN 2	990123457	Passed
Configure AtoN station 2	Set and verify own MMSI	990123457	Passed
	Set and verify parent MMSI = AtoN 1	990123456	Passed
Send AAR configuration sentence from base station to AtoN station 2			
Message from base station	Check that message 6 from the base station is received	VDM output	Passed
Forwarding of message 6 to the child	Check that the message is forwarded from AtoN station 1 to AtoN 2		Passed
	Check content of message 6		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	AtoN 2 = 990123457	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Configuration	Verify configuration by PI port query		Passed
Send query for AAR from base station to AtoN 2			
Message from base station	Check that message 6 from the base station is received	VDM output	Passed
Forwarding of the request to the child	Check that the request is forwarded from AtoN 1 to AtoN 2		Passed
	Check content of request message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	AtoN 2 = 990123457	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed
Transmission of response from AtoN 2	Check that AtoN 2 transmits the response		Passed
	Check content of request message		Passed
	Source ID	AtoN 2 = 990123457	Passed
	Destionation ID	AtoN 1 = 990123456	Passed
	MMSI of AtoN	AtoN 2 = 990123457 See Note 1)	Passed
	Check that the slot defined in the request is used for transmission		Passed

Check that AtoN 1 forwards the response to the base station	Check that AtoN 1 forwards the response to the base station		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	Base station = 001000005	Passed
	MMSI of AtoN	AtoN 2 = 990123457 See Note 1)	Passed
Other items	It seems that message 7 is always output on PI port, independent of the destination. Message 7 should be output only if the one of the destination IDs is equal to the own ID. <u>Retest 2011-04-07 Ba:</u> Message 7 is output only if addressed to the own station		Passed

2011-03-14 Ba	Test details - Test with two AtoN stations, Destination ID = 0		
Test item	Check	Remark	Result
Test is performed with a base station and two AtoN stations in a chain.			
Configure AtoN station 1	Set and verify own MMSI	990123456	Passed
	Set and verify parent MMSI = Base station	001000005	Passed
	Set and verify child MMSI = AtoN 2	990123457	Passed
Configure AtoN station 2	Set and verify own MMSI	990123457	Passed
	Set and verify parent MMSI = AtoN 1	990123456	Passed
Send AAR configuration sentence from base station to AtoN station 2, destination ID = 0			
Message from base station	Check that message 6 from the base station is received	There is no VDM output. Because the message is received and processed there should be an VDM output. Retest 2011-04-07 Ba: Message 6 with Destination ID 0 is output on the PI port	Passed
Forwarding of message 6 to the child	Check that the message is forwarded from AtoN station 1 to AtoN 2		Passed
	Check content of message 6		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Configuration	Verify configuration by PI port query		Passed
Send query for AAR from base station to AtoN 2			
Message from base station	Check that message 6 from the base station is received	No VDM output Retest 2011-04-08 Ba: Message 6 with Destination ID 0 is output on the PI port	Passed
Forwarding of the request to the child	Check that the request is forwarded from AtoN 1 to AtoN 2		Passed
	Check content of request message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed

Transmission of response from AtoN 2	Check that AtoN 2 transmits the response		Passed
	Check content of request message		Passed
	Source ID	AtoN 2 = 990123457	Passed
	Destionation ID	AtoN 1 = 990123456	Passed
	MMSI of AtoN	AtoN 2 = 990123457 See Note 1)	Passed
	Check that the slot defined in the request is used for transmission		Passed
Check that AtoN 1 forwards the response to the base station	Check that AtoN 1 forwards the response to the base station		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	Base station = 001000005	Passed
	MMSI of AtoN	AtoN 2 = 990123457 See Note 1)	Passed

Note 1)
The AtoN standards seems to require that the „MMSI of AtoN“ in the response should be set to the parent MMSI. This seems not to be appropriate because of the following reasons:

- The base station cannot recognize for which AtoN station the configuration is valid which it has received via chaining. It can request only on setting at a time and has carefully track which AtoN it has requested.

- From the base stations view there is a different behaviour between a response received directly from an AtoN (“MMSI of AtoN” = MMSI of the the station for which the response data are valid) and chaining (“MMSO of AtoN = MMSI of base station).

- The “MMSI of AtoN” field value is not what the name of the field says. When the response arrives at the base station the “MMSI of AtoN” value is the base stations MMSI.

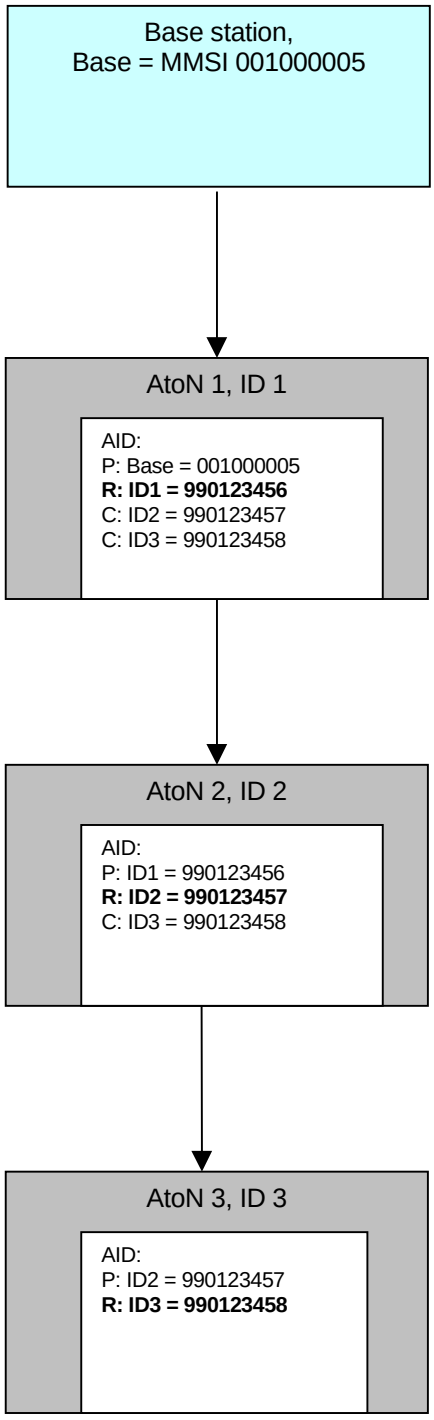
All these problems do not exist if the “MMSI of AtoN” is set to the MMSI of the AtoN station which generates the response and is not changed in the chain.

The rule for the destination of forwarding the message is:
All response message which are received from one of the childs (Source ID) have to be forwarded to the AtoN’s (single) parent station.

Because of these reasons we recommend and accept that the “MMSI of AtoN” is set to the MMSI of the AtoN station which generates the response and for which the information is valid.

2.5.7.2 Test with 3 AtoN stations in chain

2.5.7.2.1 Test setup 1

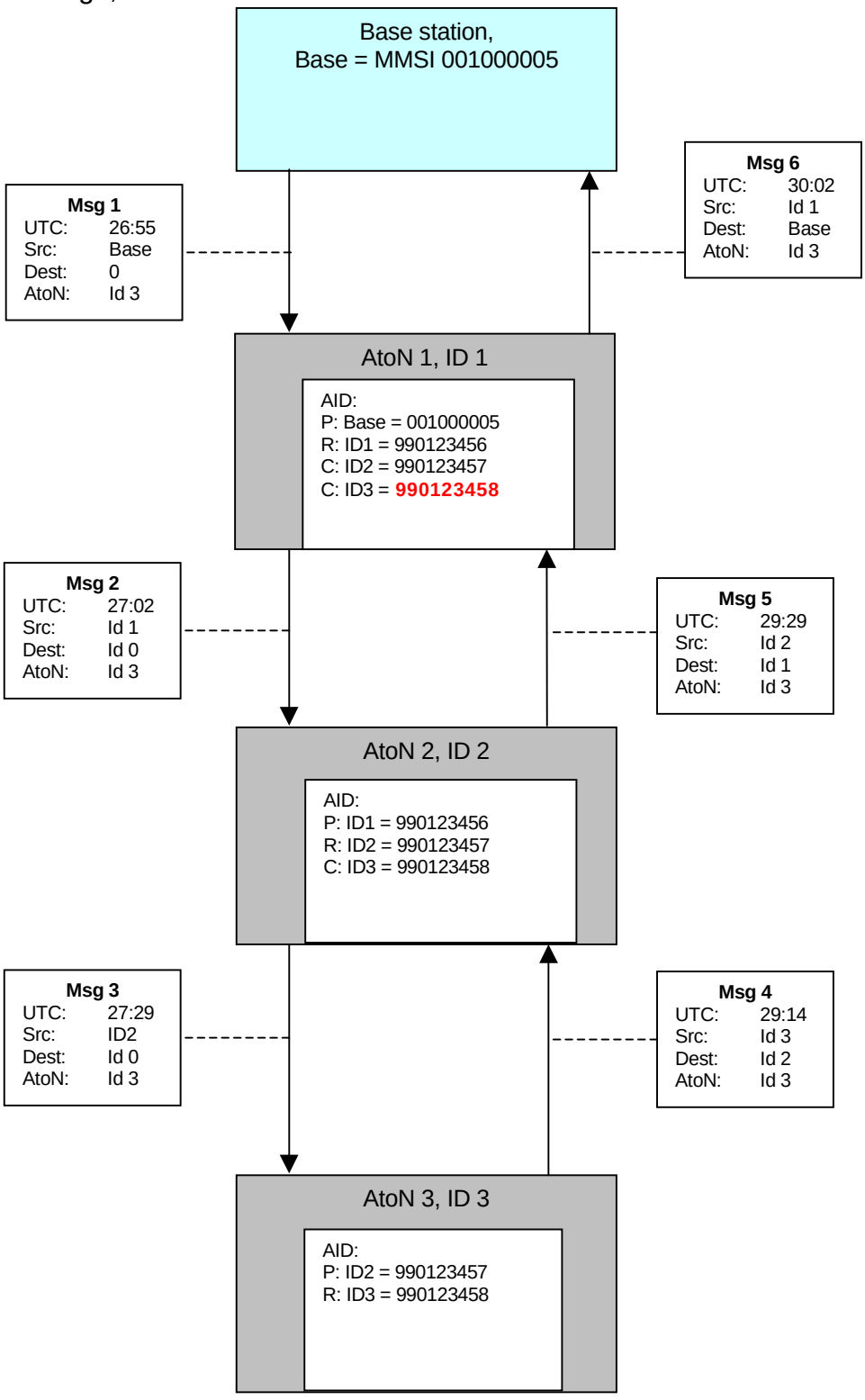


2011-03-14 Ba	Test details - Test with 3 AtoN stations, Destionation ID = 0		
Test item	Check	Remark	Result
Test is performed with a base station and two AtoN stations in a chain.			
Configure AtoN station 1	Set and verify own MMSI	990123456	Passed
	Set and verify parent MMSI = Base station	001000005	Passed
	Set and verify child MMSI = AtoN 2	990123457	Passed
Configure AtoN station 2	Set and verify own MMSI	990123457	Passed
	Set and verify parent MMSI = AtoN 1	990123456	Passed
	Set and verify child MMSI = AtoN 3	990123458	Passed
Configure AtoN station 3	Set and verify own MMSI	990123458	Passed
	Set and verify parent MMSI = AtoN 2	990123457	Passed
Send AAR configuration sentence from base station to AtoN station 3			
Message from base station	Check that message 6 from the base station is received	VDM output	Passed
Forwarding of message 6 by AtoN 1	Check that the message is forwarded from AtoN station 1		Passed
	Check content of message 6		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Message from AtoN 1	Check that message 6 AtoN 1 is received	There is no VDM output. Retest 2011-04-08 Ba: There is a VDM output	Passed
Forwarding of message 6 by AtoN 1	Check that the message is forwarded from AtoN station 2		Passed
	Check content of message 6		Passed
	Source ID	AtoN 2 = 990123457	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Configuration	Verify configuration by PI port query		Passed

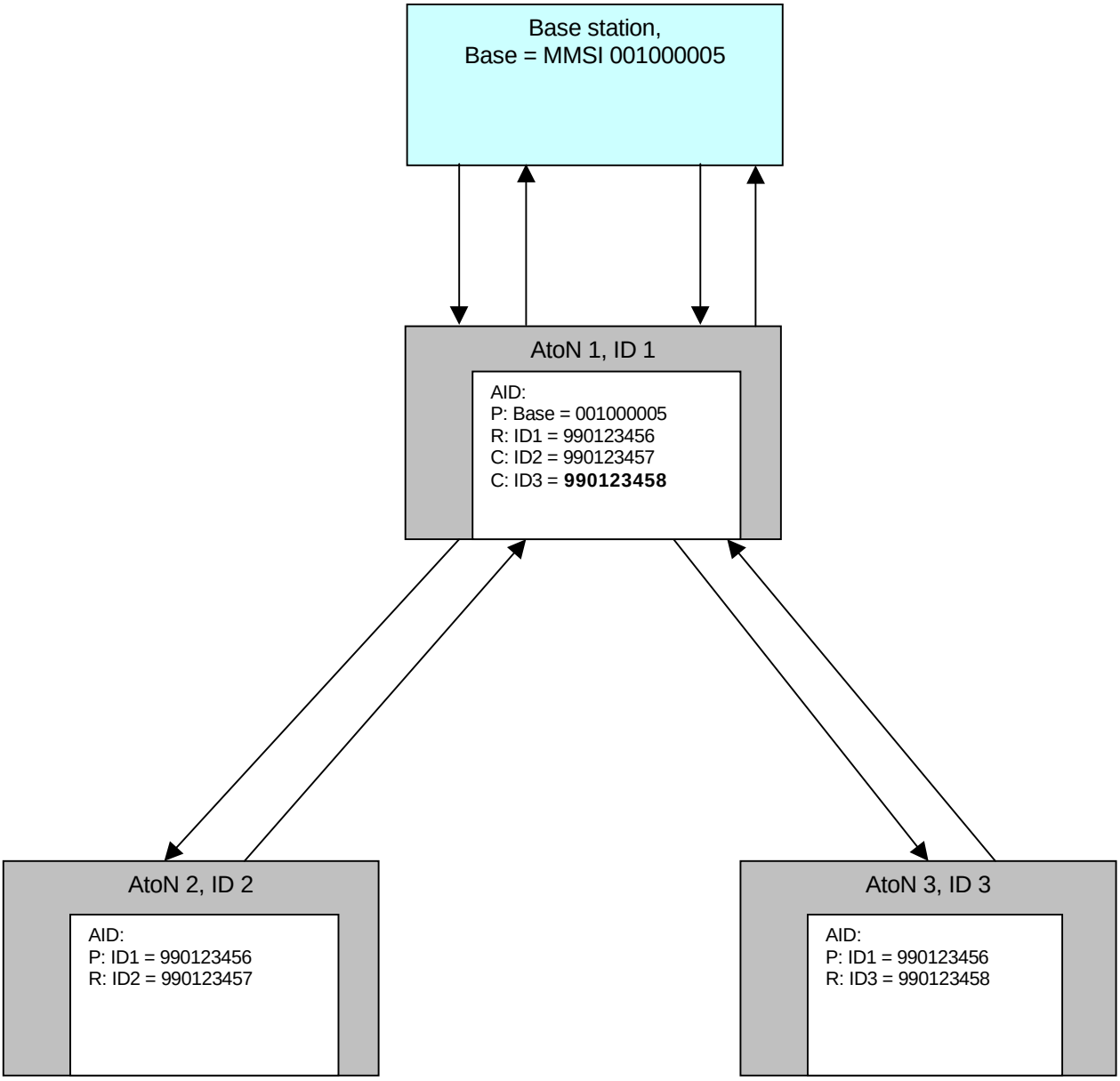
Send query for AID from base station to AtoN 3			
Message from base station	Check that the query message from the base station is received	VDM output	Passed
Forwarding of request by AtoN 1	Check that the message is forwarded from AtoN station 1		Passed
	Check content of message 6		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Message from AtoN 1	Check that the request from AtoN 1 is received	There is no VDM output Retest 2011-04-08 Ba: There is a VDM output	Passed
Forwarding of the request by AtoN 2	Check that the message is forwarded from AtoN station 2		Passed
	Check content of message 6		Passed
	Source ID	AtoN 2 = 990123457	Passed
	Destionation ID	= 0	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
	Verify that the configured slots are used (ID 0, Index1)		Passed
Transmission of response from AtoN 3	Check that AtoN 3 transmits the response		Passed
	Check content of request message		Passed
	Source ID	AtoN 2 = 990123458	Passed
	Destionation ID	AtoN 1 = 990123457	Passed
	MMSI of AtoN	AtoN 2 = 990123458 See Note 1)	Passed
	Check that the slot defined in the request is used for transmission		Passed
Forwarding of the response from AtoN 2 to AtoN 1	Check that AtoN 2 forwards the response to AtoN 1		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123457	Passed
	Destionation ID	AtoN 2 = 990123456	Passed
	MMSI of AtoN	AtoN 2 = 990123458 See Note 1)	Passed
Forwarding of the response from AtoN 1 to the base station	Check that AtoN 1 forwards the response to the base station		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	Base station = 001000005	Passed
	MMSI of AtoN	AtoN 2 = 990123458 See Note 1)	Passed

Other items	The response is transmitted twice from AtoN 1 to the base station, on channel A and B. This should be clarified Retest 2011-04-15 Ba: UTC 10:24 and UTC 10:26 The response is transmitted only once from AtoN 1 to the base station		Passed

Message exchange, Destination ID = 0



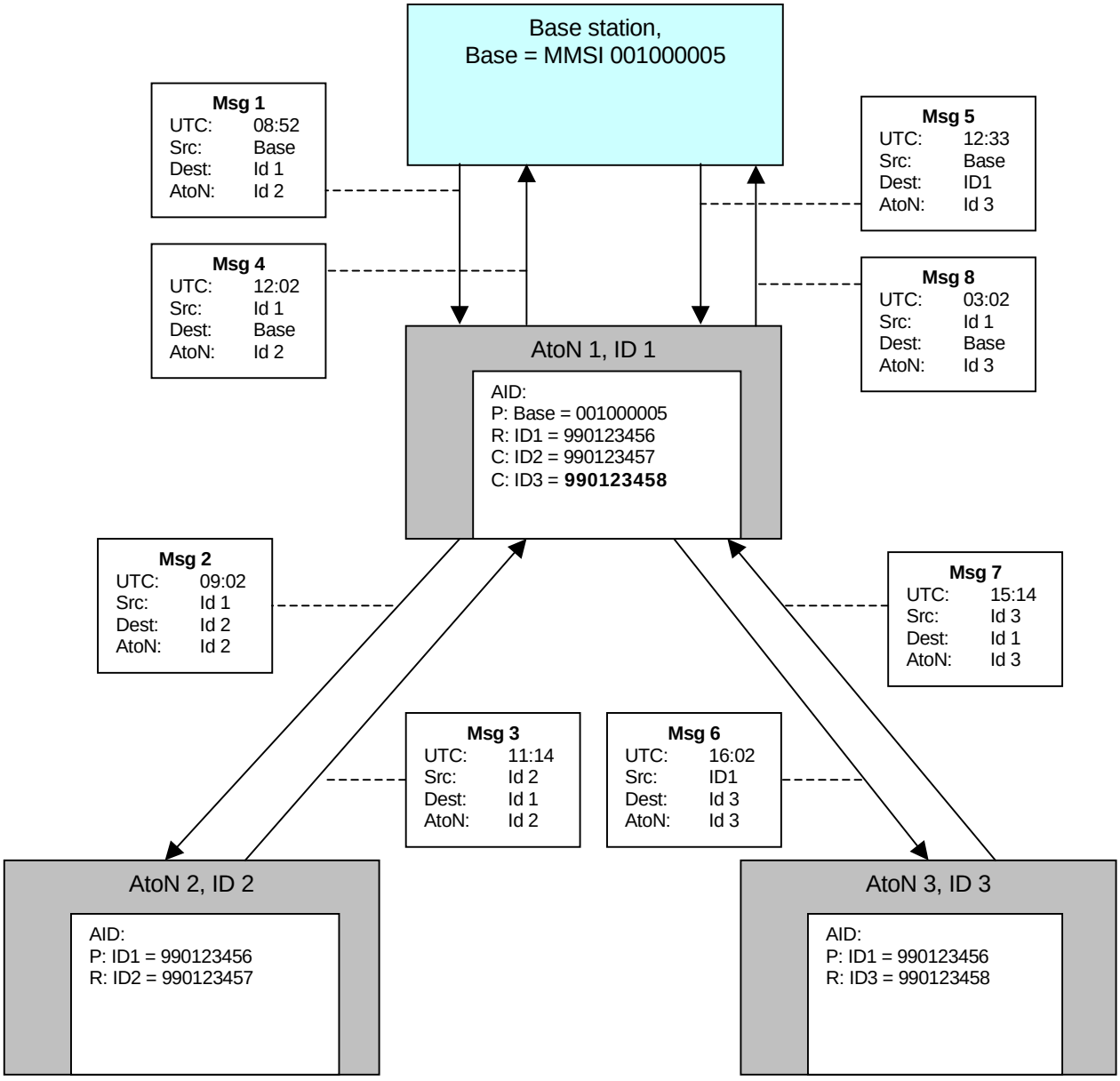
2.5.7.2.2 Test Setup 2



2011-04-15 Ba	Test details - Request in setup 2		
Test item	Check	Remark	Result
Test is performed with a base station and two AtoN stations in a chain.			
Configure AtoN station 1	Set and verify own MMSI	990123456	Passed
	Set and verify parent MMSI = Base station	001000005	Passed
	Set and verify child MMSI = AtoN 2	990123457	Passed
	Set and verify child MMSI = AtoN 3	990123458	Passed
Configure AtoN station 2	Set and verify own MMSI	990123457	Passed
	Set and verify parent MMSI = AtoN 1	990123456	Passed
Configure AtoN station 3	Set and verify own MMSI	990123458	Passed
	Set and verify parent MMSI = AtoN 1	990123456	Passed
Query for AID from base station to AtoN 2			
Message from base station	Check that message 6 from the base station is received	VDM output	Passed
Forwarding of the request to the child	Check that the request is forwarded from AtoN 1 to AtoN 2		Passed
	Check content of request message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	AtoN 2 = 990123457	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed
Transmission of response from AtoN 2	Check that AtoN 2 transmits the response		Passed
	Check content of request message		Passed
	Source ID	AtoN 2 = 990123457	Passed
	Destionation ID	AtoN 1 = 990123456	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed
	Check that the slot defined in the request is used for transmission		Passed
Check that AtoN 1 forwards the response to the base station	Check that AtoN 1 forwards the response to the base station		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	Base station = 001000005	Passed
	MMSI of AtoN	AtoN 2 = 990123457	Passed

Query for AID from base station to AtoN 3			
Message from base station	Check that message 6 from the base station is received	VDM output	Passed
Forwarding of the request to the child	Check that the request is forwarded from AtoN 1 to AtoN 3		Passed
	Check content of request message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	AtoN 2 = 990123458	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
Transmission of response from AtoN 3	Check that AtoN 3 transmits the response		Passed
	Check content of request message		Passed
	Source ID	AtoN 2 = 990123458	Passed
	Destionation ID	AtoN 1 = 990123456	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed
	Check that the slot defined in the request is used for transmission		Passed
Check that AtoN 1 forwards the response to the base station	Check that AtoN 1 forwards the response to the base station		Passed
	Check content of response message		Passed
	Source ID	AtoN 1 = 990123456	Passed
	Destionation ID	Base station = 001000005	Passed
	MMSI of AtoN	AtoN 2 = 990123458	Passed

Messages


Base station,
Base = MMSI 001000005
Msg 1
UTC: 08:52
Src: Base
Dest: Id 1
AtoN: Id 2
Msg 5
UTC: 12:33
Src: Base
Dest: ID1
AtoN: Id 3
Msg 4
UTC: 12:02
Src: Id 1
Dest: Base
AtoN: Id 2
Msg 8
UTC: 03:02
Src: Id 1
Dest: Base
AtoN: Id 3
AtoN 1, ID 1
AID:
P: Base = 001000005
R: ID1 = 990123456
C: ID2 = 990123457
C: ID3 = 990123458
Msg 2
UTC: 09:02
Src: Id 1
Dest: Id 2
AtoN: Id 2
Msg 7
UTC: 15:14
Src: Id 3
Dest: Id 1
AtoN: Id 3
Msg 3
UTC: 11:14
Src: Id 2
Dest: Id 1
AtoN: Id 2
Msg 6
UTC: 16:02
Src: ID1
Dest: Id 3
AtoN: Id 3
AtoN 2, ID 2
AID:
P: ID1 = 990123456
R: ID2 = 990123457
AtoN 3, ID 3
AID:
P: ID1 = 990123456
R: ID3 = 990123458

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.

2011-02-22 Ba	Test details -		
Test item	Check	Remark	Result
Disconnect VHF antenna	Check that EUT ceases transmission	EUT continues with VDO and transmission. This is acceptable because on this way the EUT can check if the VHF antenna is available again	Passed
Channel 1 receiver fault	Check documentation for receiver fault detection	See manual, Version 1.38, section 5.4.2	Passed
Channel 2 receiver fault	Check documentation for receiver fault detection	See manual, Version 1.38, section 5.4.2	Passed
Augmentation system	Disable augmentation system	EUT continues transmission without augmentationsystem	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.

2011-06-30 Ba	Test details - Transmitter shutdown procedure		
Test item	Check	Remark	Result
Check documentation	The manufacturer has provided in document MD303-WV-QA-1106-01, date 06/3072011 information about the transmitter shutdown procedure. (circuit drawing and function description). The implemented transmitter shutdown procedure is in compliance with the requirement and works independent of software.		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.

2011-06-22 Ba	Test details - Average power consumption		
Test item	Check	Remark	Result
Average power consumption of Mando-301 (Type 1) Tested with equipment no. 8			
FATDMA mode	Measured value	12 mA = 0.288 Ah/day	
	Compare measured values with the average power consumption	Manual (Version 1.38) 0.288 Ah/day	Passed
Average power consumption of Mando-303 (Type 3) Tested with equipment no. 7			
FATDMA mode	Measured value	18 mA = 0.432 Ah/day	
	Compare measured values with the average power consumption	Manual (Version 1.38) 0.432 Ah/day	Passed
RATDMA mode	Measured value	69 mA = 1.656 Ah/day	
	Compare measured values with the average power consumption	Manual (Version 1.38) 1.656 Ah/day	Passed
Remark	The manual has been adapted to the BSH measurement values, therefore the measured values and the manual values are identical		

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.

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.

2011-06-30 Ba	Test details - Quality assurance		
Test item	Check	Remark	Result
	The manufacturer has provided a certificate for compliance to ISO 9001:2008		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.

2011-06-30 Ba	Test details -		
Test item	Check	Remark	Result
Check documentation	According to the document: "Comment Checklist for AIS_Testreport_AMEC_8, Mando-301/-303 AIS AtoN", Date: June 28,2011 no additional features are implemented in the Mando-301/-303.		N/A

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.*

2011-04-18 Ba	Test details – Requirements of IEC 61993-2		
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
	Check that mechanical dimension drawings of GPS antenna are available		Passed
	Check that mechanical dimension drawings of VHF antenna are available if provided		Passed
Configuration	Check that information about configuration is included	The configuration is in addition to the standard sentences performed using a special configuration program. The usage of this configuration program is decribed in detail in the manual	Passed
Power consumption	Check that information about power consumption in FATDMA mode is provided	The average power consumption is provided: 0.48 Ah/day	Passed
	Check that information about power consumption in RATDMA mode is provided	The average power consumption is provided: 1.63 Ah/day	Passed
Firmware upgrade	Check that information about firmware upgrade is provided	There is a separate document which describes the firmware update.	Passed

Configuration interface	Check that information about configuration sentences is provided	The standard sentences are used for configuration. In addition there are some propriatary sentences for settings which are not available for the normal operator.	Passed
	Check that information about configuration interface hardware is provided	See above (Connectors)	Passed
	Check that electrical details of the configuration interface is provided.	RS232	Passed

2.10.4 8.10.4 Marking and identification

Verify that marking and identification complies with 5.4.3.

2011-04-18 Ba	Test details - Marking and identification		
Test item	Check	Remark	Result
Check that the marking and labeling includes:	Identification of the manufacturer	"AMEC" on the top cover of the unit	Passed
	Model identification	"MANDO-303 AIS AtoN" on the top cover	Passed
	Serial number		Passed
	Operating voltage	The operating voltage is not provided on the equipment. It is important to provide this information because 12 Vdc and 24 Vdc are commonly used, and provided 24 Vdc may destroy the equipment Retest 2011-06-29 Ba: The label of the new equipment (No. 7 and 8) show the operating voltage of 12 VDC	Passed
	Software version	The software version is provided on the serial interface, at start and on request (query for VER).	Passed

Annex A Test equipment

A.1 Test equipment summary

#	description	type	identification
1	VDL analyser / Generator	Attingimus UAIS Test unit	S/N 001 BSH PC5593 SW AISterm V1.0rev47 AISmain V1.47011120R
2	Target simulator software	Furuno Navintra	BSH PC8019
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
	Auxiliaries:		
5	True RMS Multimeter DMM 916	Tektronix	S/N 138531
6	2-Kanal-Digital-Oszilloskop Wavesurfer 422	Le Croy	LCRY 0301 J 15673
7	8 Converters RS 422 to RS 232		
8	2 fixed voltage power supply (24 V/10A)		
9	2 adjustable power supplies (30 V/5 A)		
10	Active retransmitting GPS antenna		

for a description of pos. 1-4 see below

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.

A.1.2 Target simulator

The target simulator consists of a standard PC with

- special Radar and Target Simulator software
- extension boards for generation of Radar signals and RS422 serial output signals

Connection of AIS Test system
For tests of AIS transponders the data of 60 moving targets defined in the Radar Simulator are transferred to the VDL Generator and transmitted on VHF. Thus the AIS VHF data link is loaded with simulated AIS targets.
Connection of display systems
Radar systems as well as ECDIS systems will have the ability to receive, process and display AIS information in the near future. In order to test this feature the data of moving targets defined in the Radar Simulator are transferred to the RADAR (together with video, sensor data etc as known).
Connection of AIS under Test
The AIS under test can be connected to the own ship sensor outputs in order to provide full control over own ships dynamic data (for tests of reporting rates, channel management...).

A.1.3 Presentation Interface Monitor

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

- simulate Sensor inputs
- 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 DSC Testbox

The DSC test box includes:

- A standard VHF DSC controller DEBEG 3817 with open interface
- A standard VHF radiotelephone DEBEG 6348

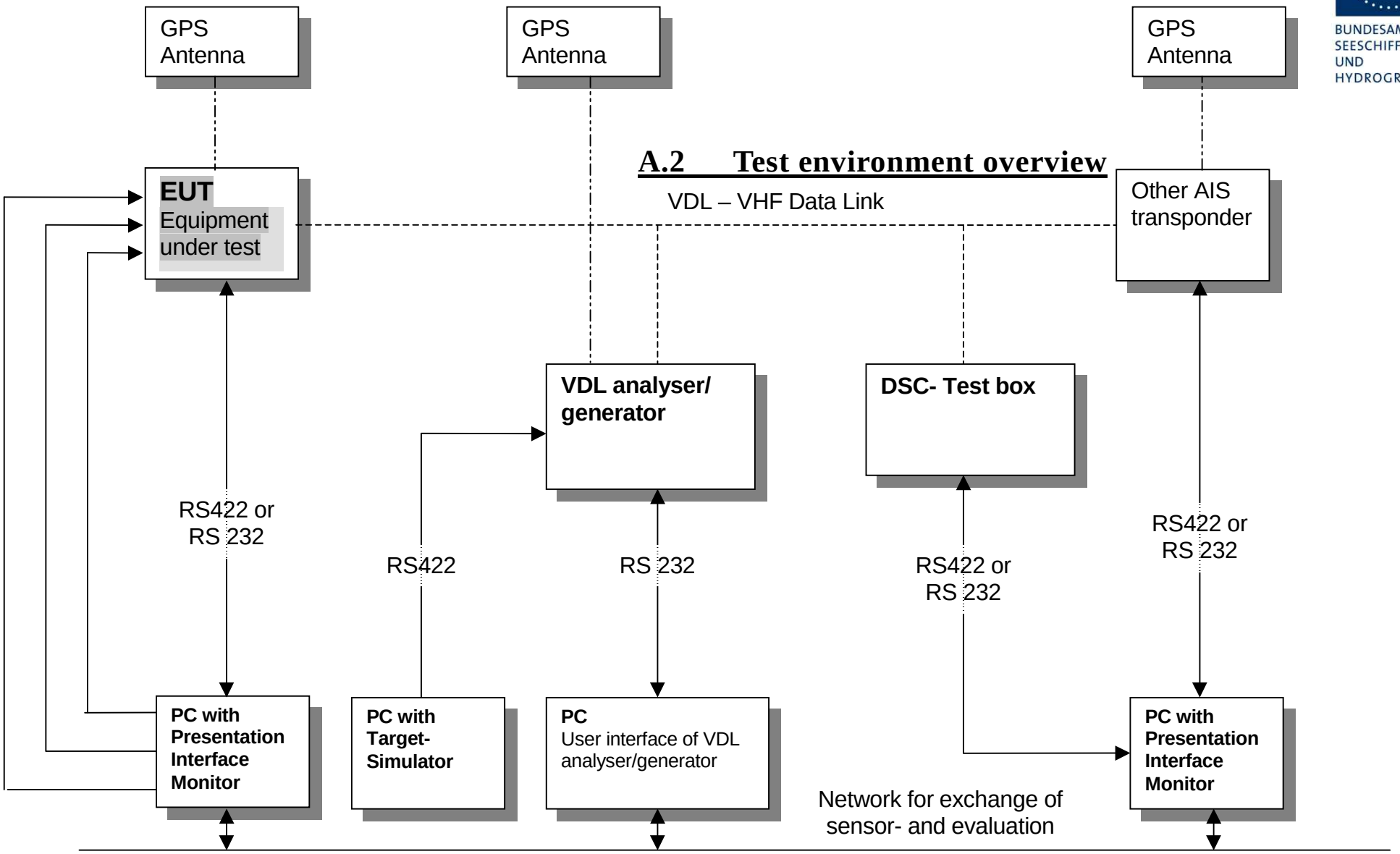
The software modification of the DSC controller comprises a remote control input/output facility

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

The Presentation Interface Monitor is used to generate the DSC calls and to display, log and evaluate the received DSC calls.

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

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

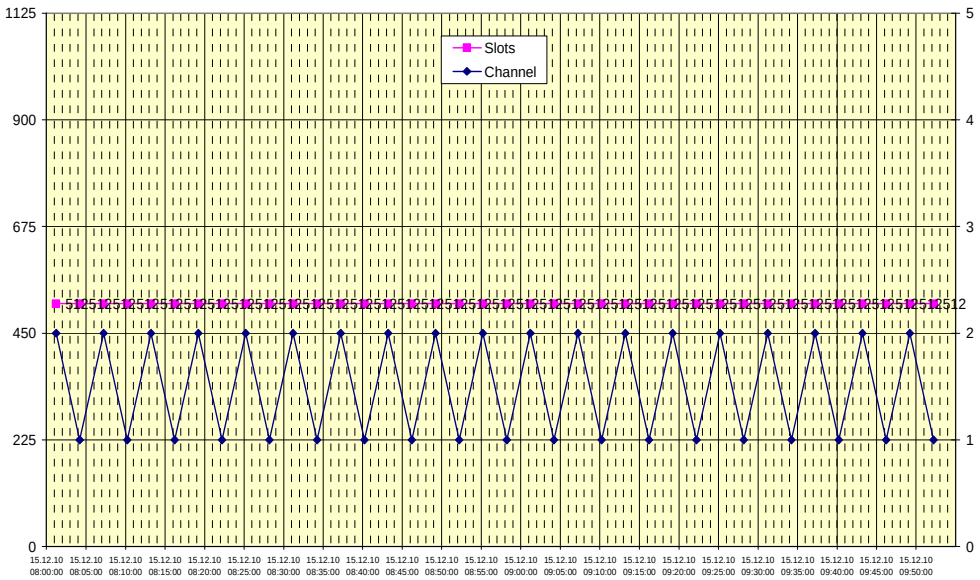
Configuration of chaining	
File name	Description
Sentences	
AID_main_parent_Base.SST	MMSI configuration of the parent of the main AtoN
`$VTAID,990123456,1,001000005,P,C`	
AID_main_child_1.SST	MMSI configuration of the child 1 of the main AtoN
`$VTAID,990123456,1,990123457,C,C`	
AID_main_child_2.SST	MMSI 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

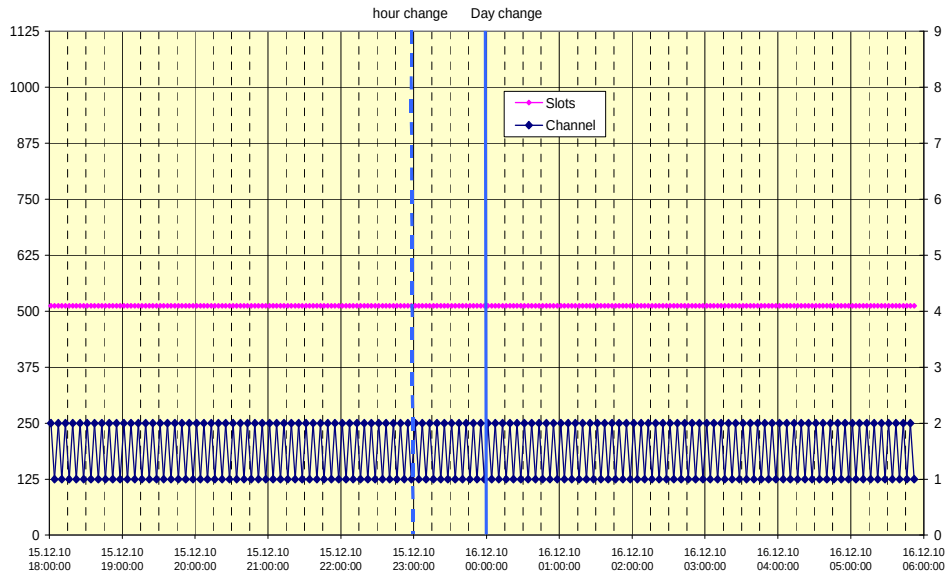
C.1 Type 3 equipment Mando-303

C.1.1 8.1.2 Mode A FATDMA Message 21

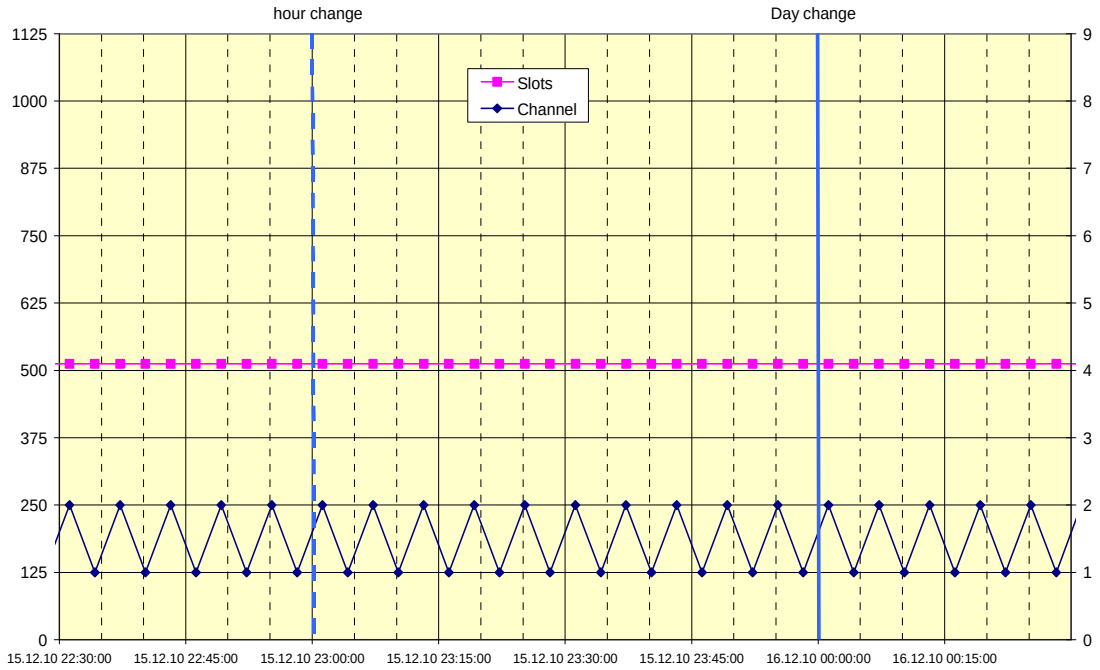
2010-12-15 AMEC Mando-303 - 8.1.2 Schedule FATDMA mode A message 21



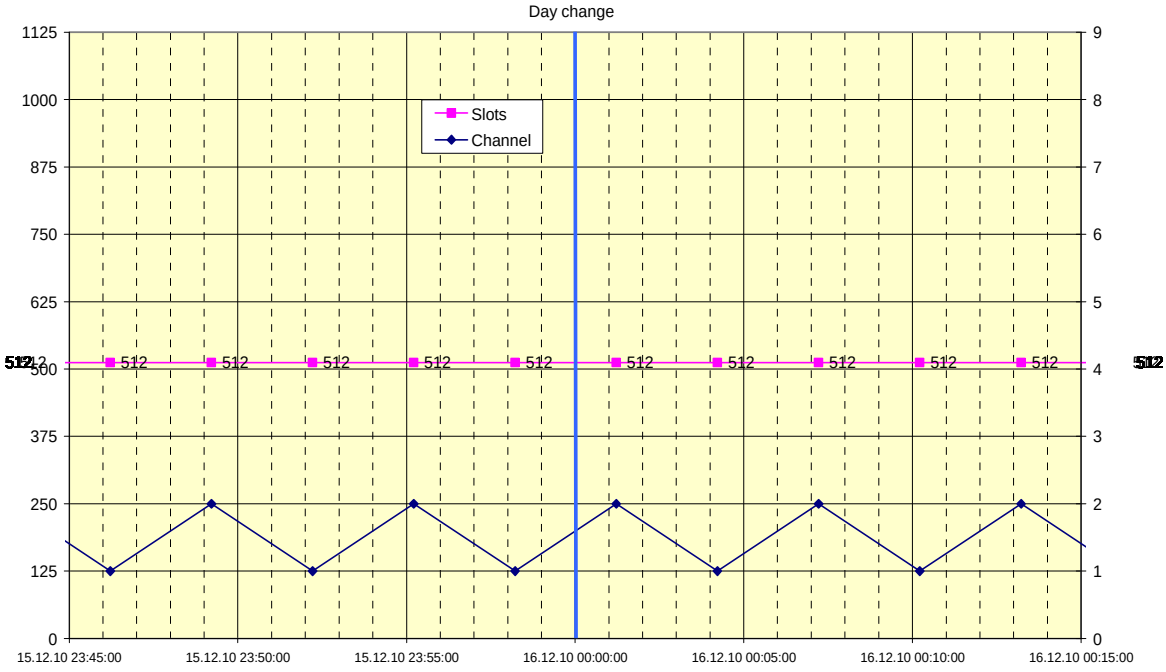
2010-12-16 Ba -AMEC Mando-303 - 8.1.2 Schedule mode A FATDMA message 21



2010-12-16 Ba -AMEC Mando-303 - 8.1.2 Schedule mode A FATDMA message 21

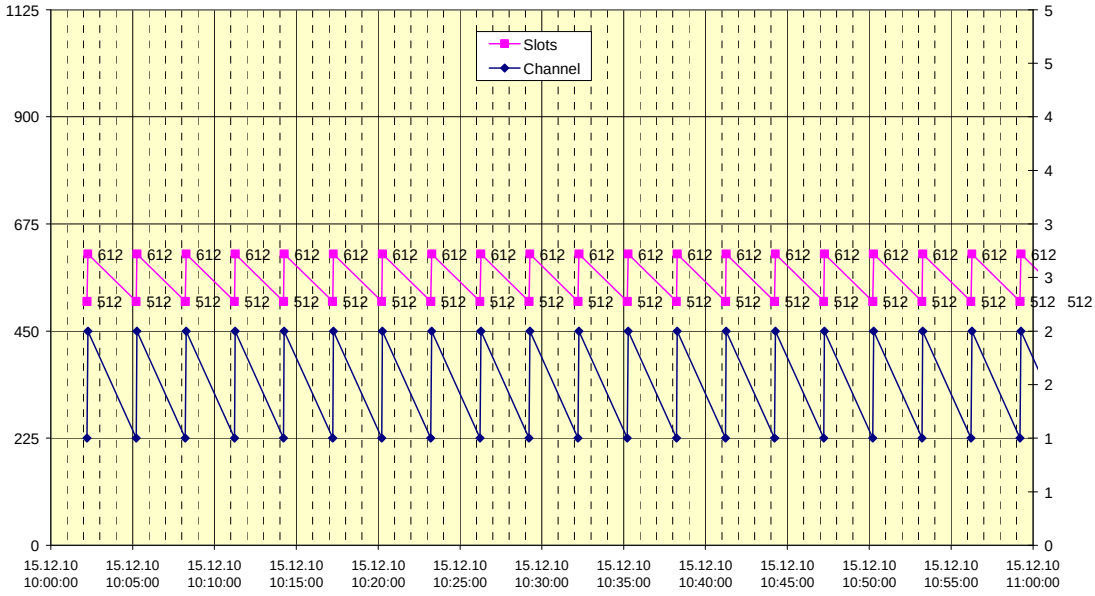


2010-12-16 Ba -AMEC Mando-303 - 8.1.2 Schedule mode A FATDMA message 21

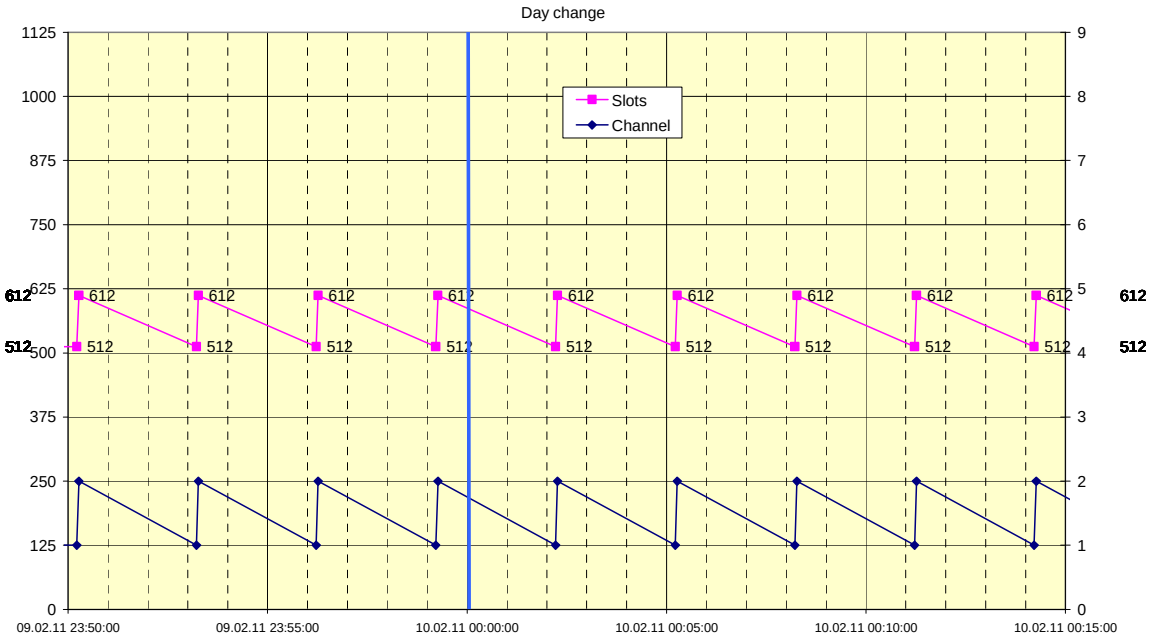


C.1.2 8.1.3 Mode B FATDMA Message 21

2010-12-15 AMEC Mando-303 - 8.1.3 Schedule FATDMA mode B message 21

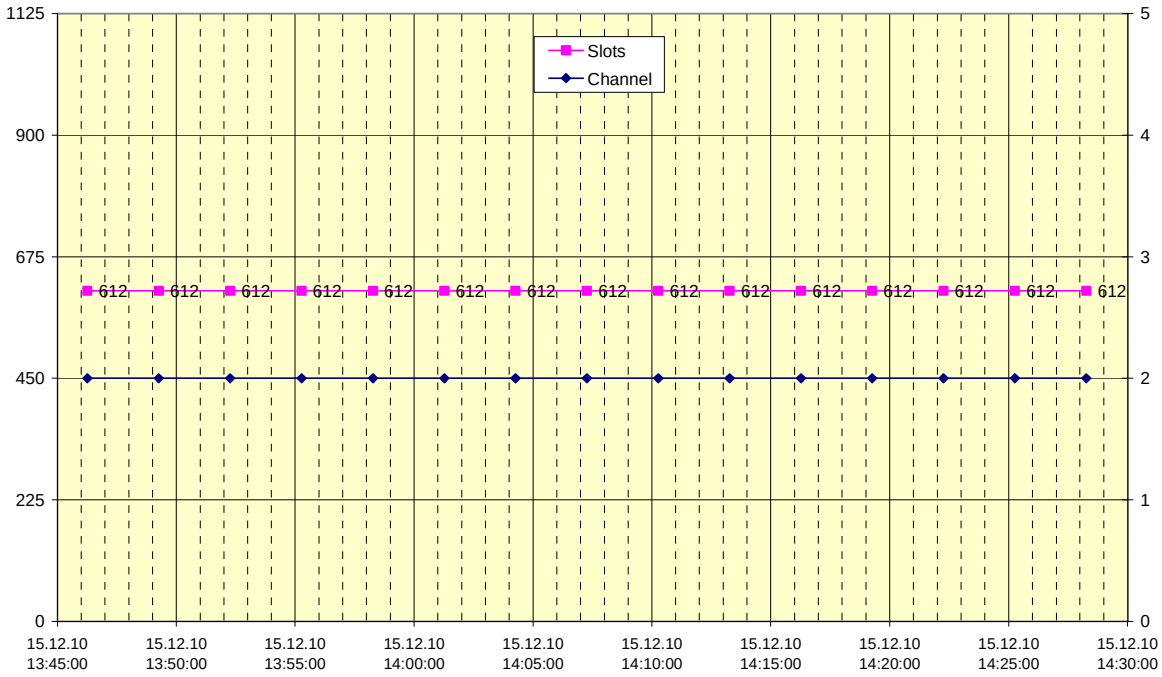


2011-02-10 Ba -AMEC Mando-303 - 8.1.3 Schedule mode B FATDMA message 21

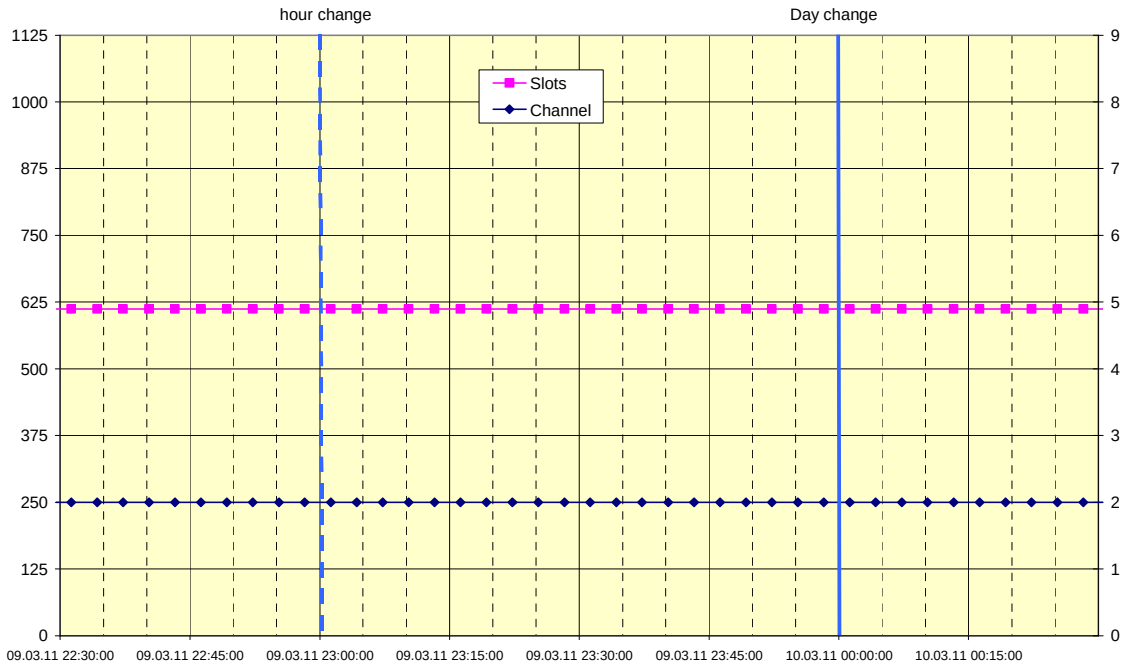


C.1.3 8.1.4 Mode C FATDMA Message 21

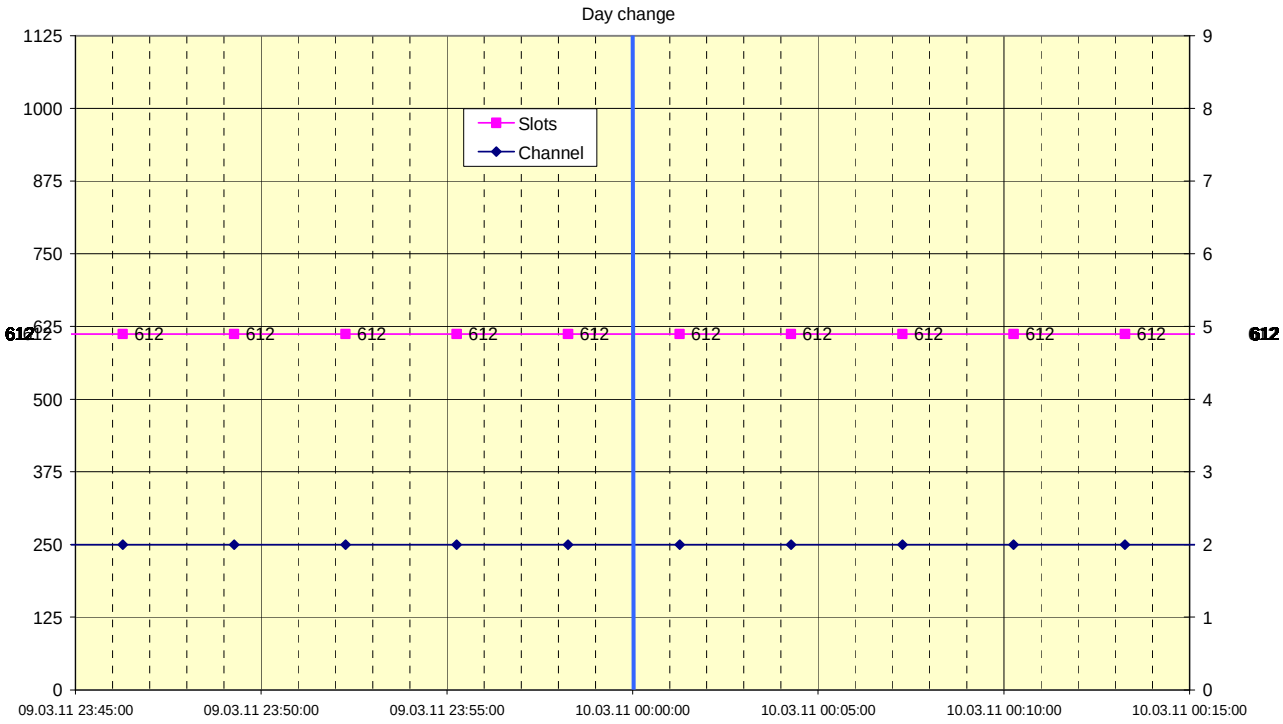
2010-12-15 AMEC Mando-303 - 8.1.4 Schedule FATDMA mode C message 21



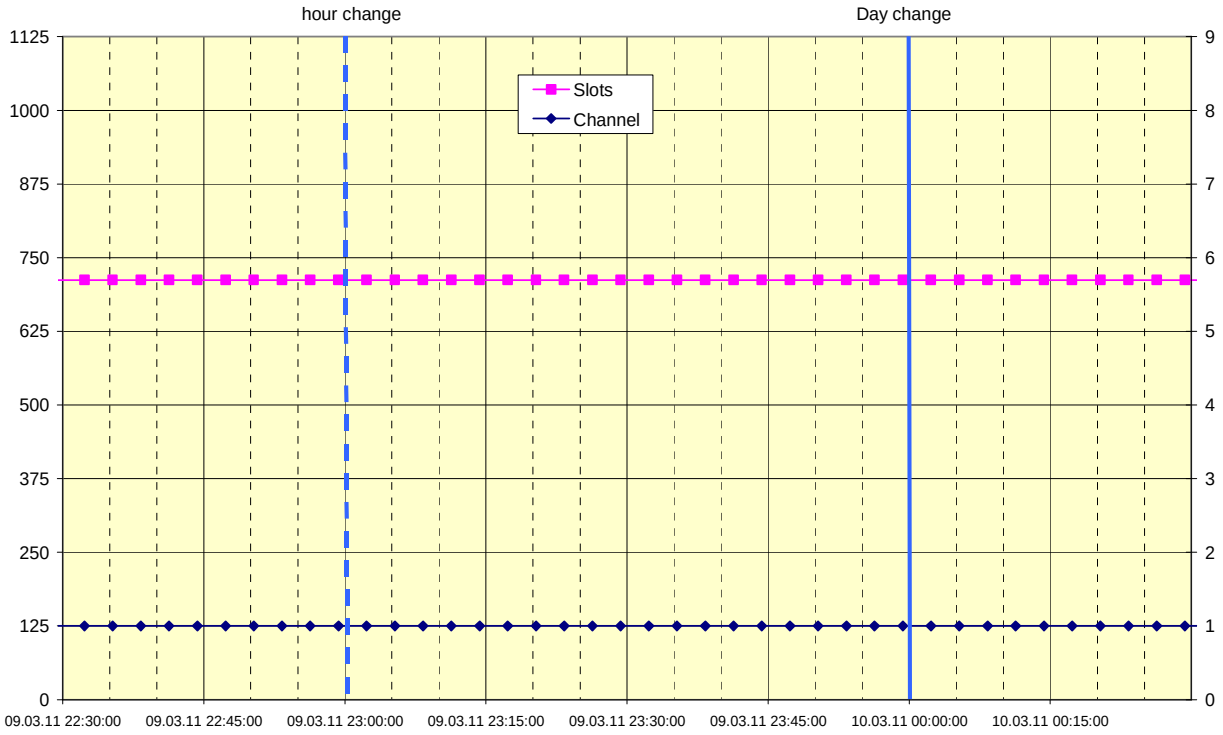
2011-03-10 Ba -AMEC Mando-303 - 8.1.4 Schedule mode C FATDMA message 21



2011-03-10 Ba -AMEC Mando-303 - 8.1.4 Schedule mode C FATDMA message 21

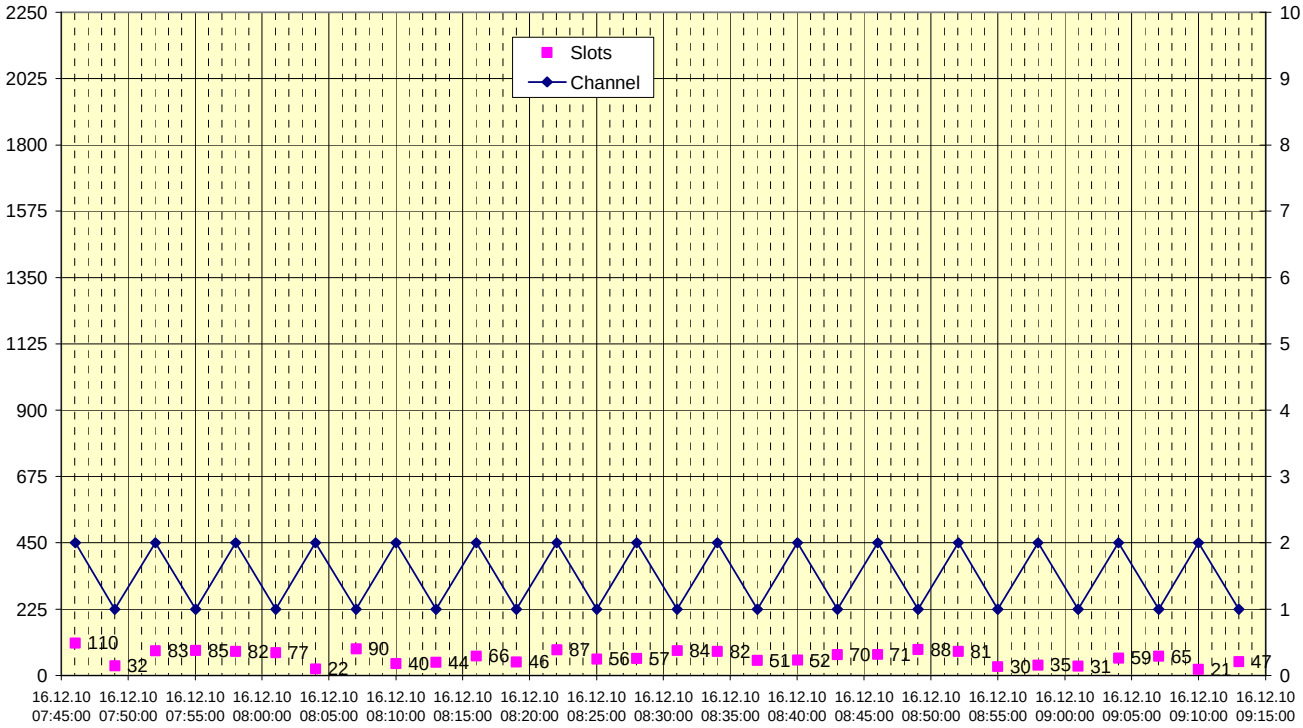


2011-03-10 Ba -AMEC Mando-303 - 8.1.4 Schedule mode C FATDMA message 21

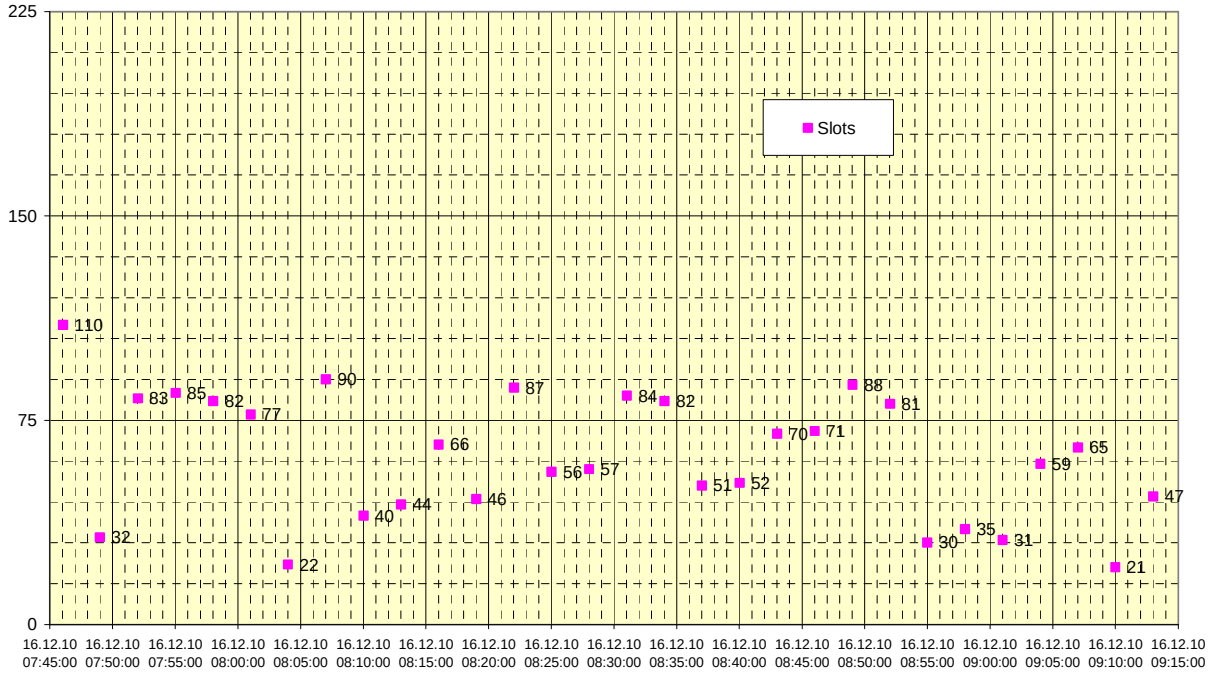


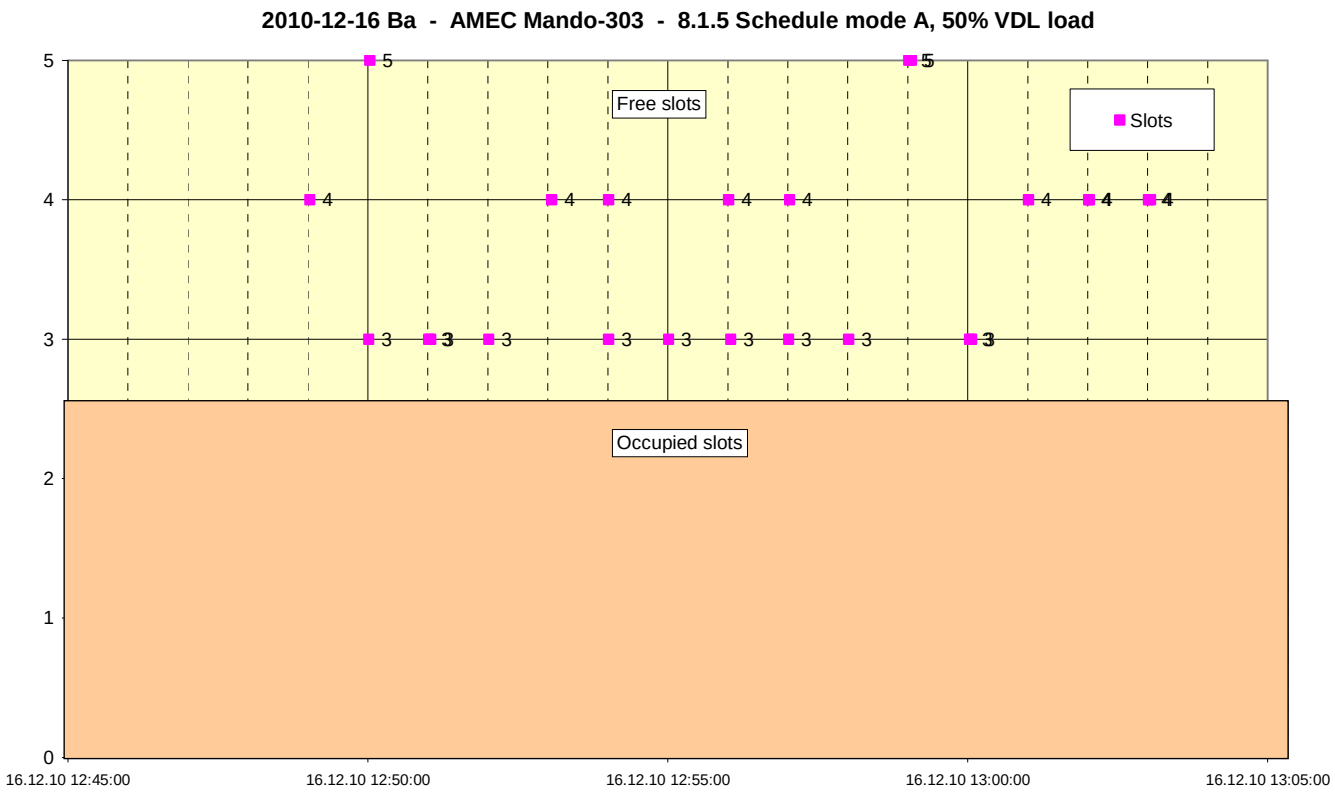
C.1.4 8.1.5 Mode A RATDMA Message 21

2010-12-16 Ba - AMEC Mando-303 - 8.1.5 Schedule mode A RATDMA message 21



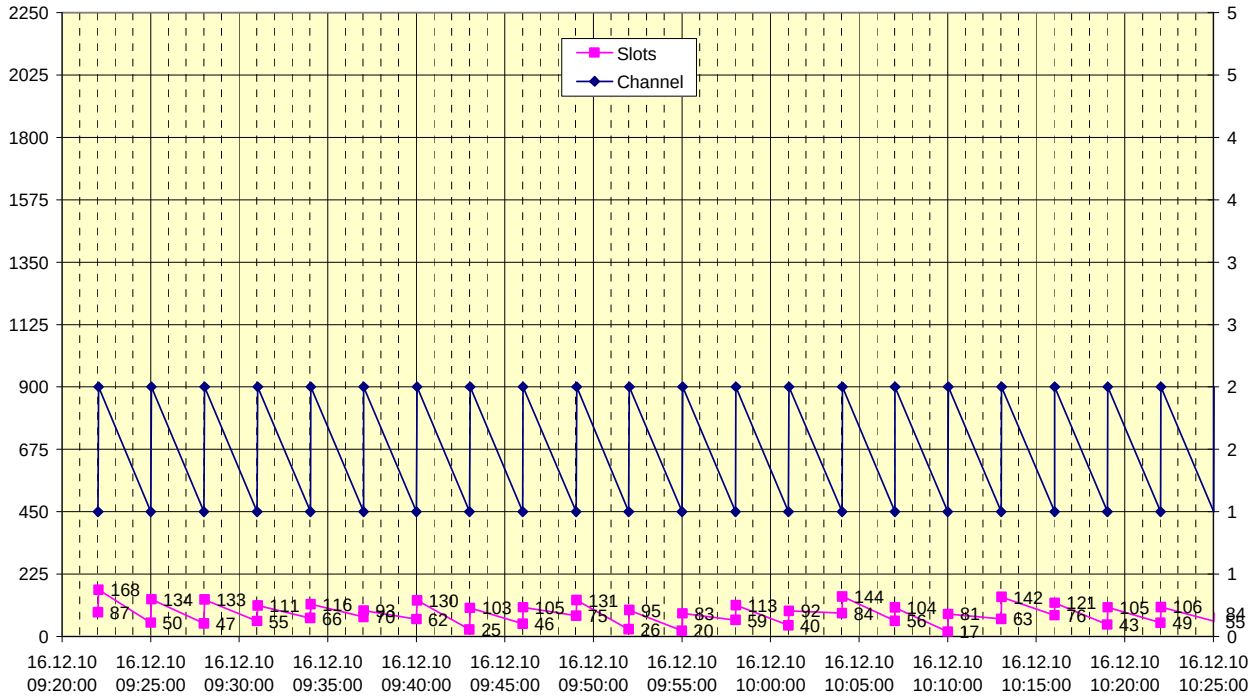
2010-12-16 Ba - AMEC Mando-303 - 8.1.5 Schedule mode A RATDMA message 21



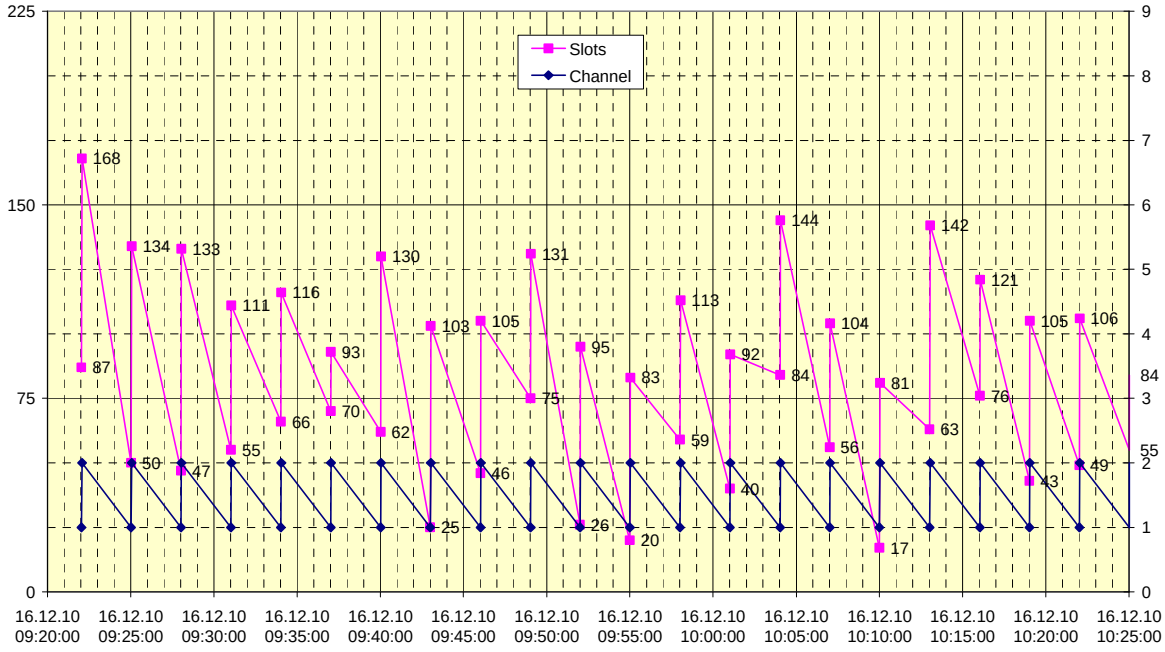

2010-12-16 Ba - AMEC Mando-303 - 8.1.5 Schedule mode A, 50% VDL load
Free slots
Slots
Occupied slots
5
4
3
2
1
0
16.12.10 12:45:00
16.12.10 12:50:00
16.12.10 12:55:00
16.12.10 13:00:00
16.12.10 13:05:00

C.1.5 8.1.6 Mode B RATDMA Message 21

2010-12-16 AMEC Mando-303 - 8.1.6 Schedule mode B RATDMA message 21

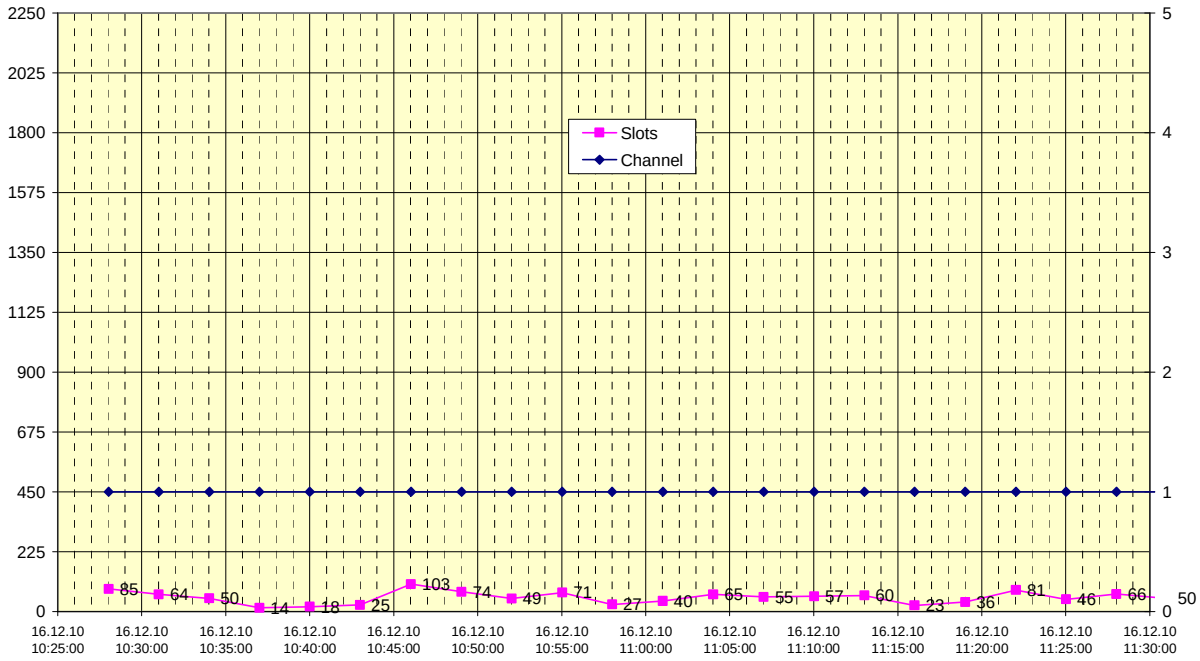


2010-12-16 AMEC Mando-303 - 8.1.6 Schedule mode B RATDMA message 21

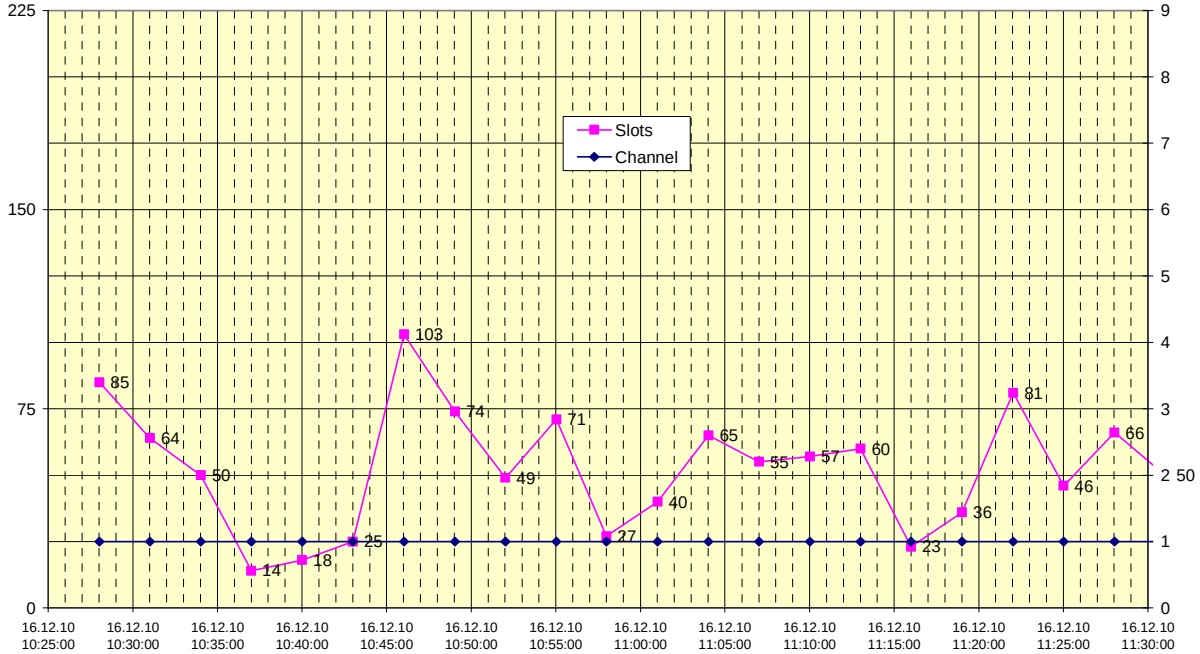


C.1.6 8.1.7 Mode C RATDMA Message 21

2010-12-16 Ba AMEC Mando-303 - 8.1.7 Schedule mode C RATDMA message 21

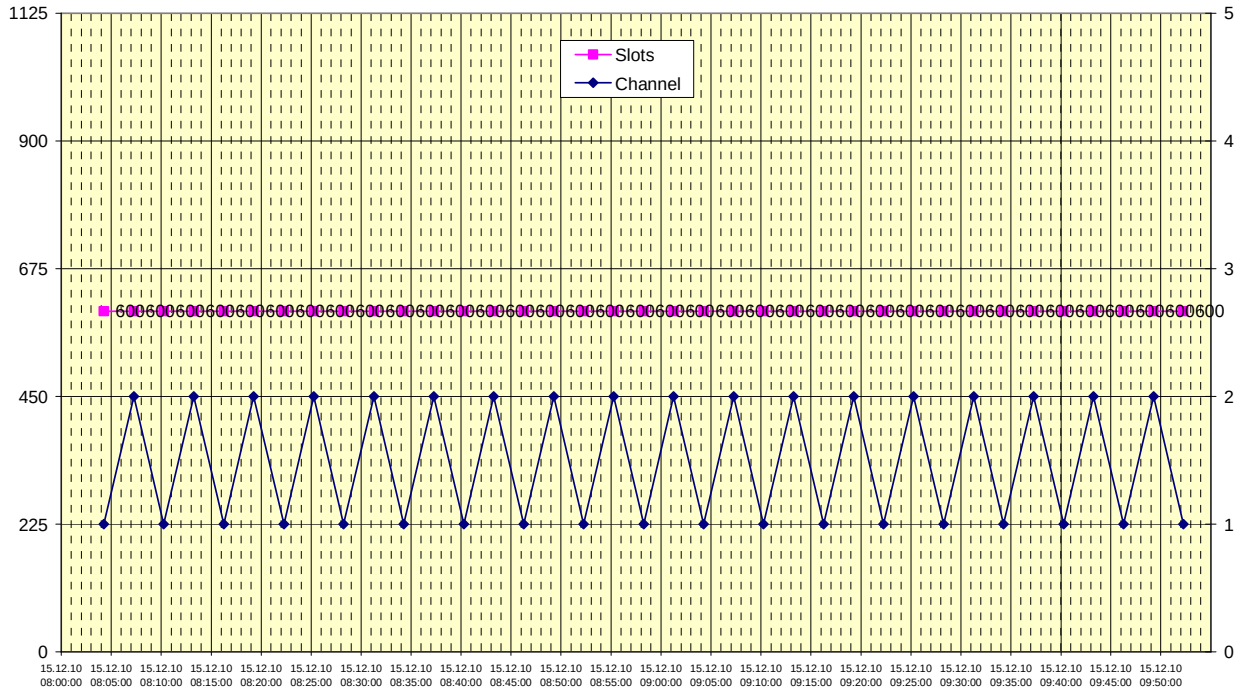


2010-12-16 Ba AMEC Mando-303 - 8.1.7 Schedule mode C RATDMA message 21

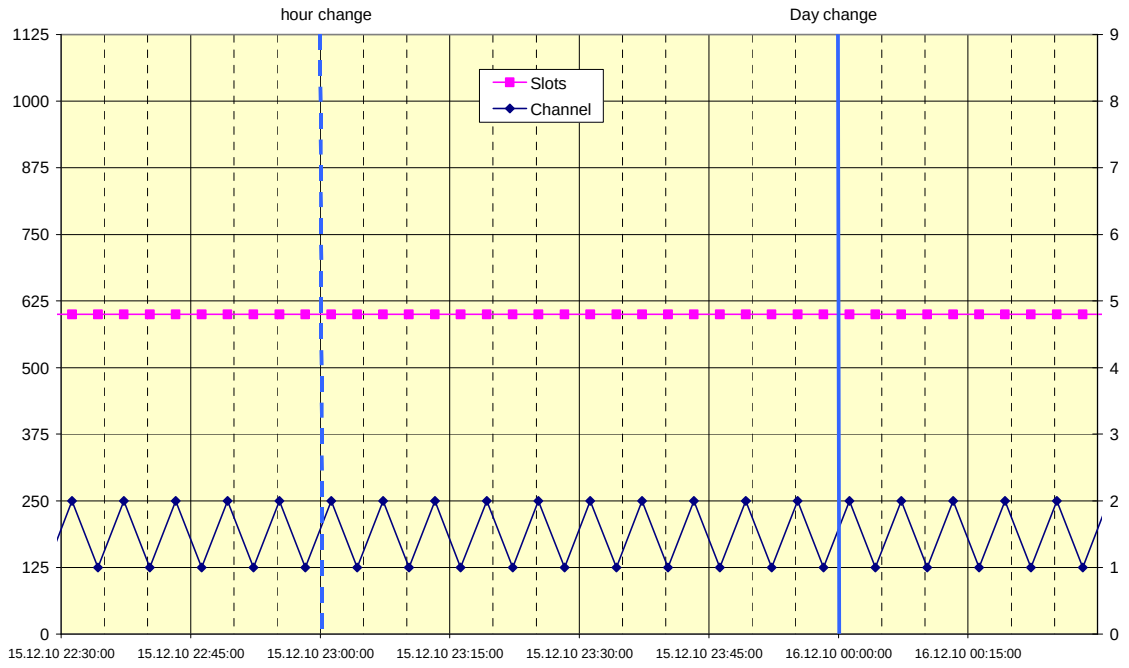


C.1.7 8.1.8 Addressed binary data Message 6

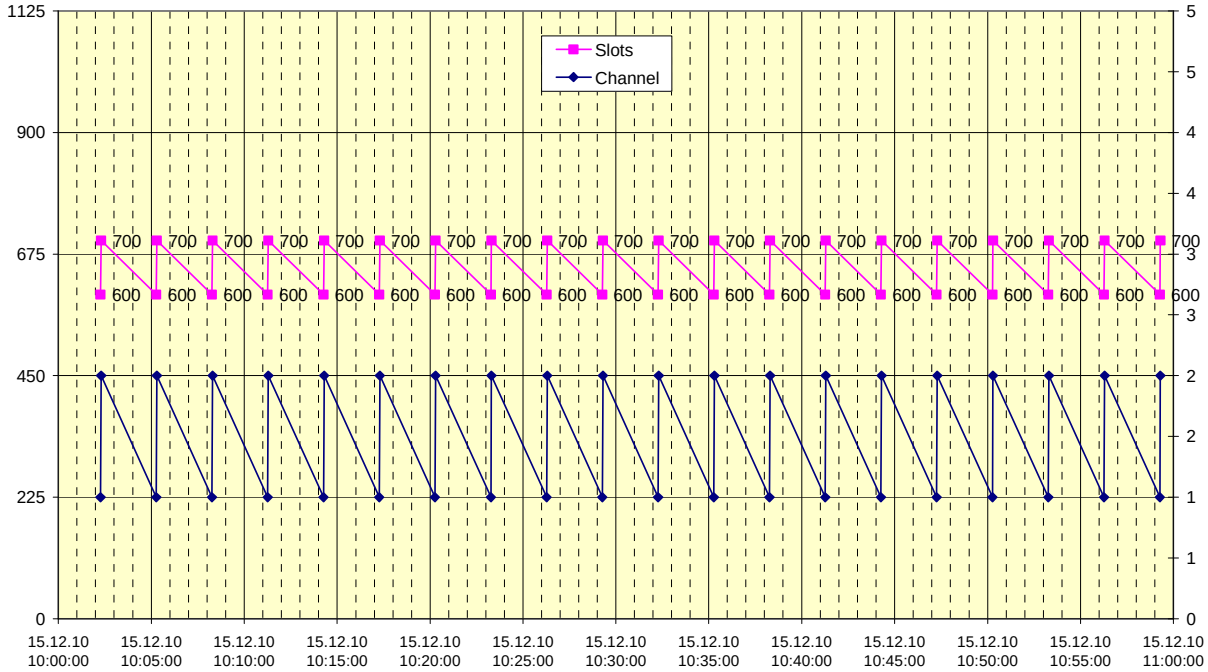
2010-12-15 AMEC Mando-303 - 8.1.8 Schedule FATDMA mode A message 6



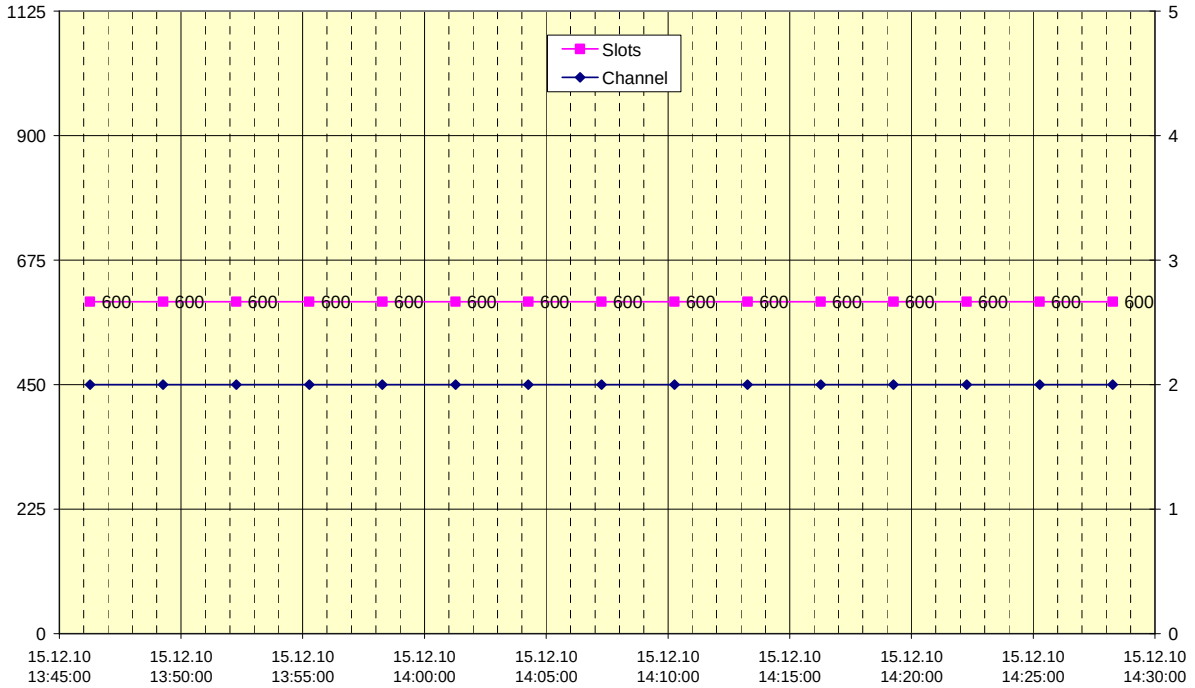
2010-12-16 Ba -AMEC Mando-303 - 8.1.8 Schedule mode A FATDMA message 6



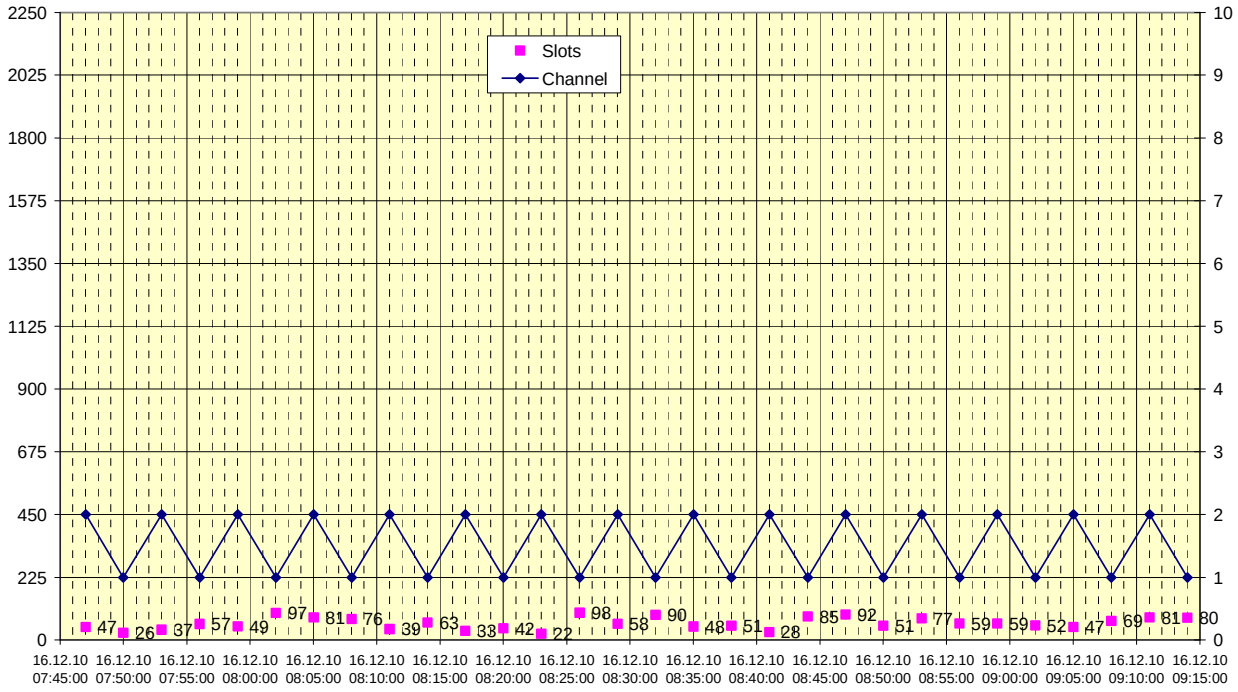
2010-12-15 AMEC Mando-303 - 8.1.8 Schedule FATDMA mode B message 6



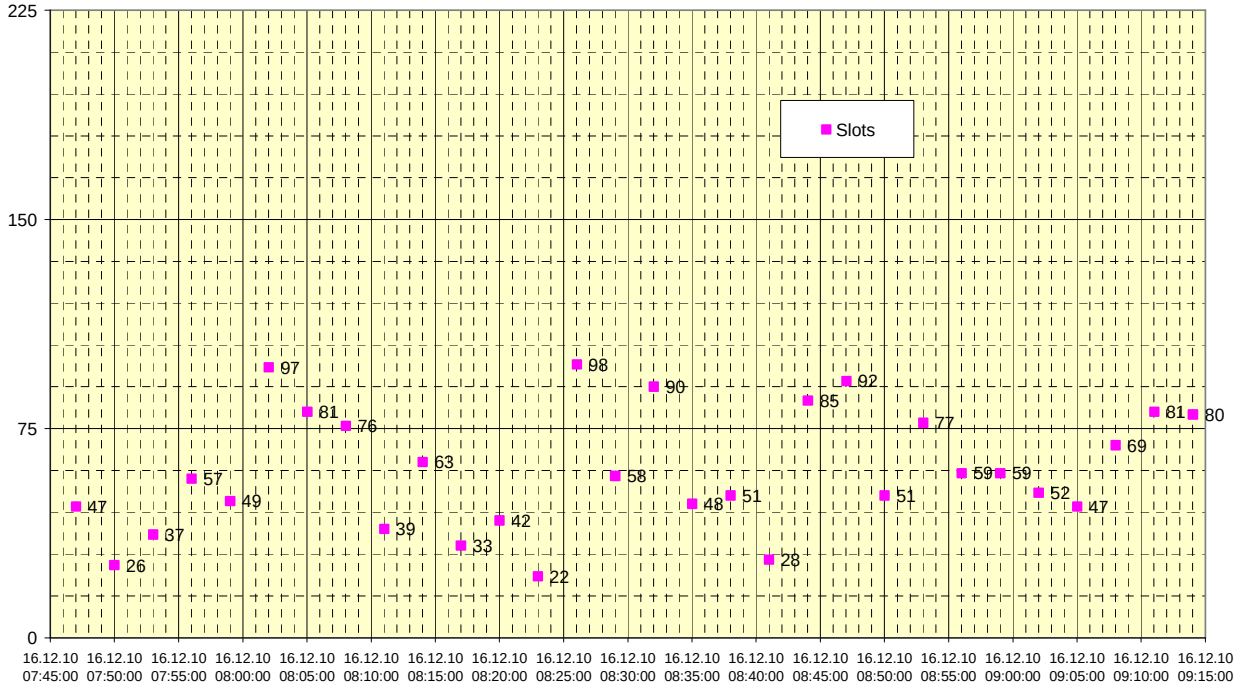
2010-12-15 AMEC Mando-303 - 8.1.8 Schedule FATDMA mode C message 6



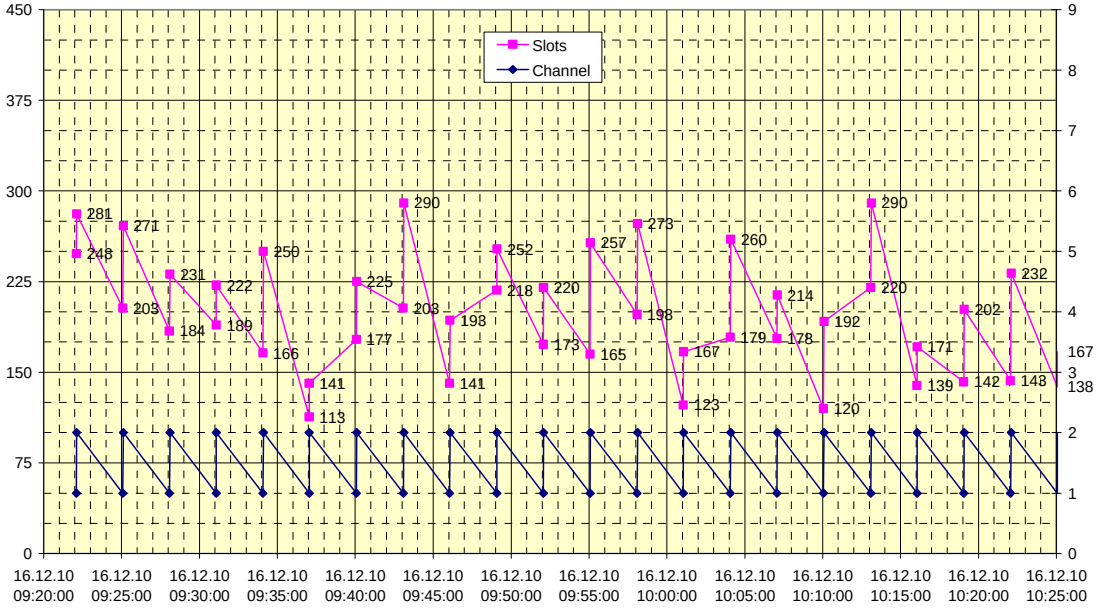
2010-12-16 Ba - AMEC Mando-303 - 8.1.8 Schedule mode A RATDMA message 6



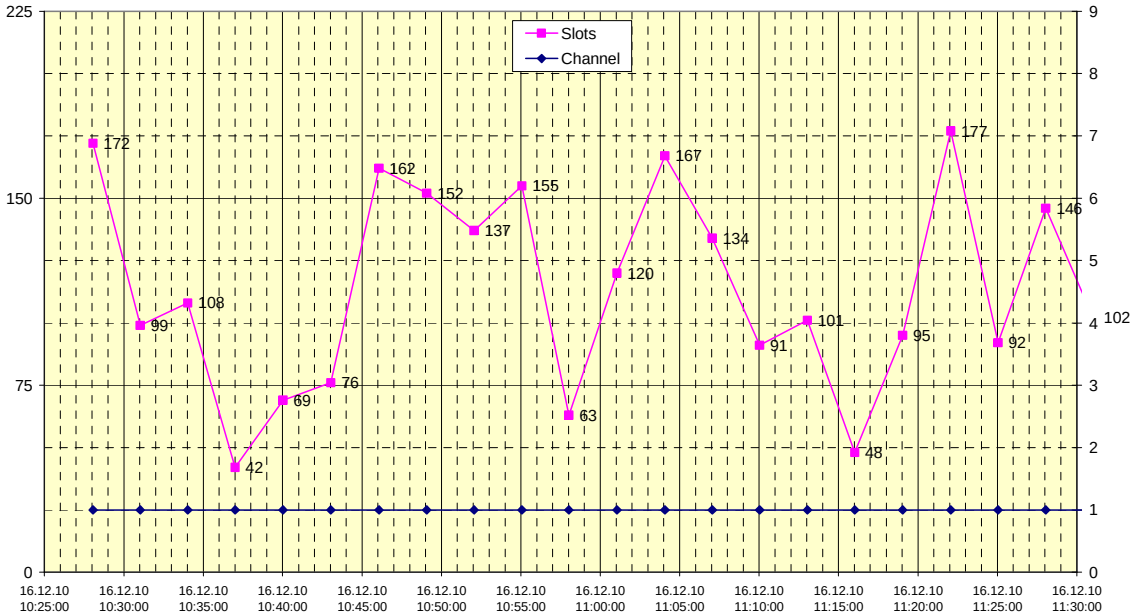
2010-12-16 Ba - AMEC Mando-303 - 8.1.8 Schedule mode A RATDMA message 6



2010-12-16 AMEC Mando-303 - 8.1.8 Schedule mode B RATDMA message 6

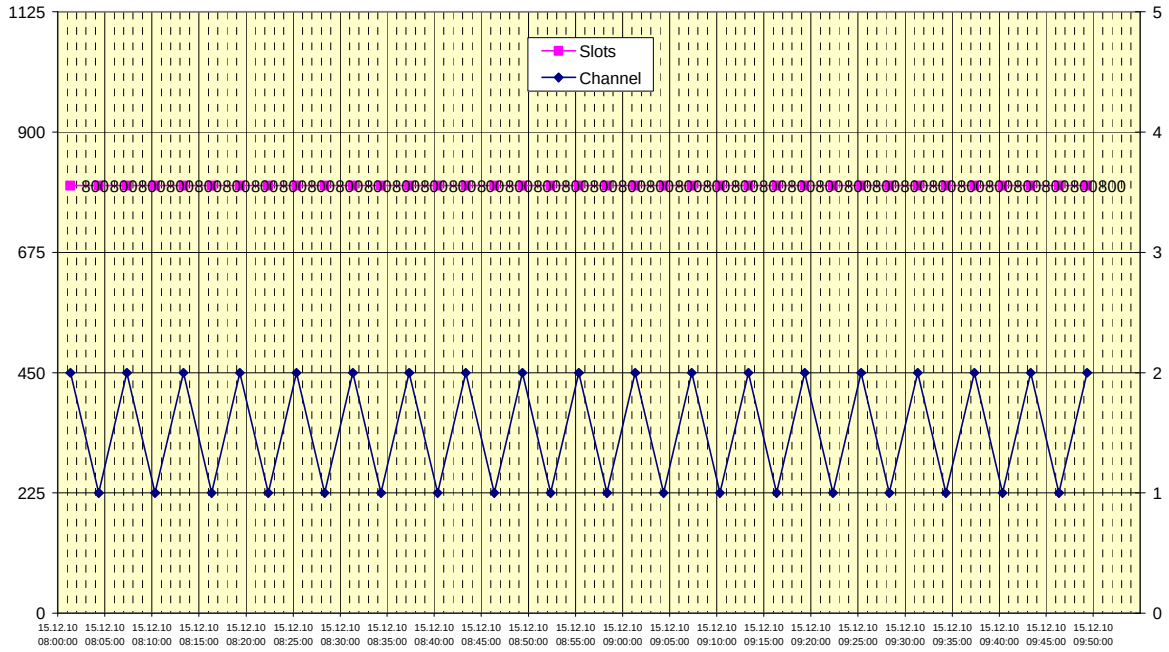


2010-12-16 Ba AMEC Mando-303 - 8.1.8 Schedule mode C RATDMA message 6

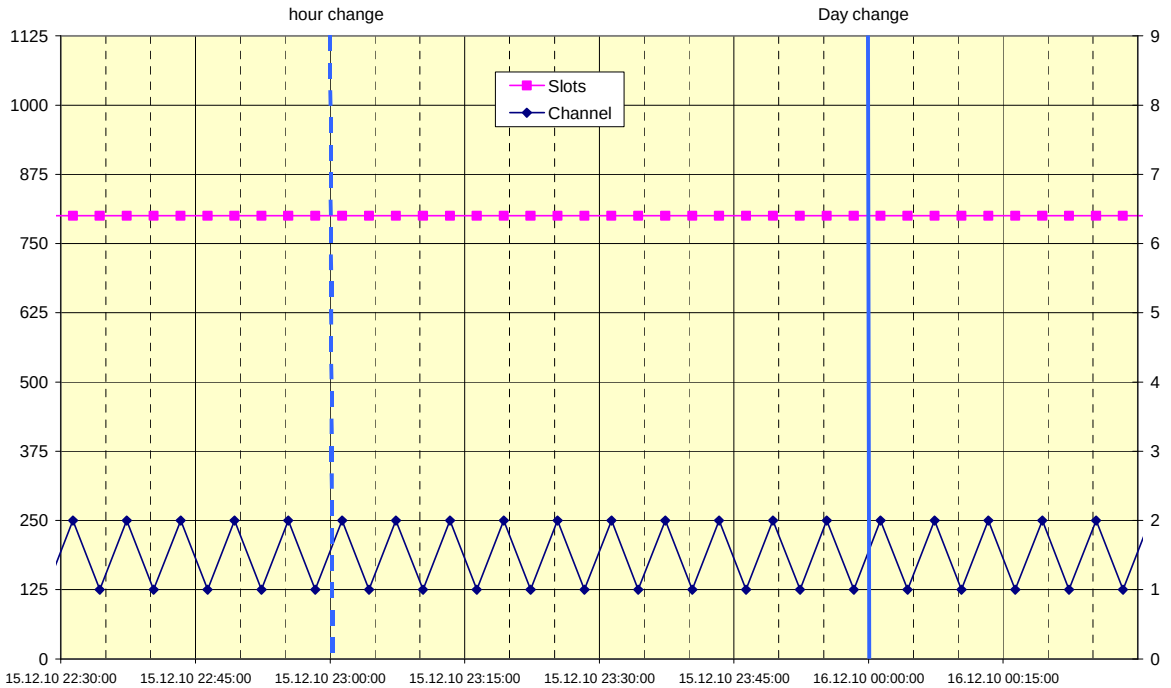


C.1.8 8.1.10 Broadcast binary data Message 8

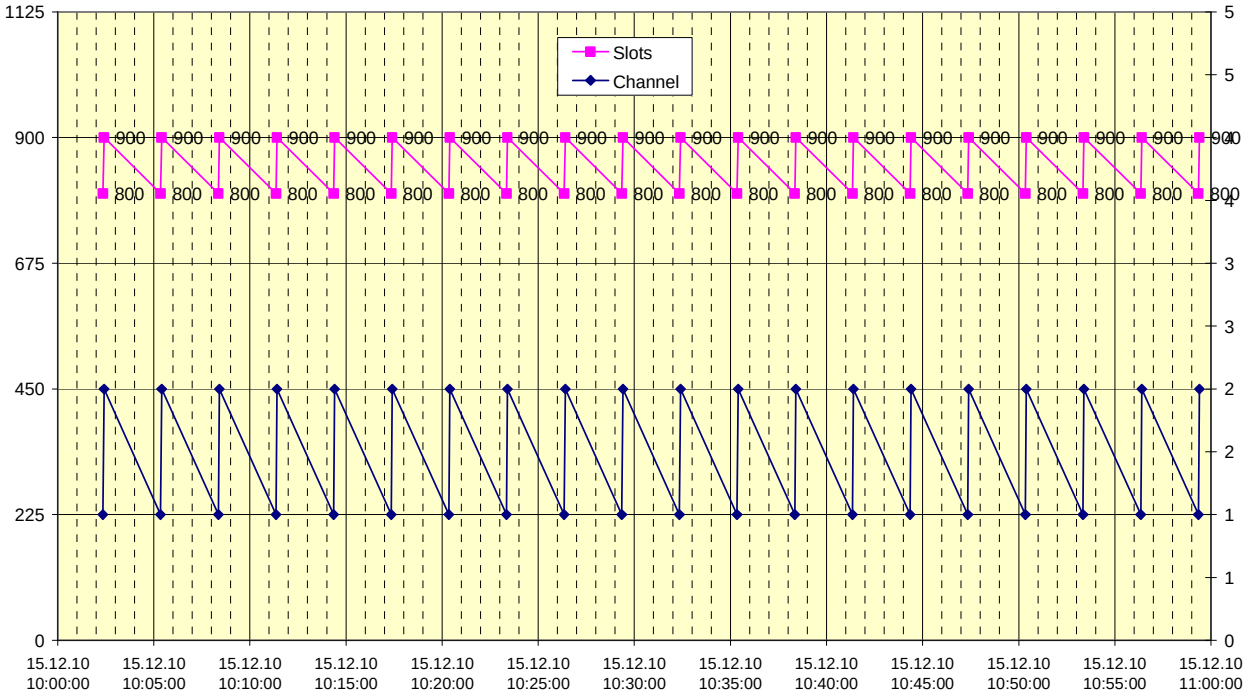
2010-12-15 AMEC Mando-303 - 8.1.10 Schedule FATDMA mode A message 8



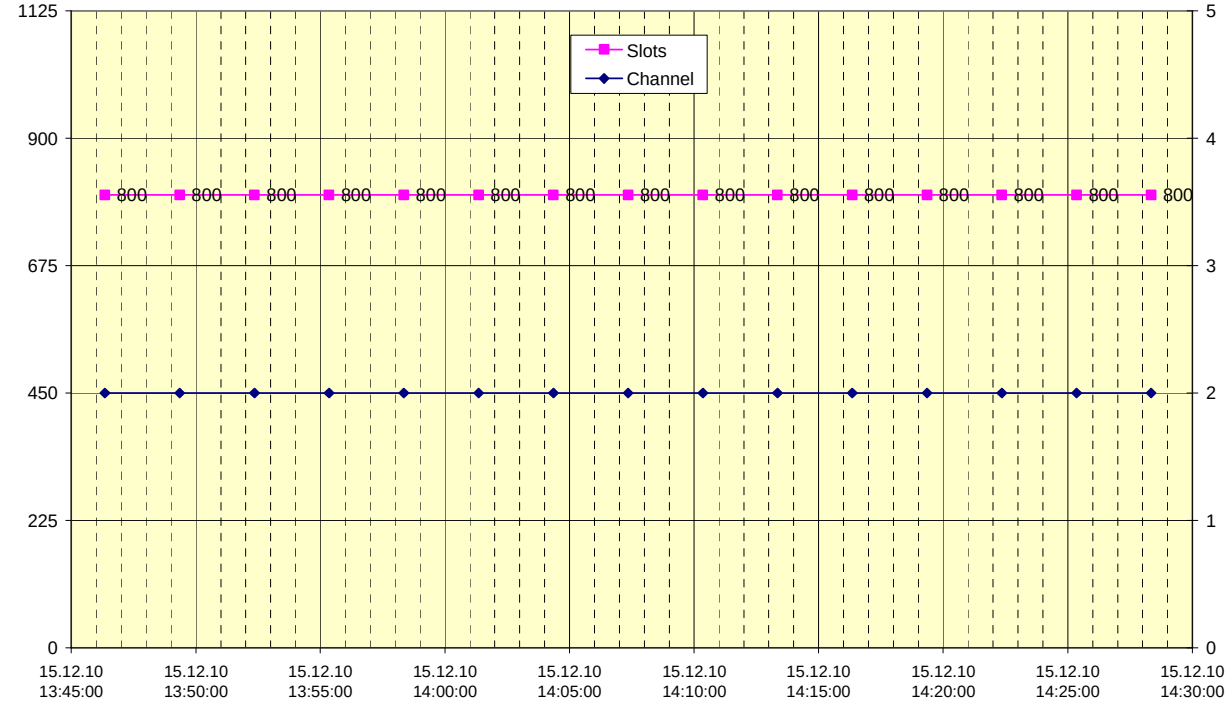
2010-12-16 Ba -AMEC Mando-303 - 8.1.10 Schedule mode A FATDMA message 8



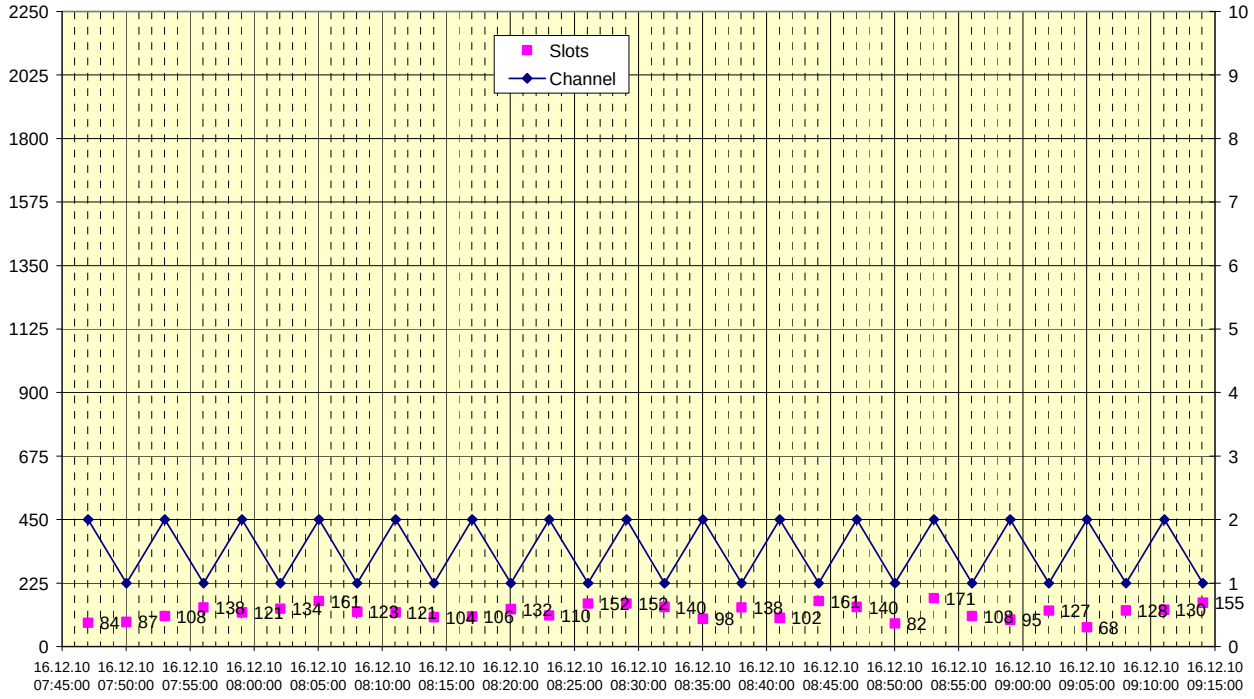
2010-12-15 AMEC Mando-303 - 8.1.10 Schedule FATDMA mode B message 8



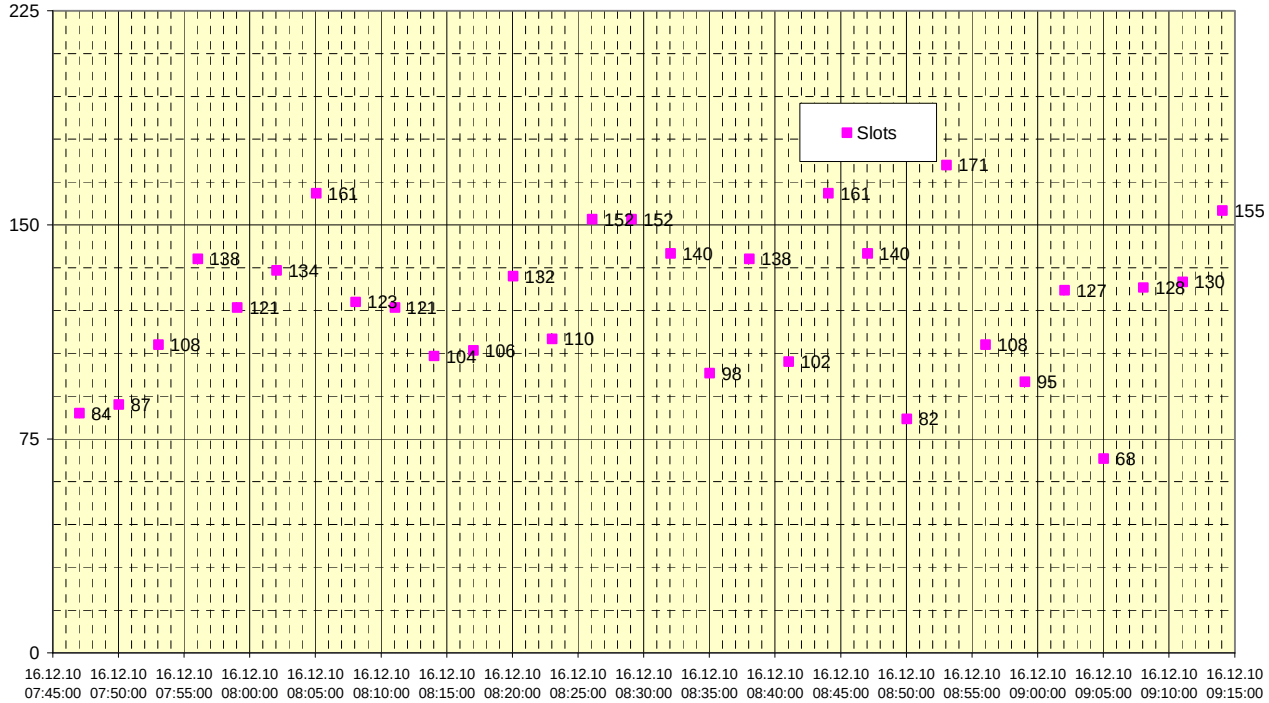
2010-12-15 AMEC Mando-303 - 8.1.10 Schedule FATDMA mode C message 8



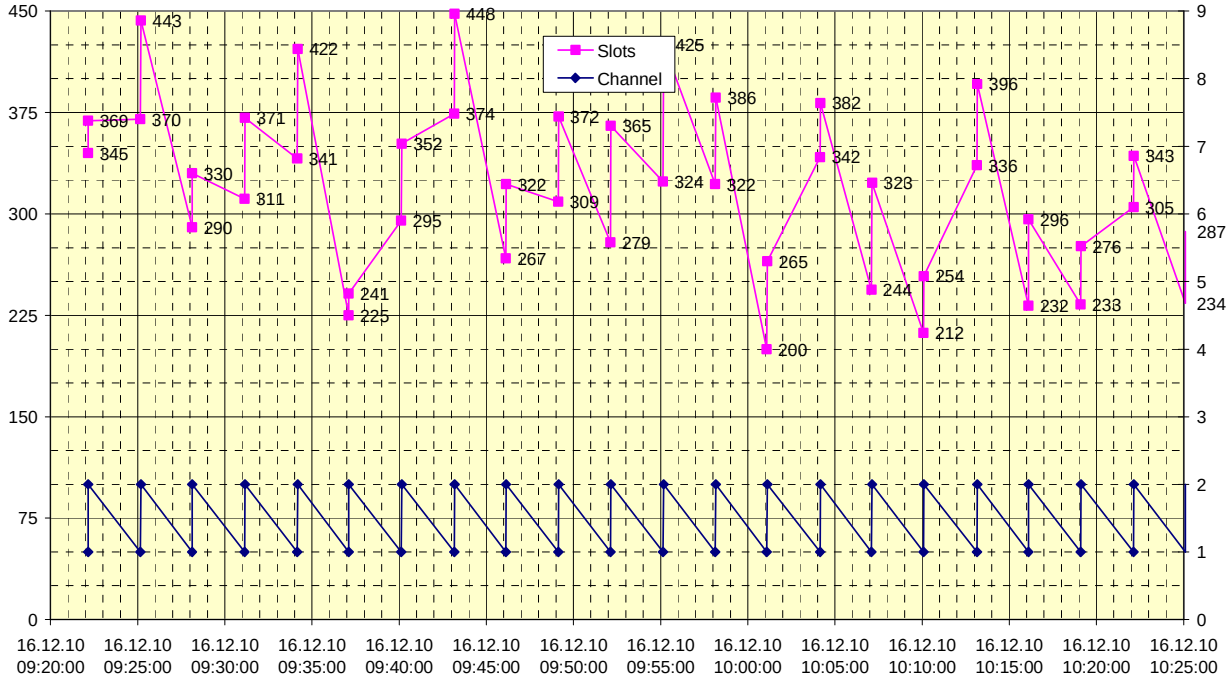
2010-12-16 Ba - AMEC Mando-303 - 8.1.10 Schedule mode A RATDMA message 8



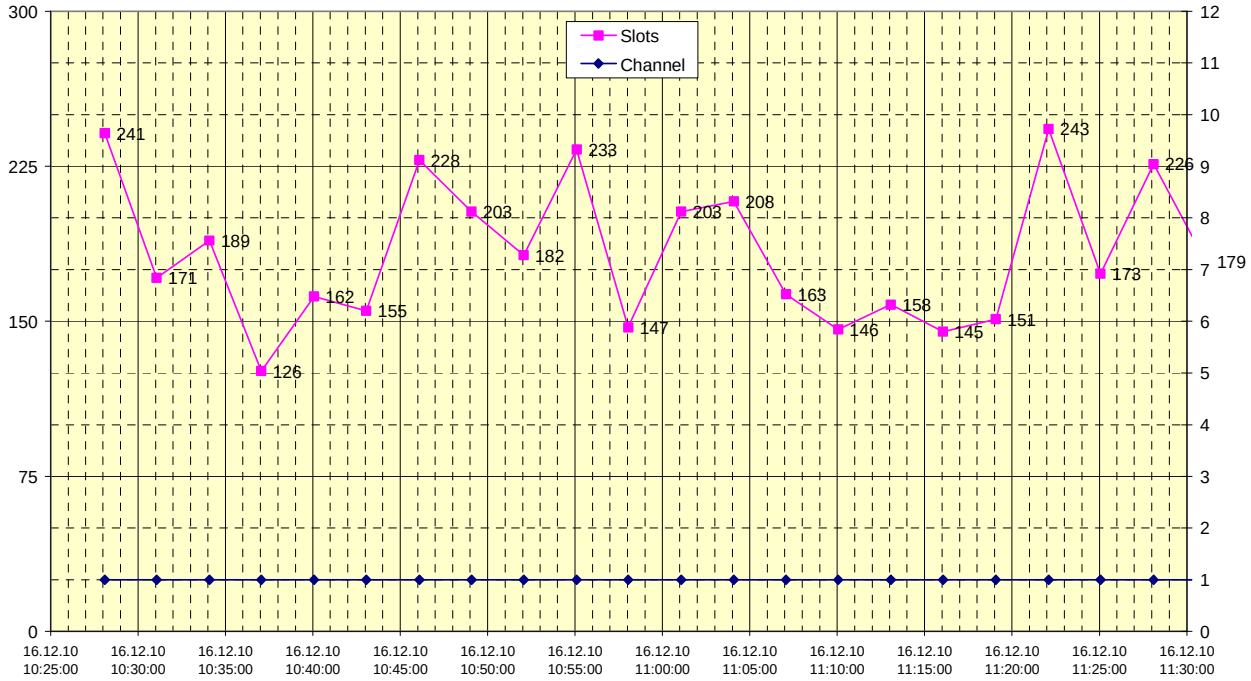
2010-12-16 Ba - AMEC Mando-303 - 8.1.10 Schedule mode A RATDMA message 8



2010-12-16 AMEC Mando-303 - 8.1.10 Schedule mode B RATDMA message 8

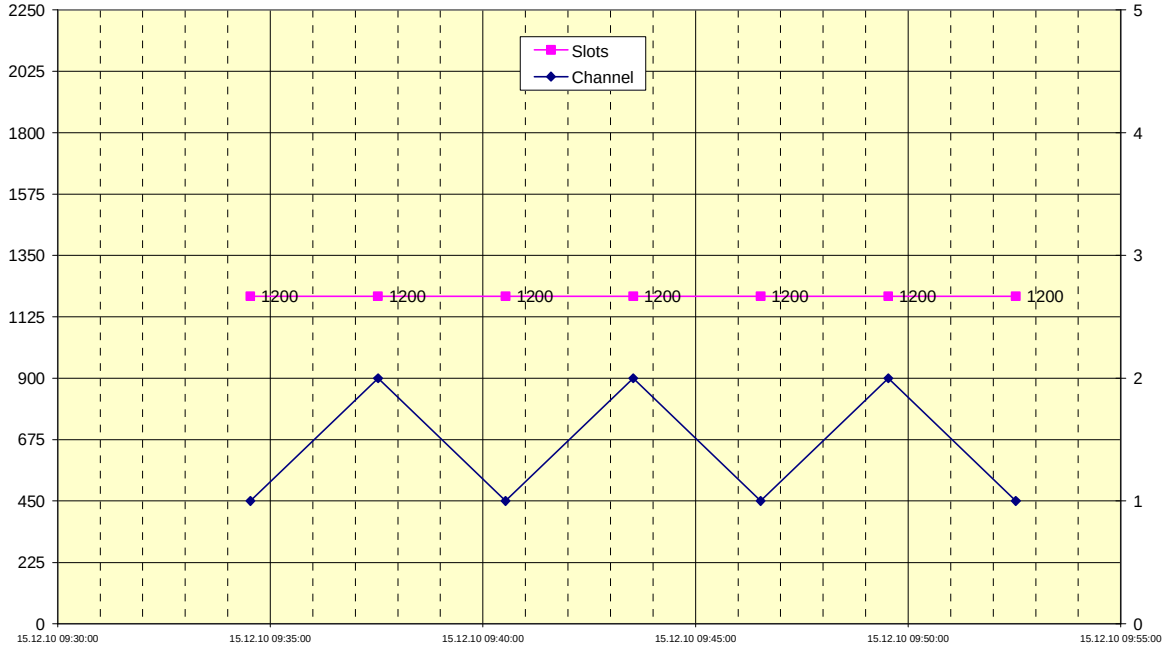


2010-12-16 Ba AMEC Mando-303 - 8.1.10 Schedule mode C RATDMA message 8

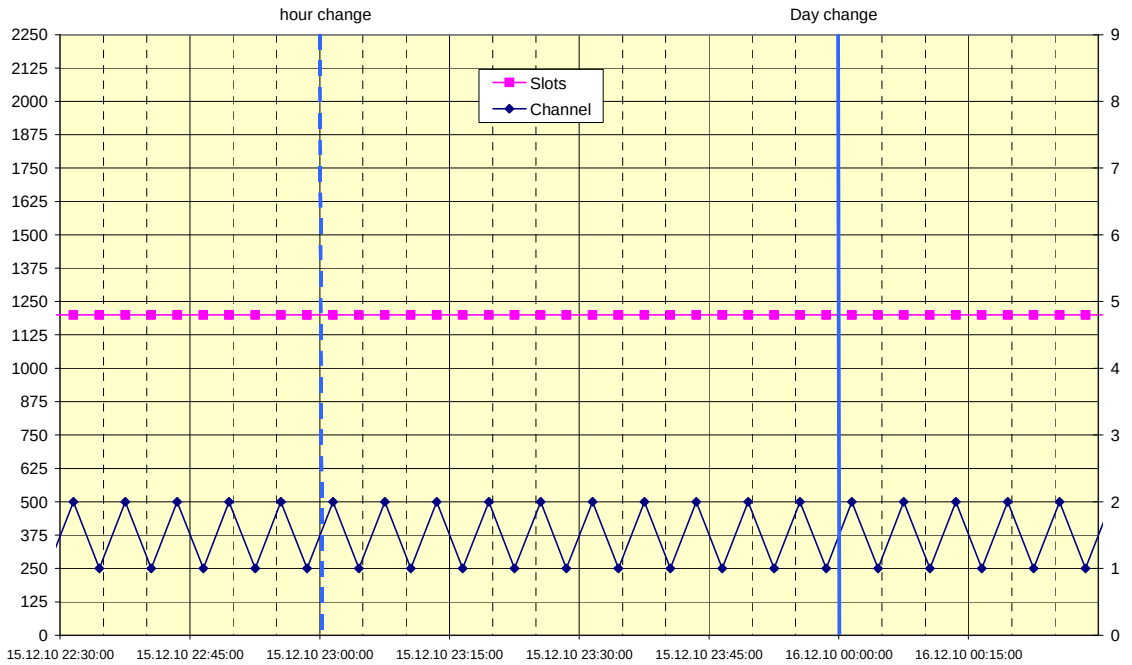


C.1.9 8.1.11 AIS AtoN configuration Messages 12

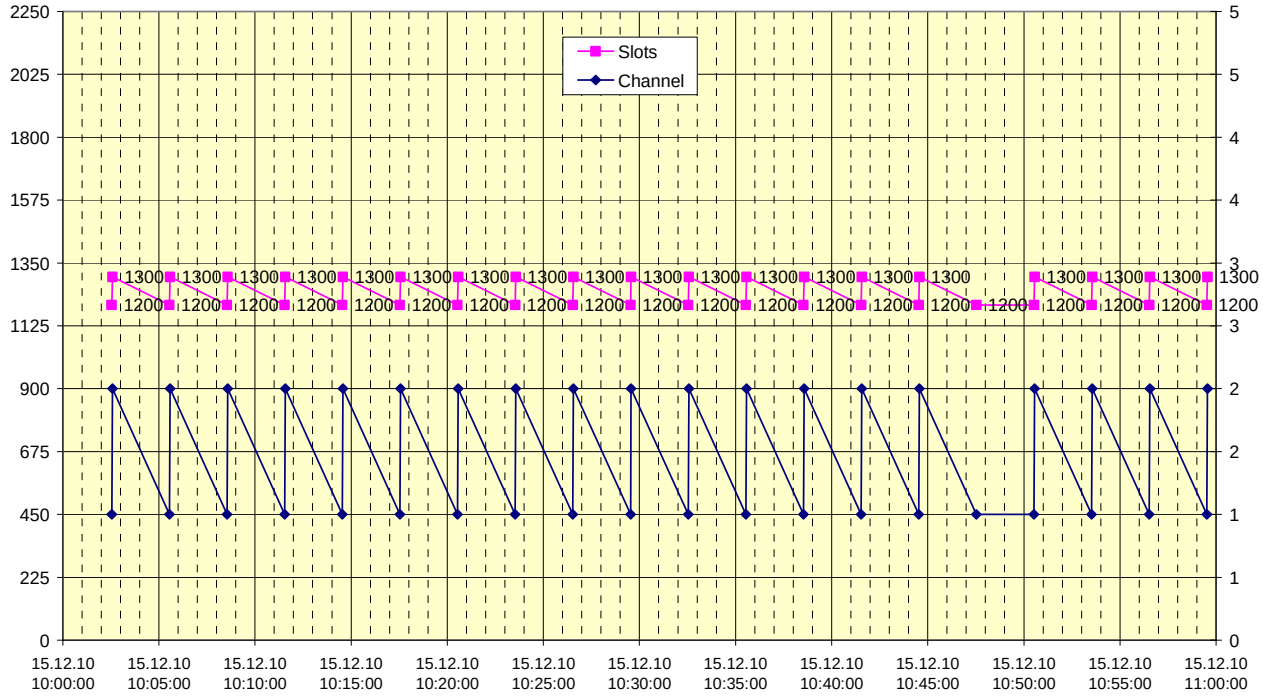
2010-12-15 AMEC Mando-303 - 8.1.11 Schedule FATDMA mode A message 12



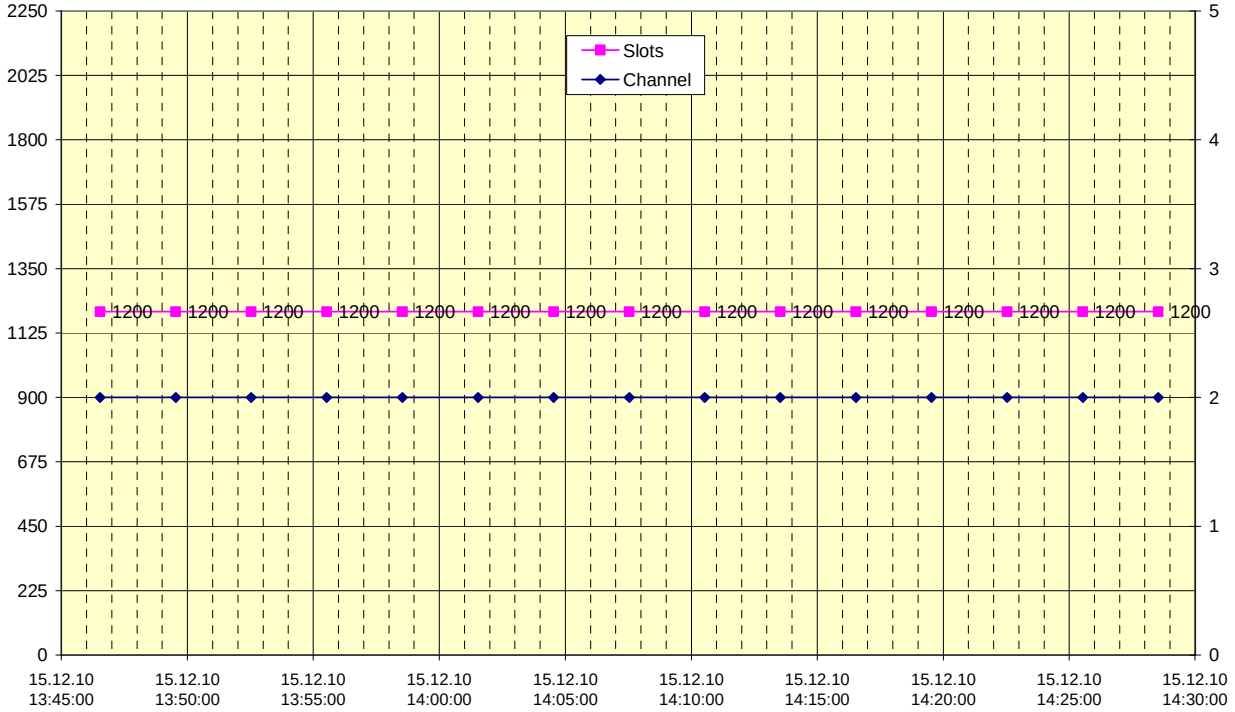
2010-12-16 Ba -AMEC Mando-303 - 8.1.11 Schedule mode A FATDMA message 12



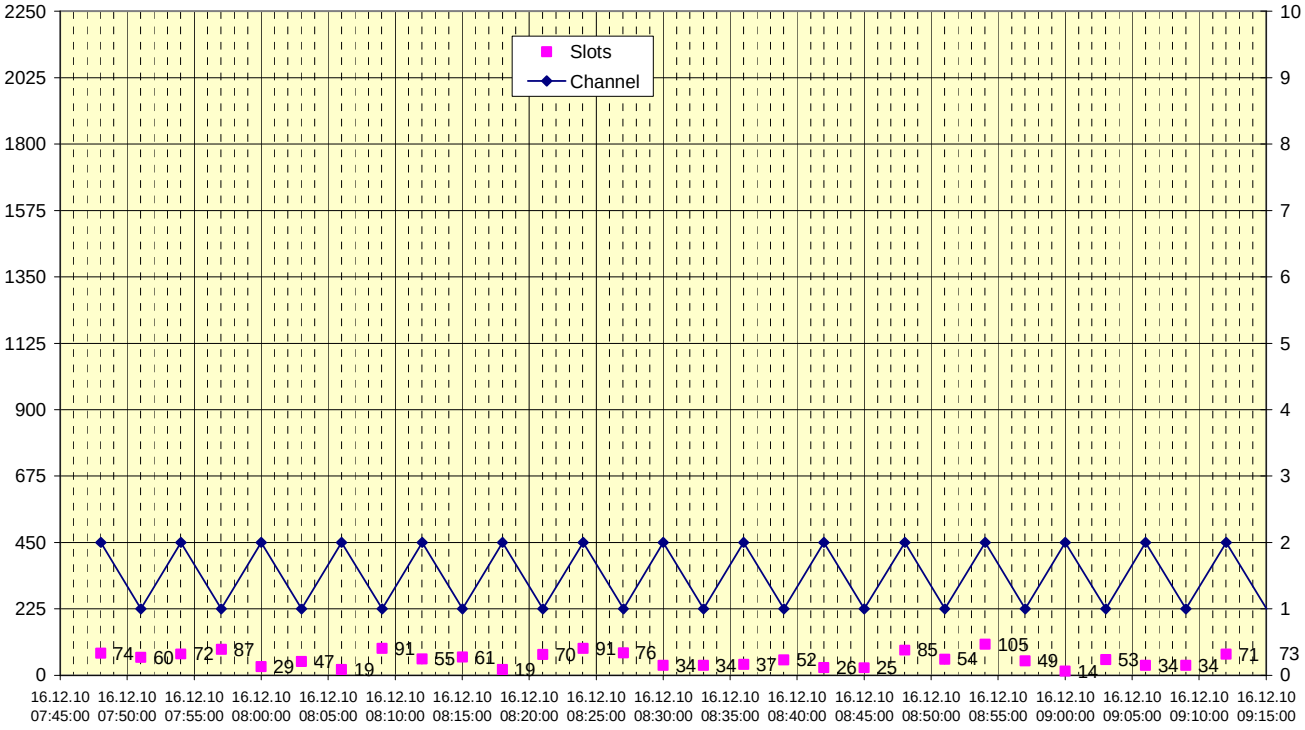
2010-12-15 AMEC Mando-303 - 8.1.11 Schedule FATDMA mode B message 12



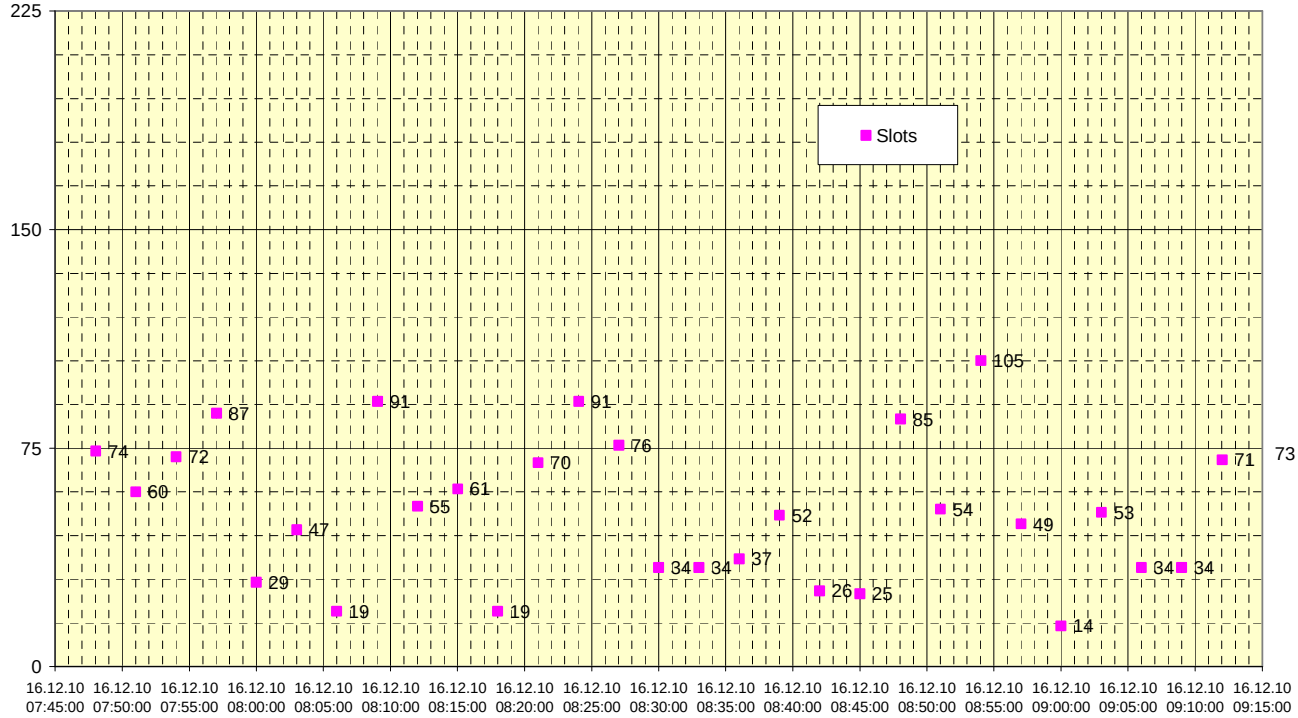
2010-12-15 AMEC Mando-303 - 8.1.11 Schedule FATDMA mode C message 12



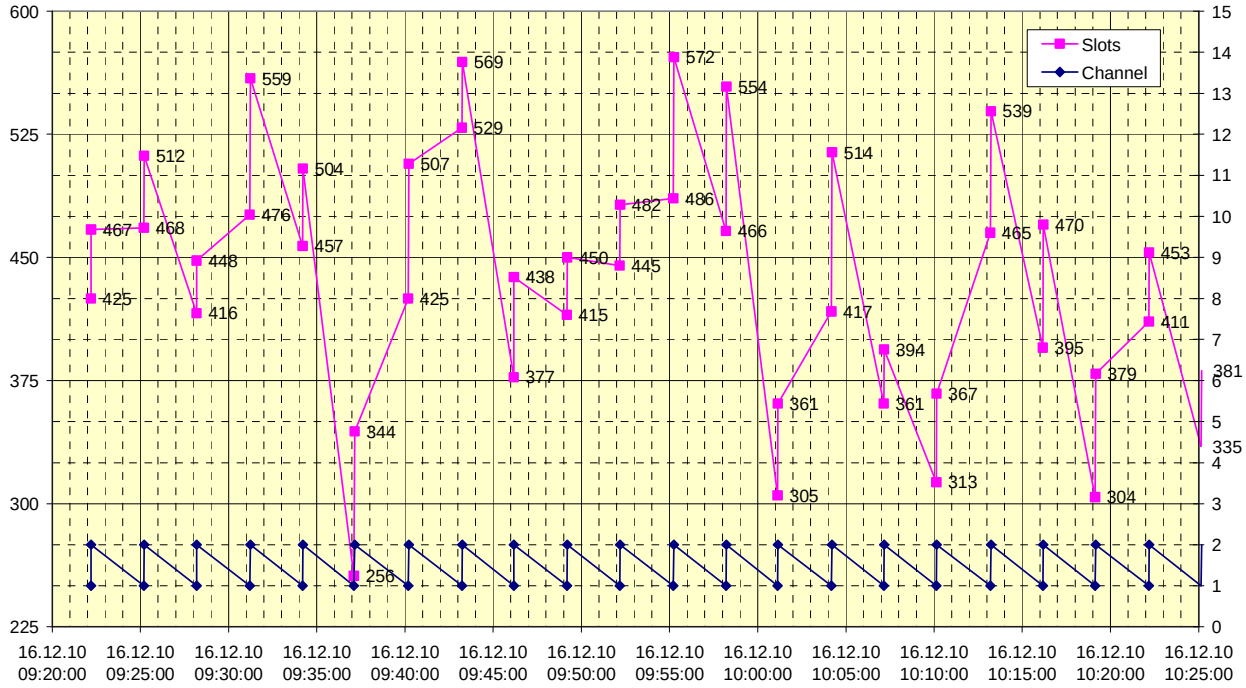
2010-12-16 Ba - AMEC Mando-303 - 8.1.11 Schedule mode A RATDMA message 12



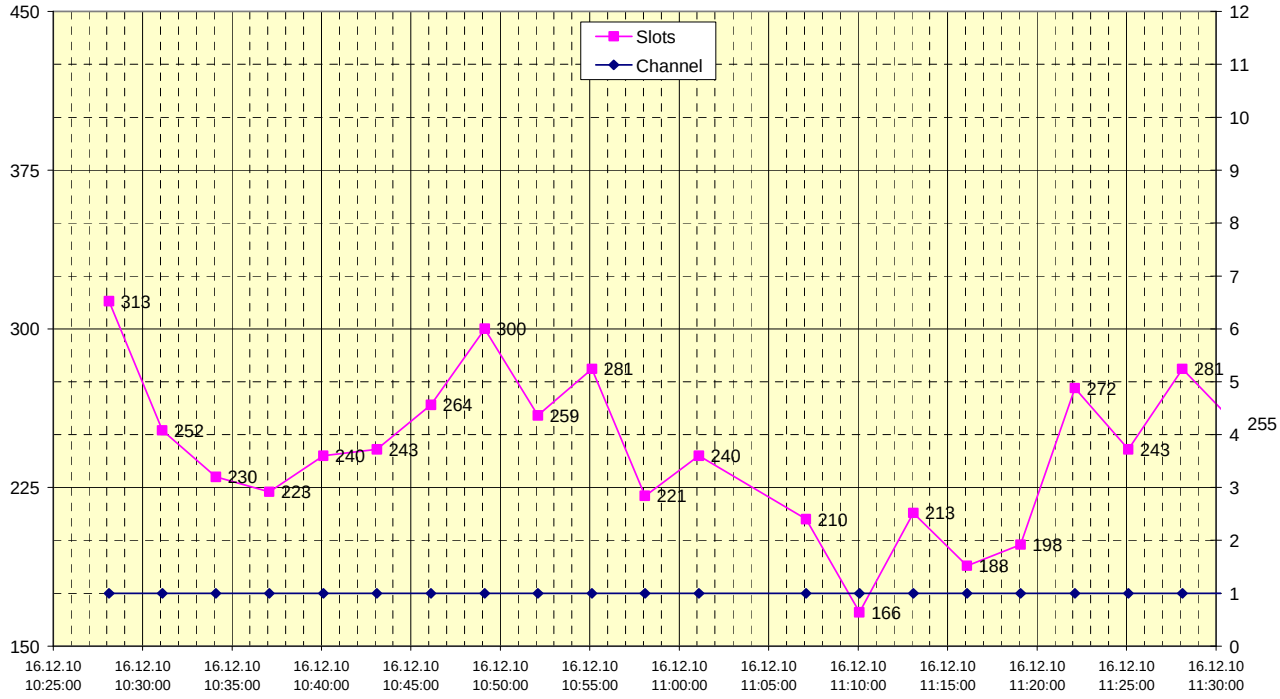
2010-12-16 Ba - AMEC Mando-303 - 8.1.11 Schedule mode A RATDMA message 12



2010-12-16 AMEC Mando-303 - 8.1.11 Schedule mode B RATDMA message 12

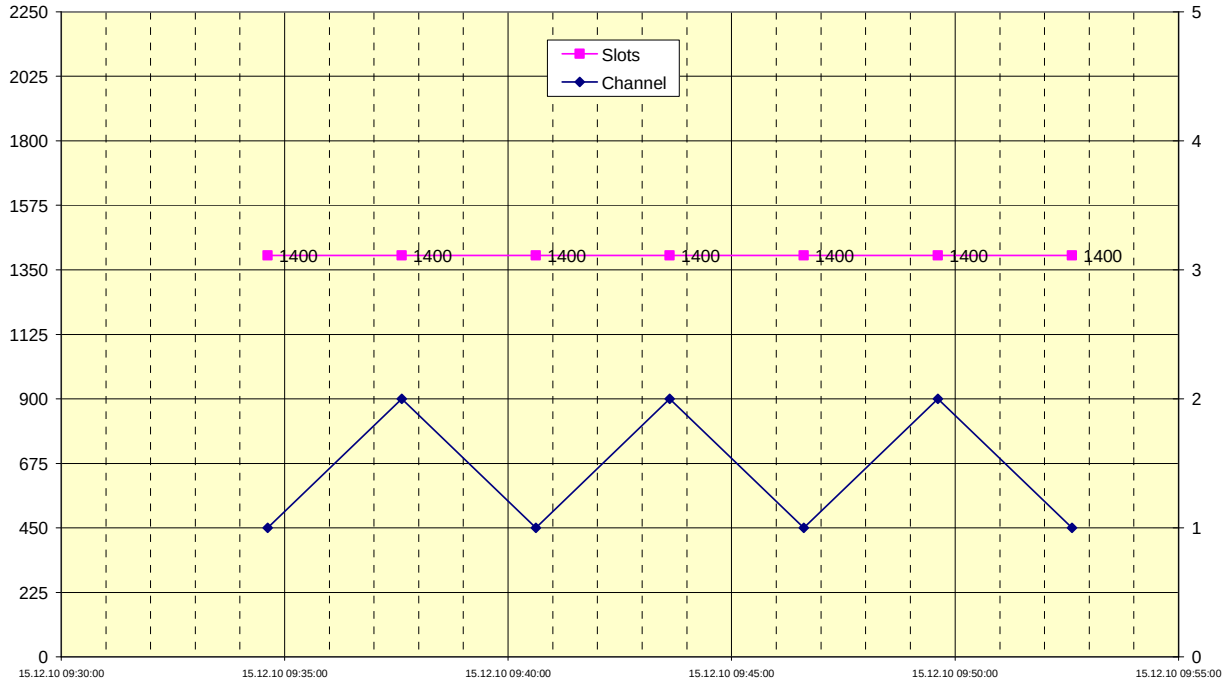


2010-12-16 Ba AMEC Mando-303 - 8.1.11 Schedule mode C RATDMA message 12

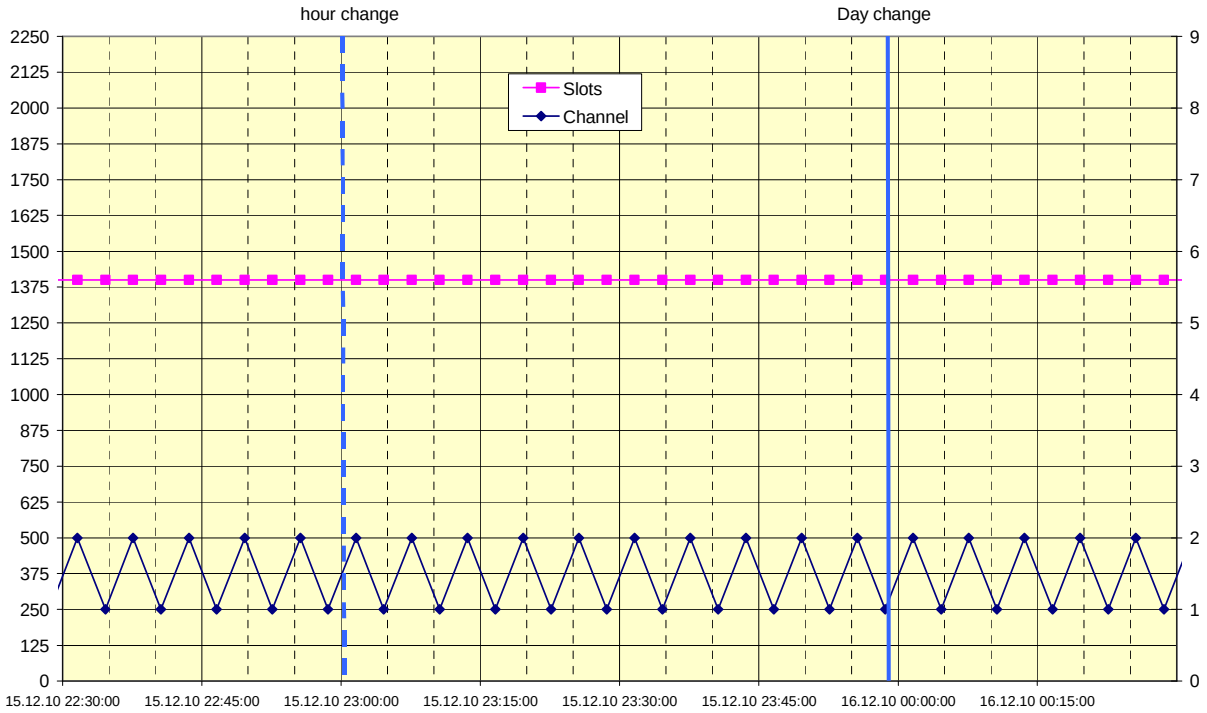


C.1.10 8.1.12 AIS AtoN configuration Messages 14

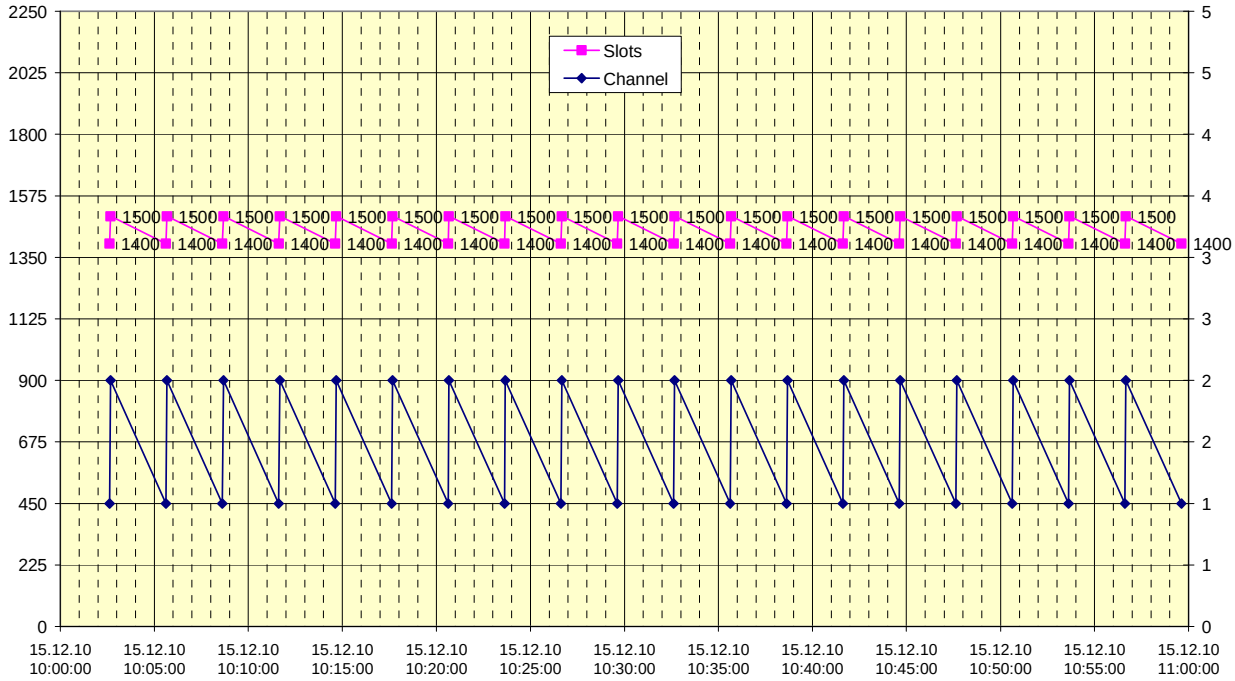
2010-12-15 AMEC Mando-303 - 8.1.12 Schedule FATDMA mode A message 14



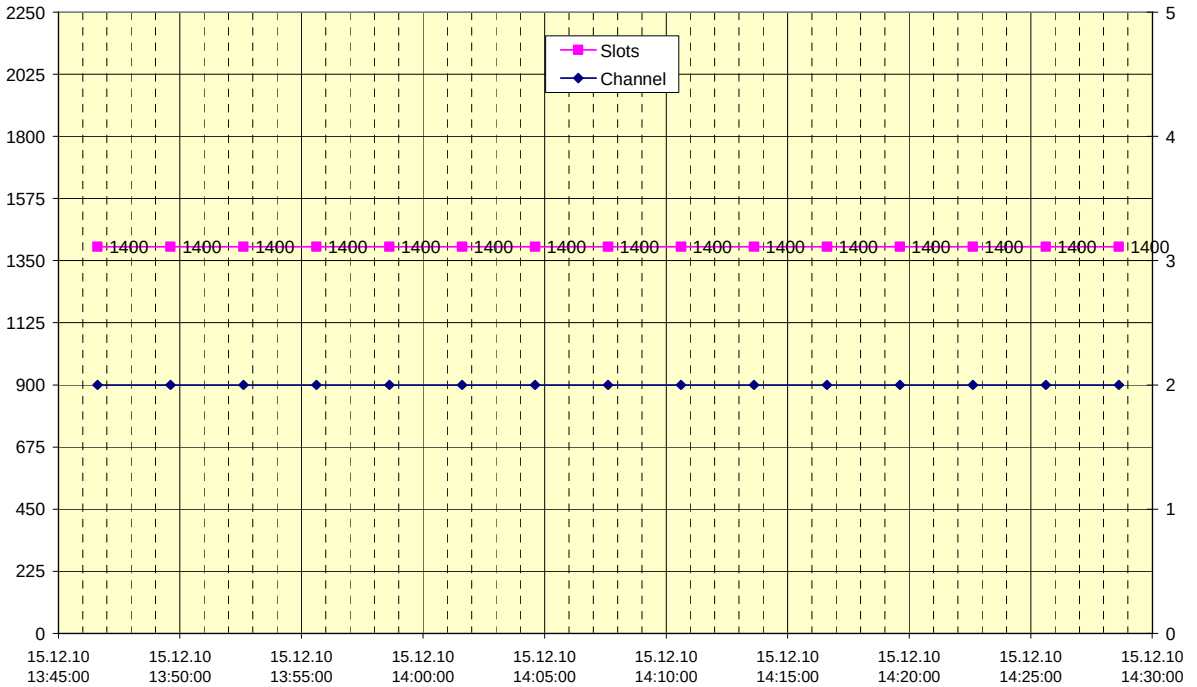
2010-12-16 Ba -AMEC Mando-303 - 8.1.12 Schedule mode A FATDMA message 14



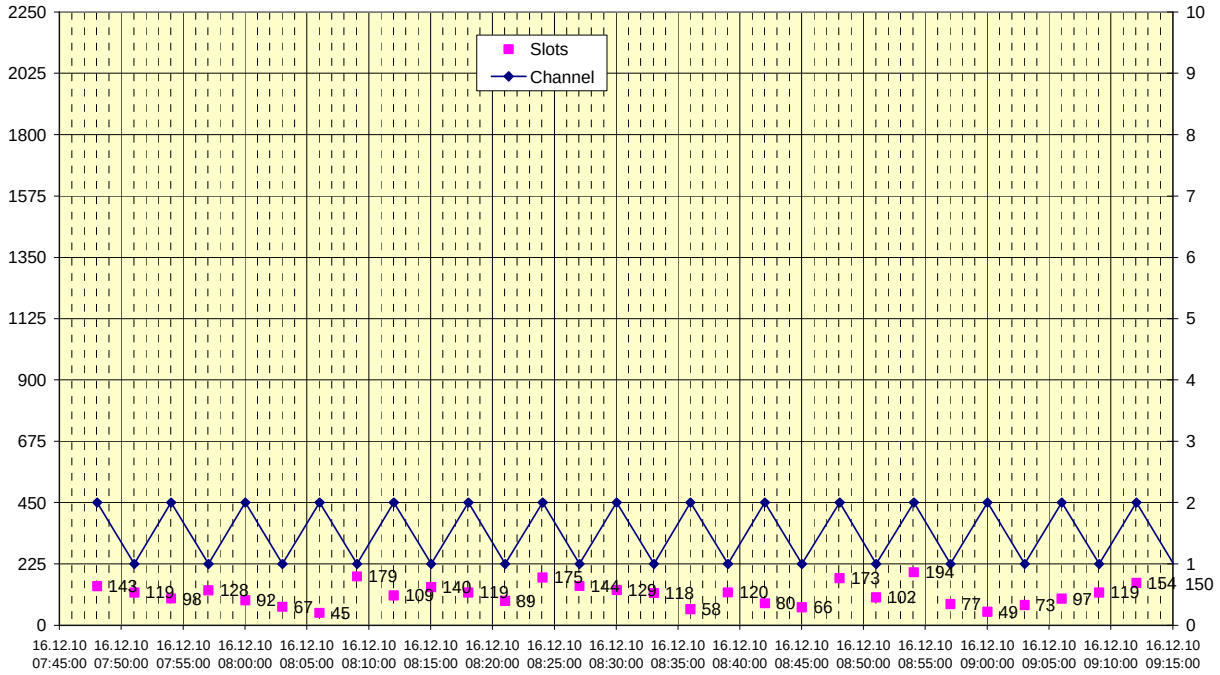
2010-12-15 AMEC Mando-303 - 8.1.12 Schedule FATDMA mode B message 14



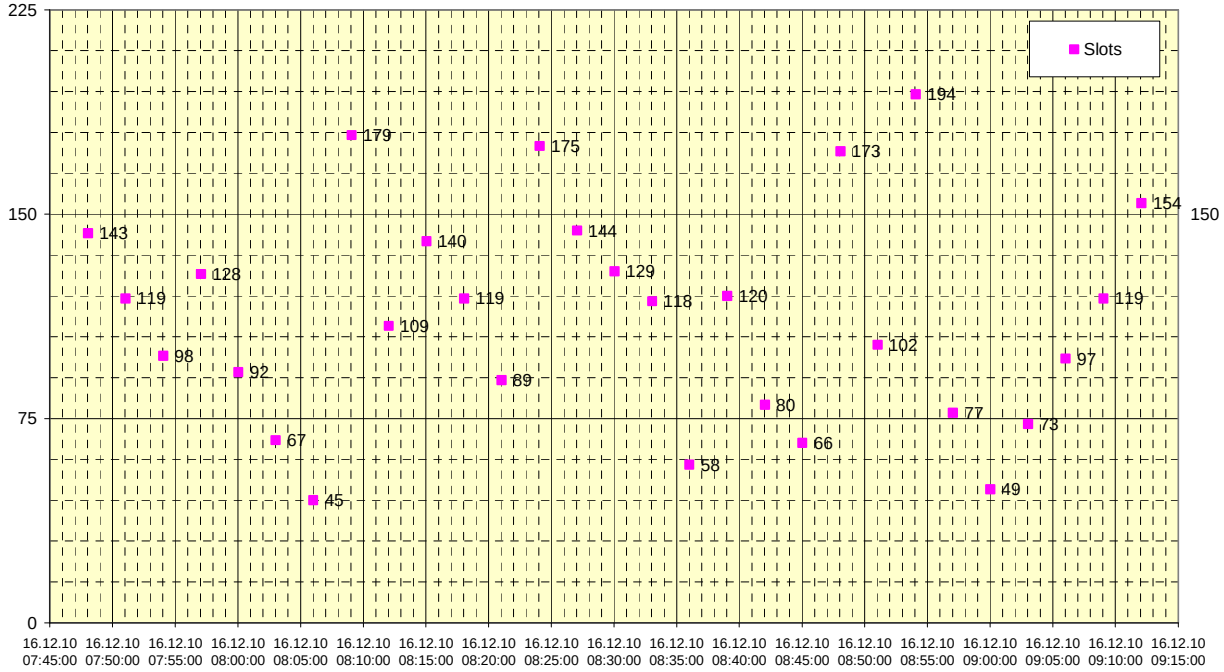
2010-12-15 AMEC Mando-303 - 8.1.12 Schedule FATDMA mode C message 14



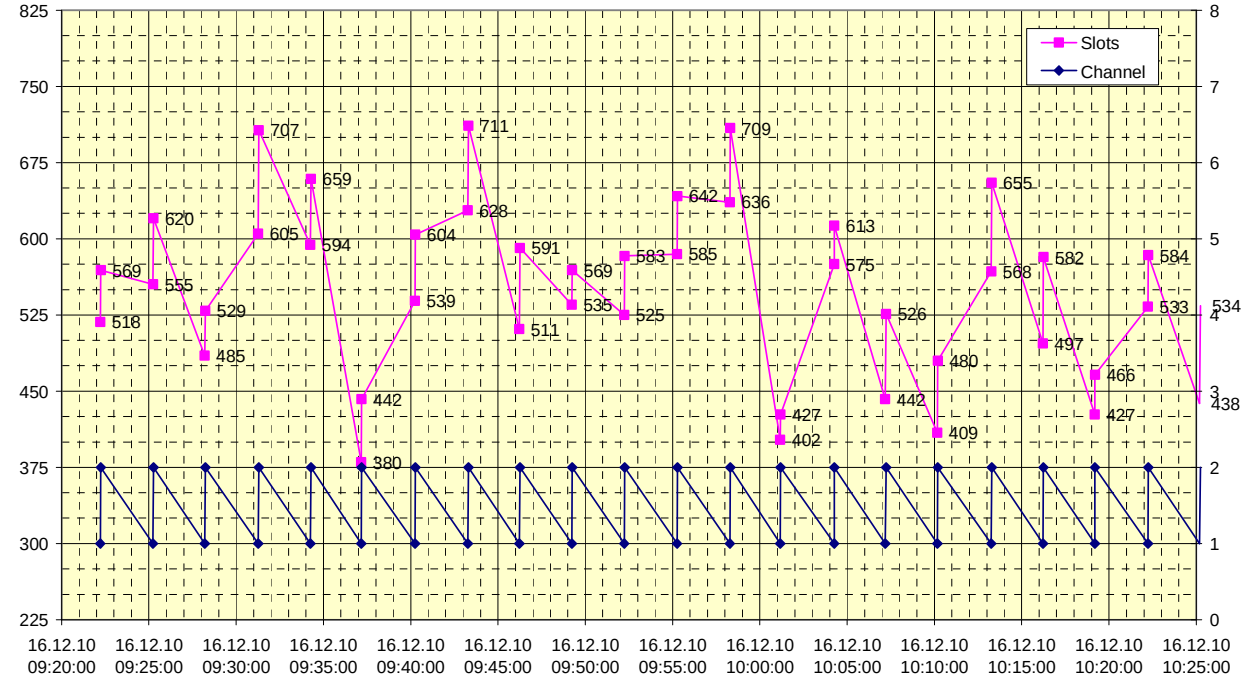
2010-12-16 Ba - AMEC Mando-303 - 8.1.12 Schedule mode A RATDMA message 14



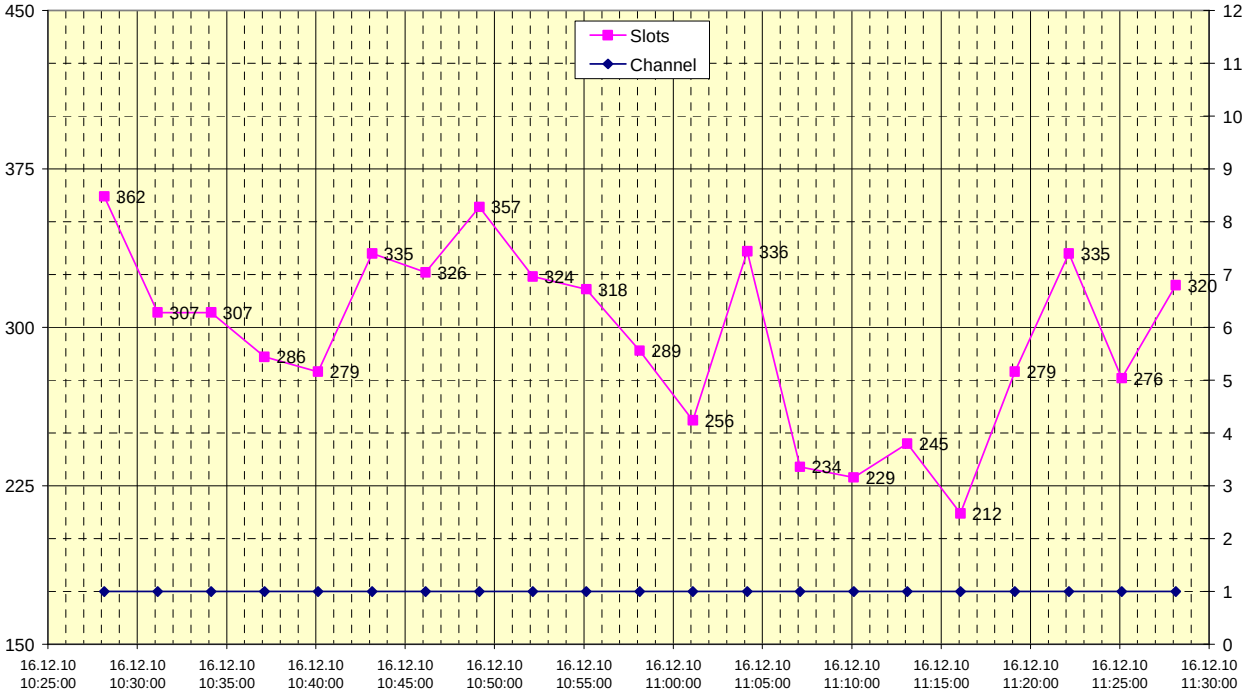
2010-12-16 Ba - AMEC Mando-303 - 8.1.12 Schedule mode A RATDMA message 14



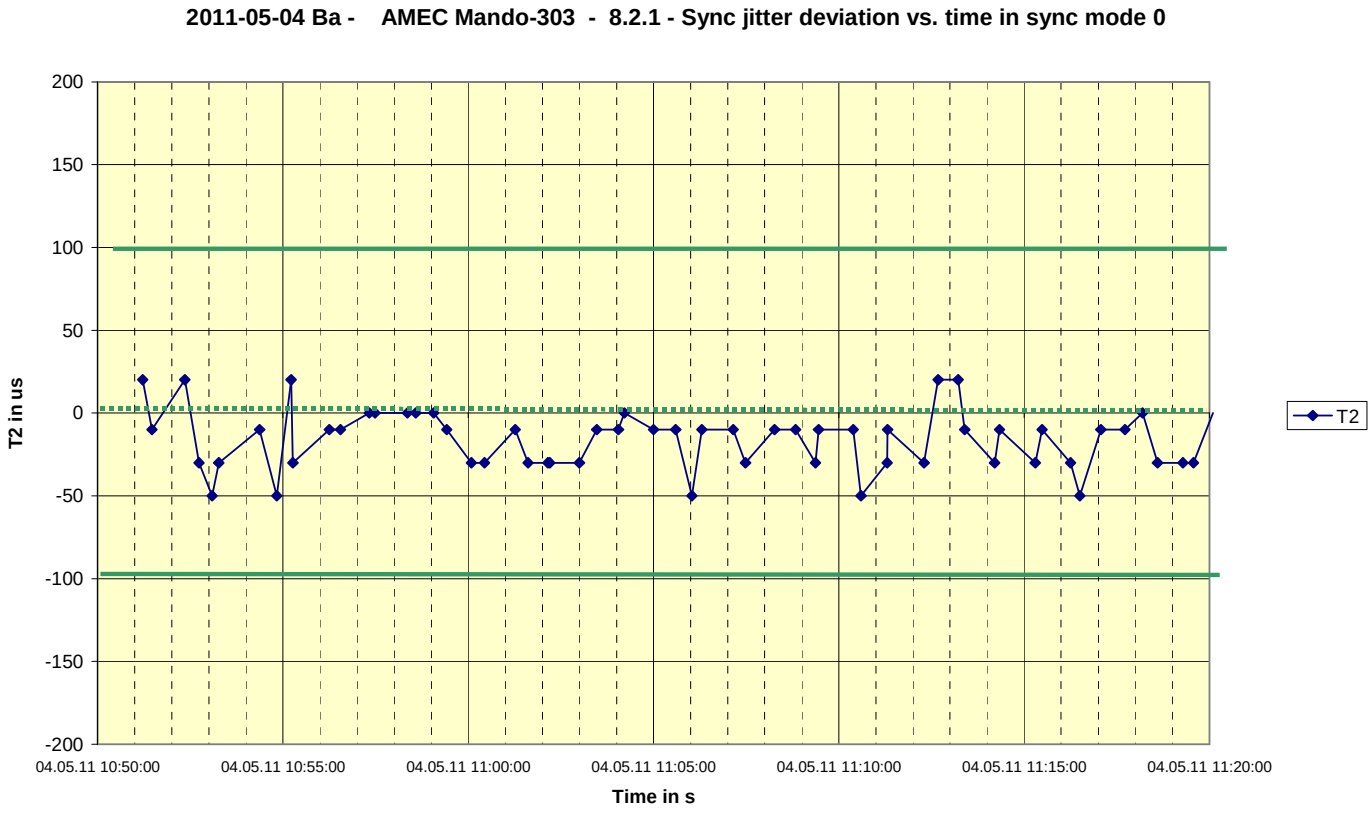
2010-12-16 AMEC Mando-303 - 8.1.12 Schedule mode B RATDMA message 14

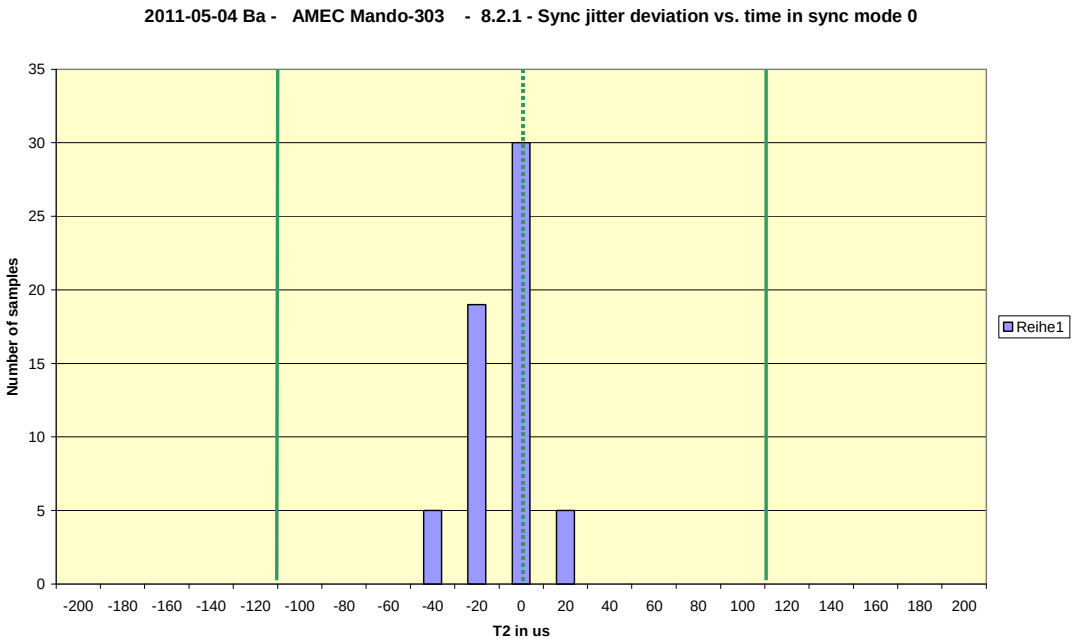


2010-12-16 Ba AMEC Mando-303 - 8.1.12 Schedule mode C RATDMA message 14

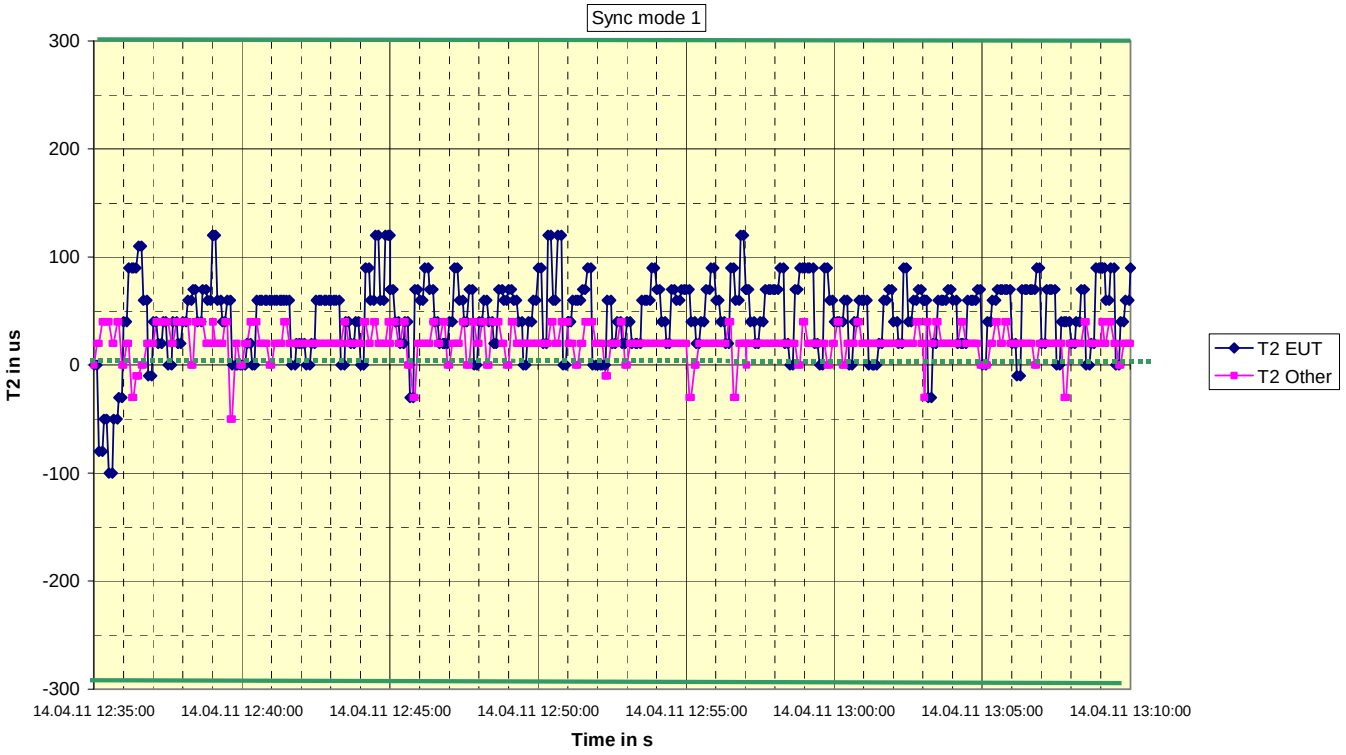


C.1.11 8.2.1 Synchronisation error with UTC

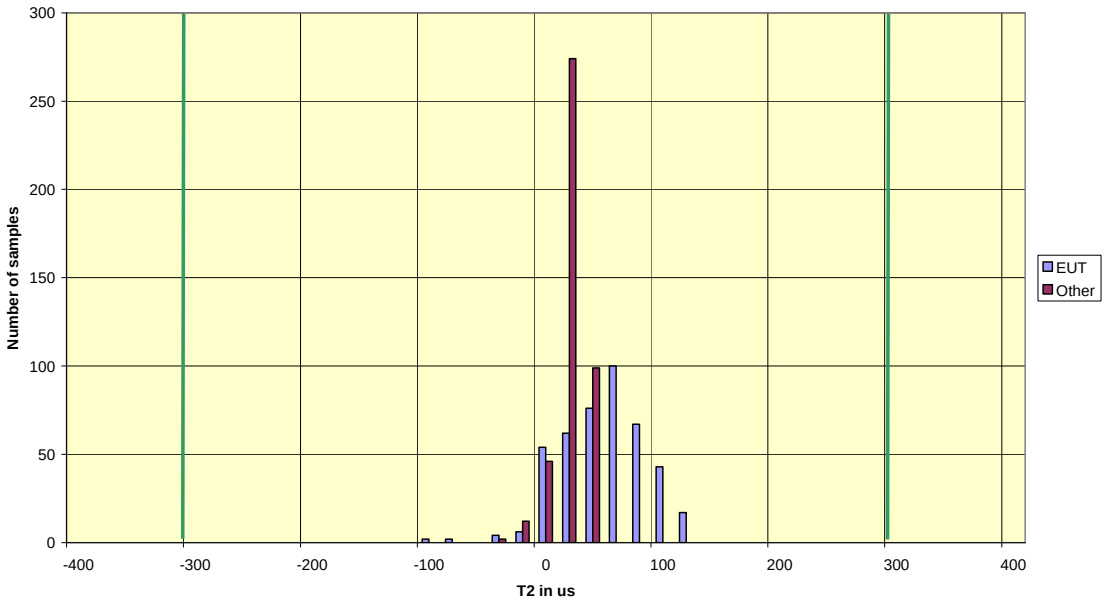


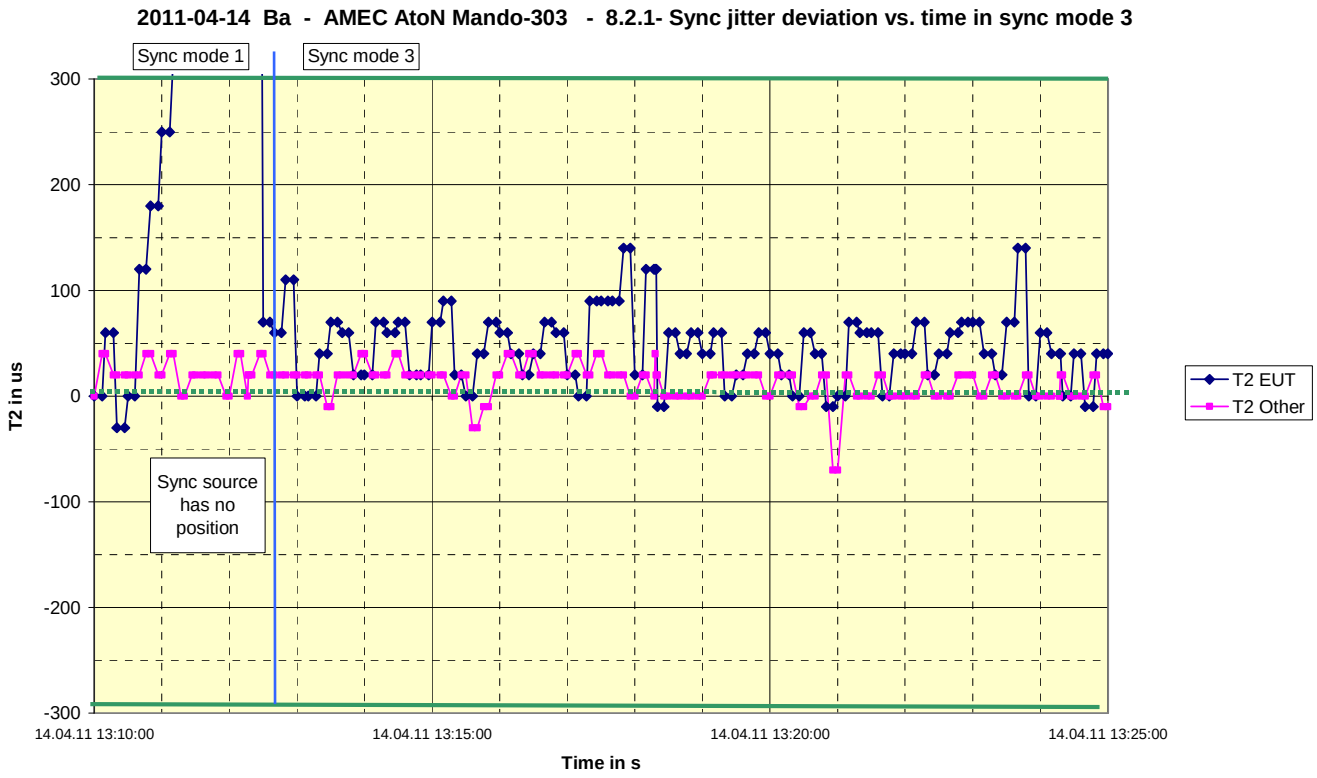


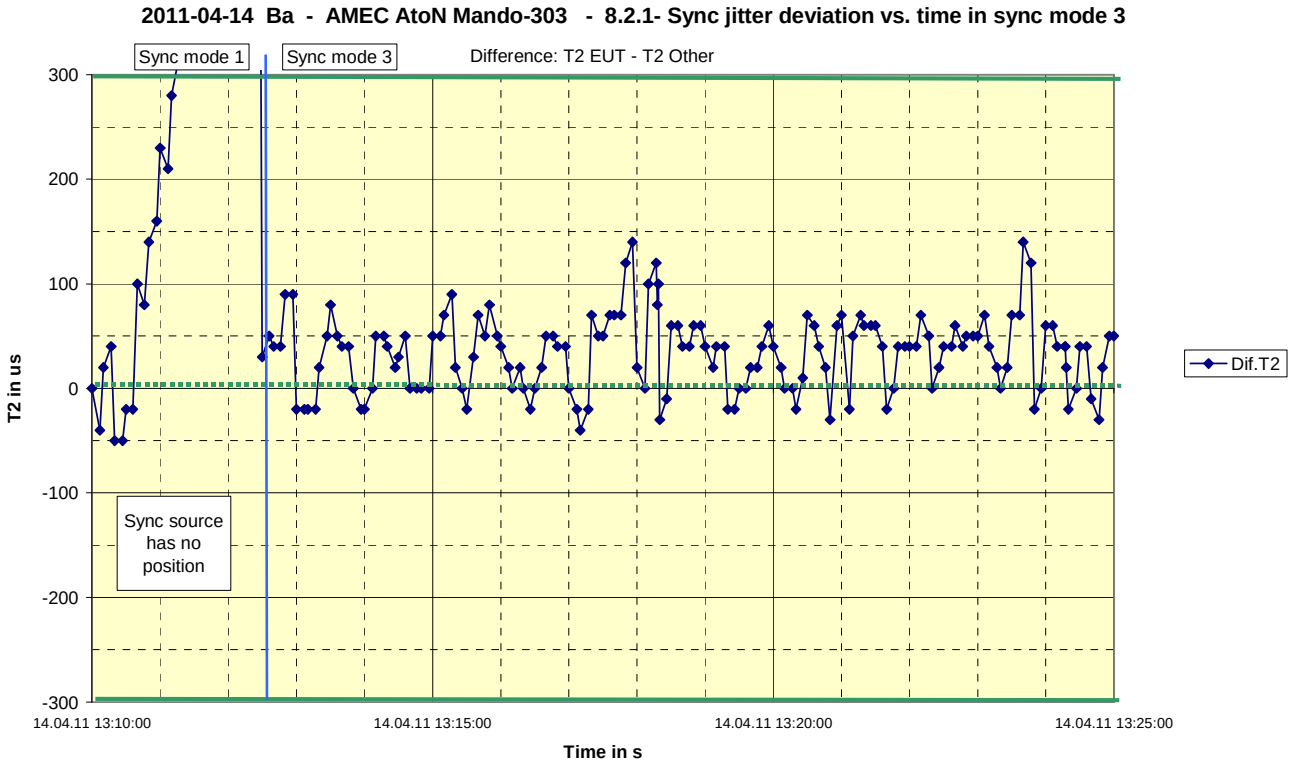
2011-04-14 Ba - AMEC AtoN Mando-303 - 8.2.1- Sync jitter deviation vs. time in sync mode 1



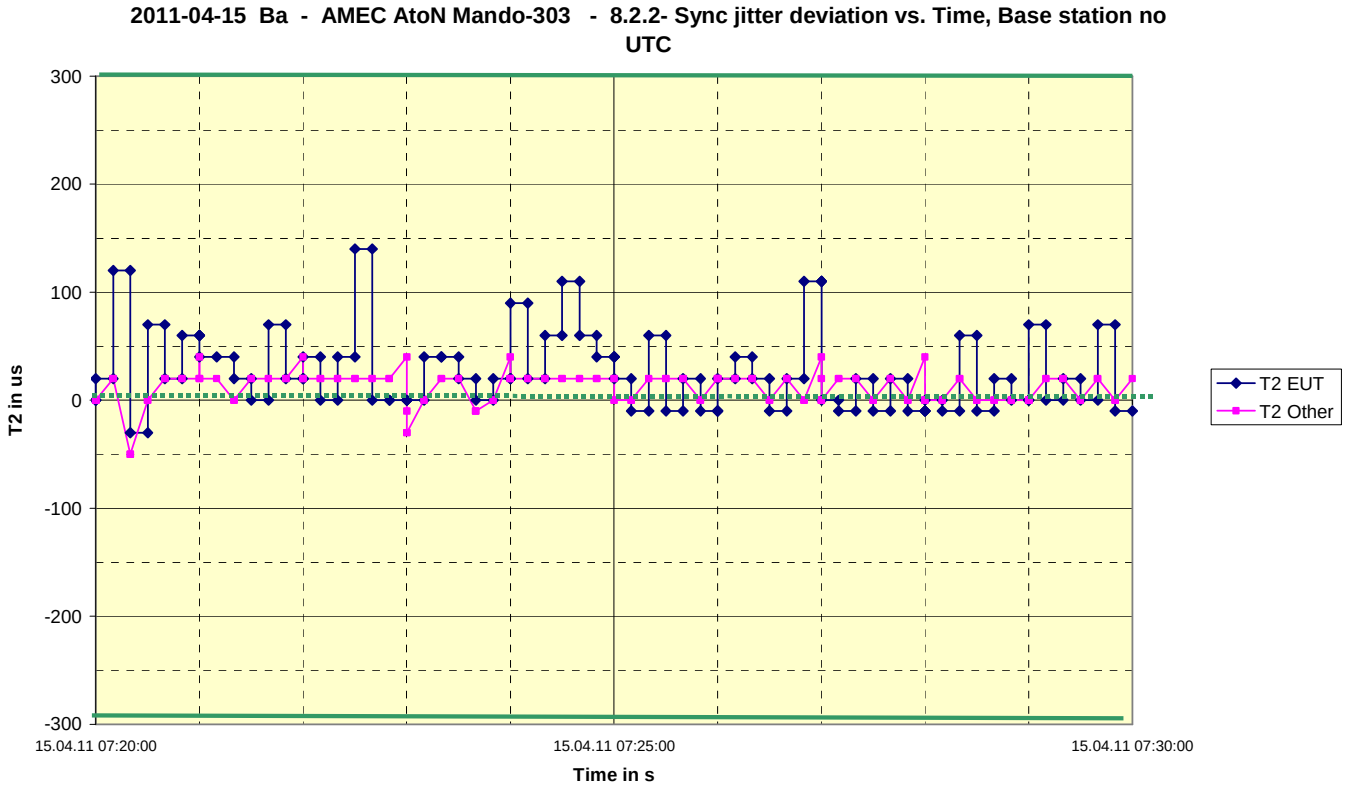
2011-04-14 Ba - AMEC AtoN Mando-303 - 8.2.1- Sync jitter deviation vs. time in sync mode 1

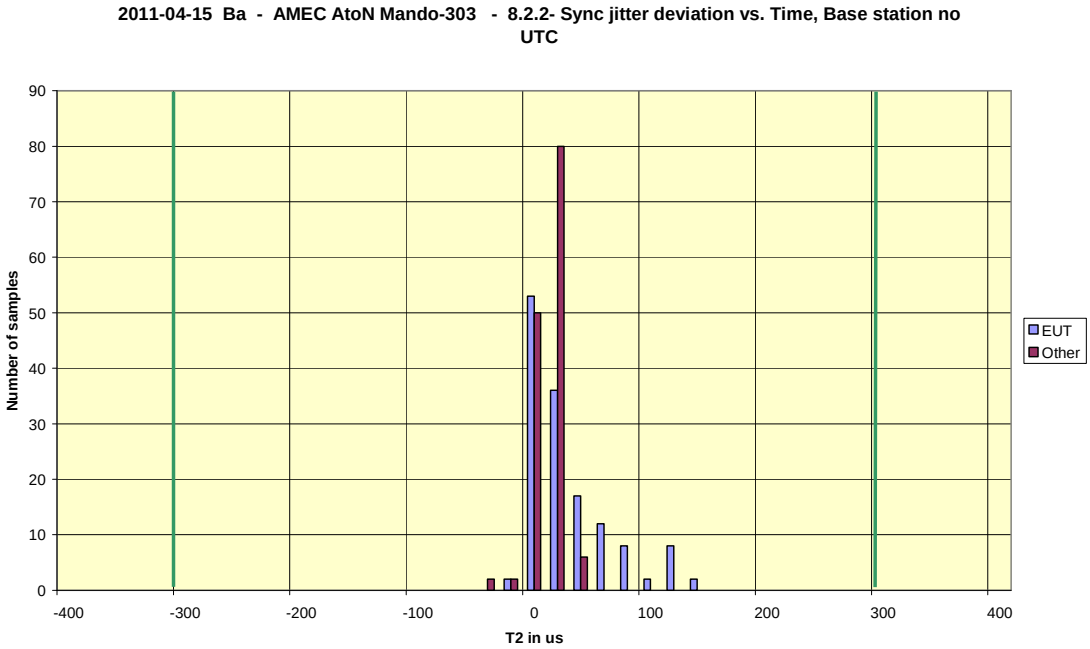


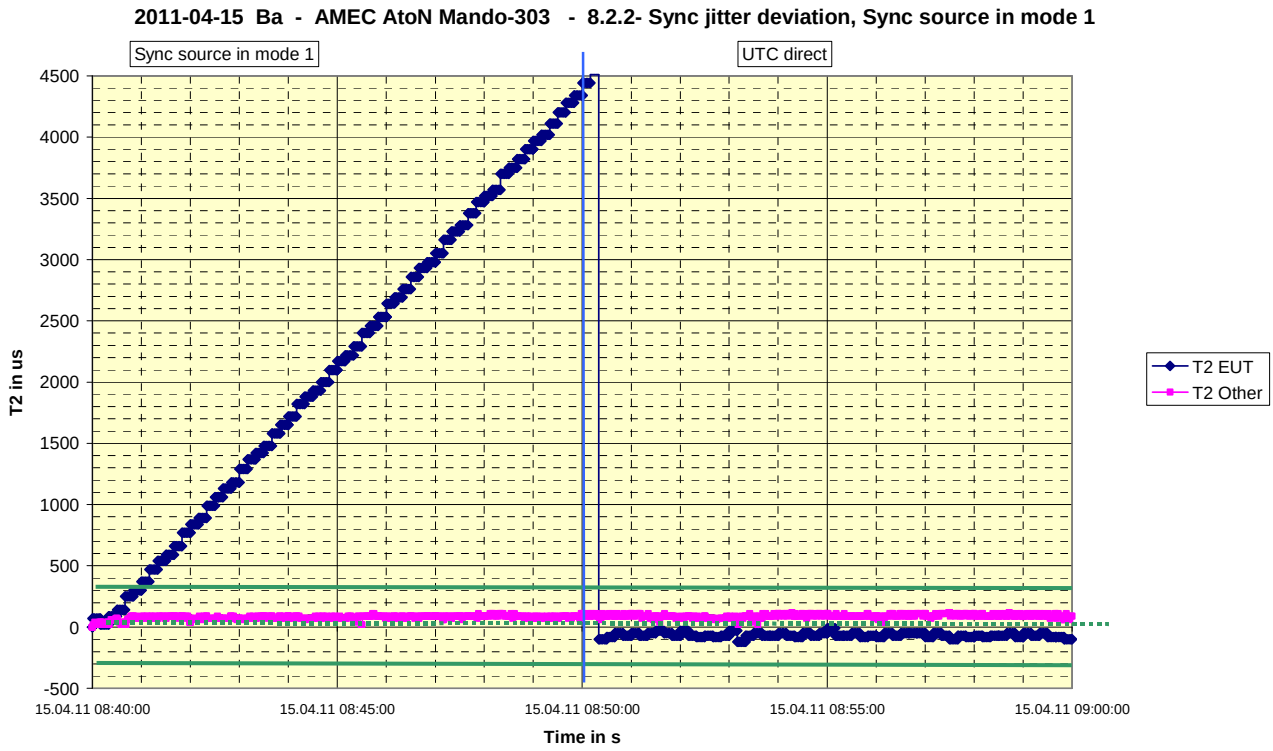

2011-04-14 Ba - AMEC AtoN Mando-303 - 8.2.1- Sync jitter deviation vs. time in sync mode 3
Sync mode 1
Sync mode 3
Sync source has no position
T2 EUT
T2 Other
T2 in us
Time in s
300
200
100
0
-100
-200
-300
14.04.11 13:10:00
14.04.11 13:15:00
14.04.11 13:20:00
14.04.11 13:25:00

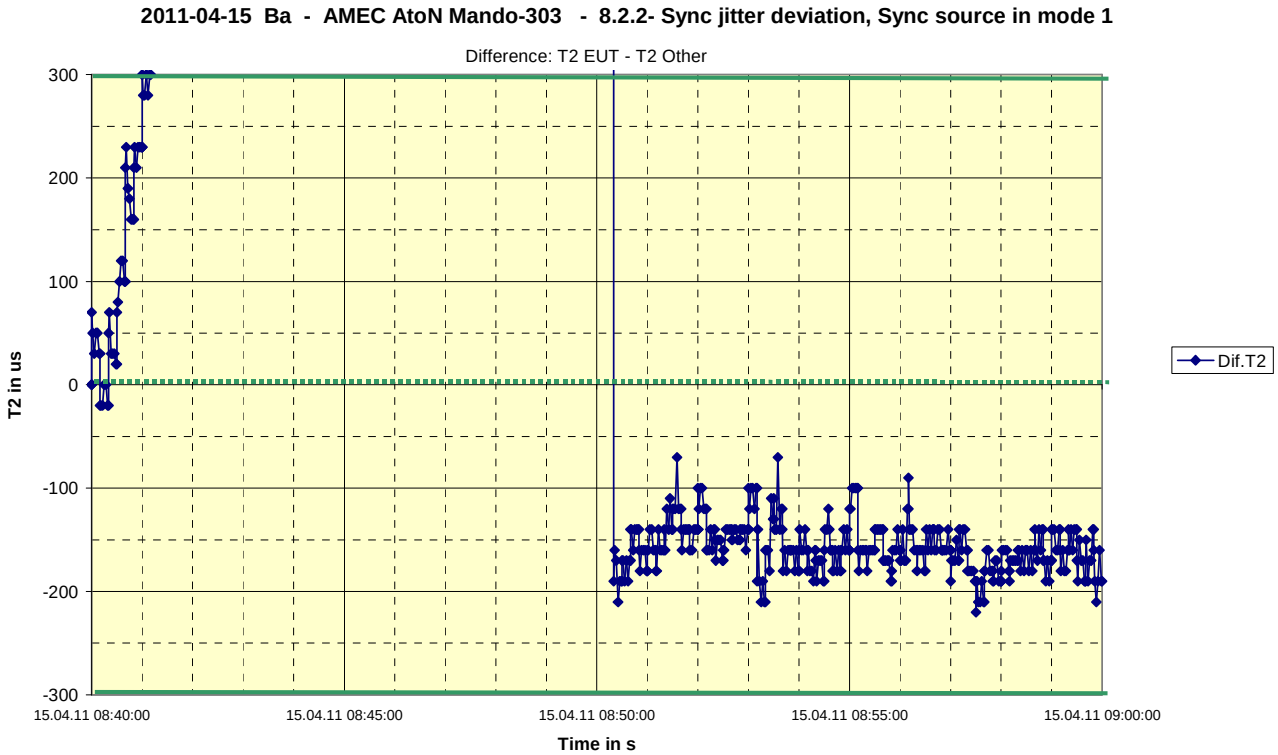

2011-04-14 Ba - AMEC AtoN Mando-303 - 8.2.1- Sync jitter deviation vs. time in sync mode 3
Sync mode 1
Sync mode 3
Difference: T2 EUT - T2 Other
Sync source has no position
Dif.T2
T2 in us
Time in s
300
200
100
0
-100
-200
-300
14.04.11 13:10:00
14.04.11 13:15:00
14.04.11 13:20:00
14.04.11 13:25:00

C.1.12 8.2.2 Synchronisation error without UTC



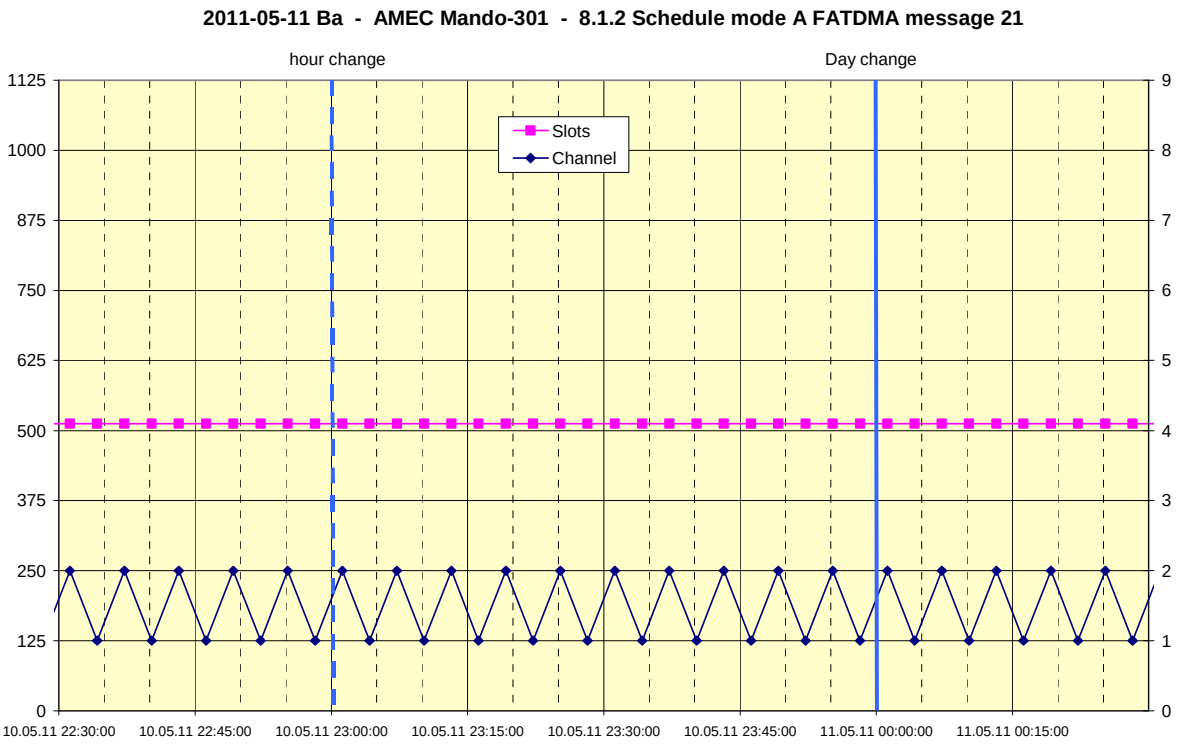


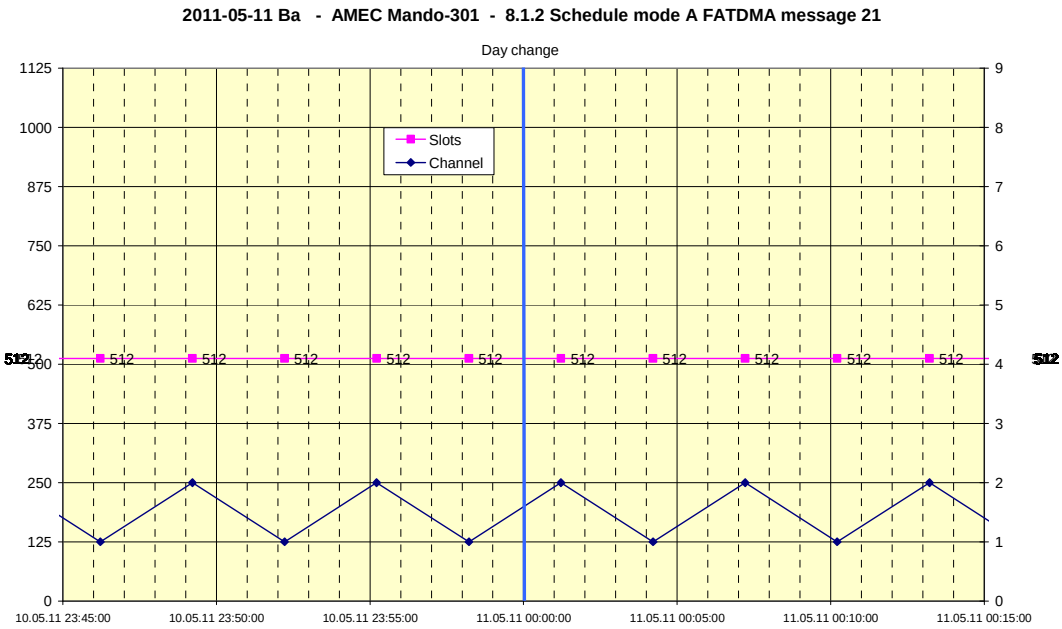

2011-04-15 Ba - AMEC AtoN Mando-303 - 8.2.2- Sync jitter deviation, Sync source in mode 1
Sync source in mode 1
UTC direct
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-500
T2 in us
15.04.11 08:40:00
15.04.11 08:45:00
15.04.11 08:50:00
15.04.11 08:55:00
15.04.11 09:00:00
Time in s
T2 EUT
T2 Other


2011-04-15 Ba - AMEC AtoN Mando-303 - 8.2.2- Sync jitter deviation, Sync source in mode 1
Difference: T2 EUT - T2 Other
300
200
100
0
-100
-200
-300
T2 in us
15.04.11 08:40:00
15.04.11 08:45:00
15.04.11 08:50:00
15.04.11 08:55:00
15.04.11 09:00:00
Time in s
Dif.T2

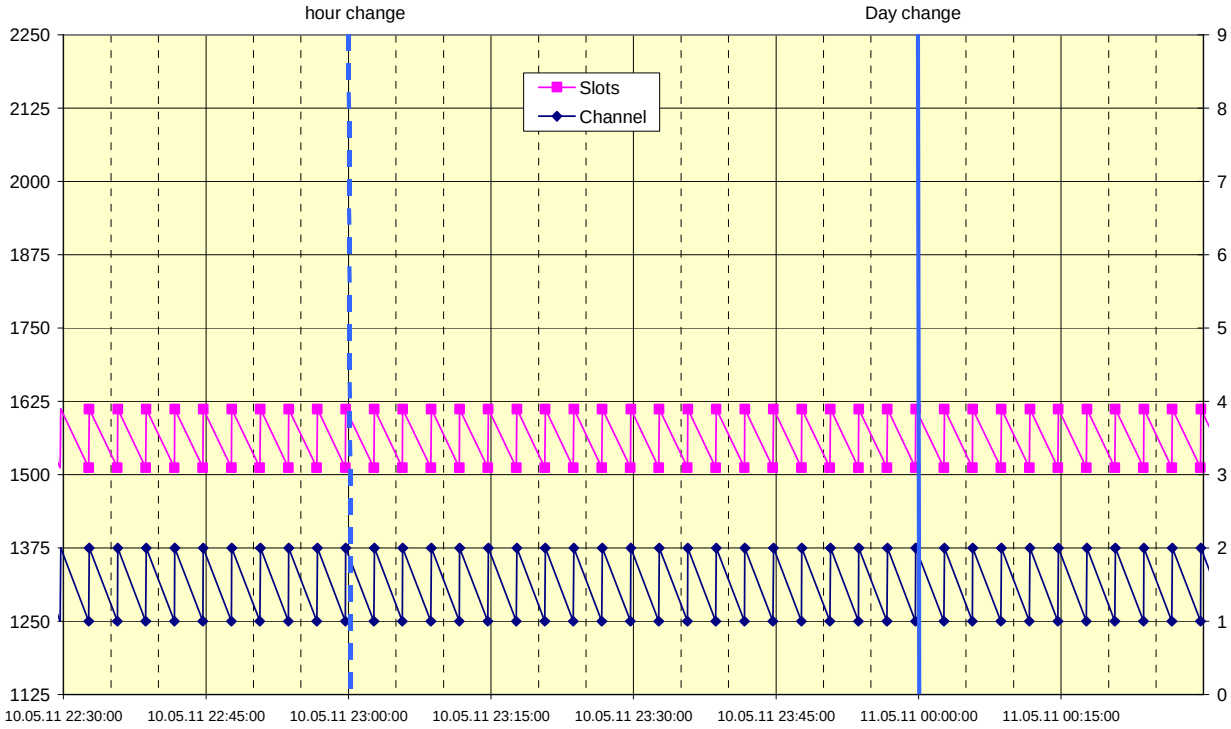
C.2 Type 1 equipment Mando-301

C.2.1 8.1.2 Mode A FATDMA Message 21

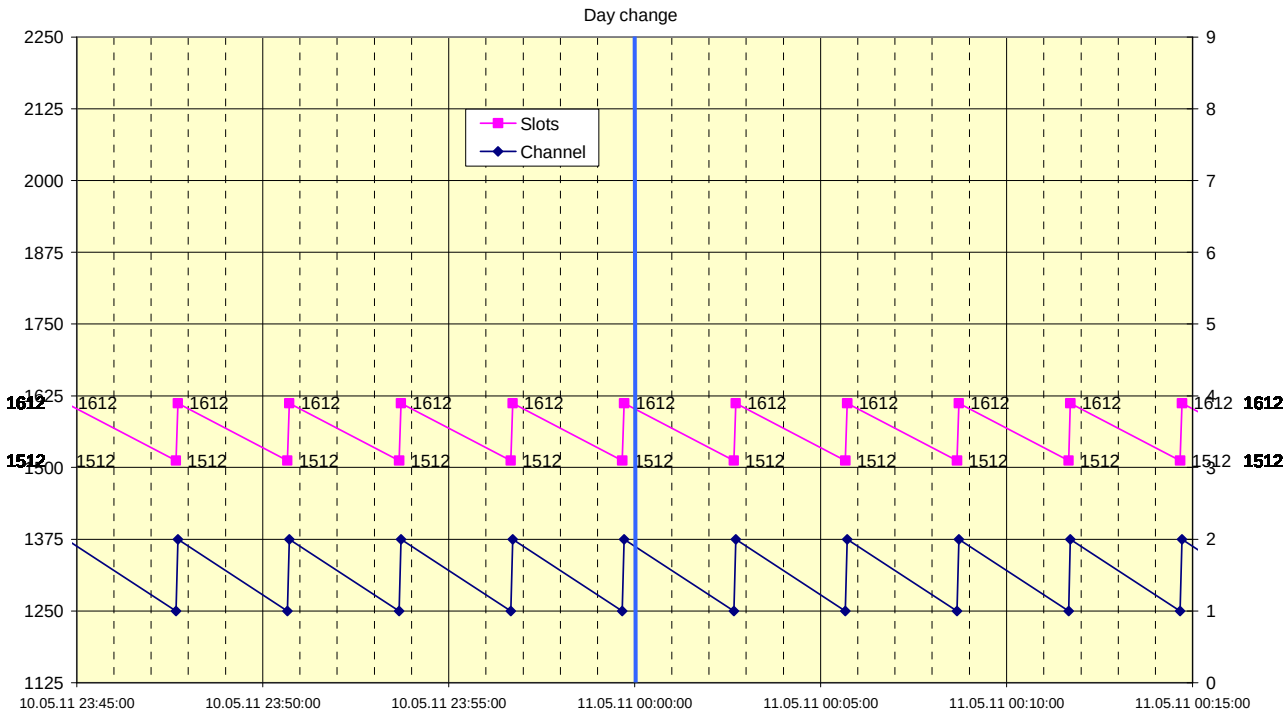




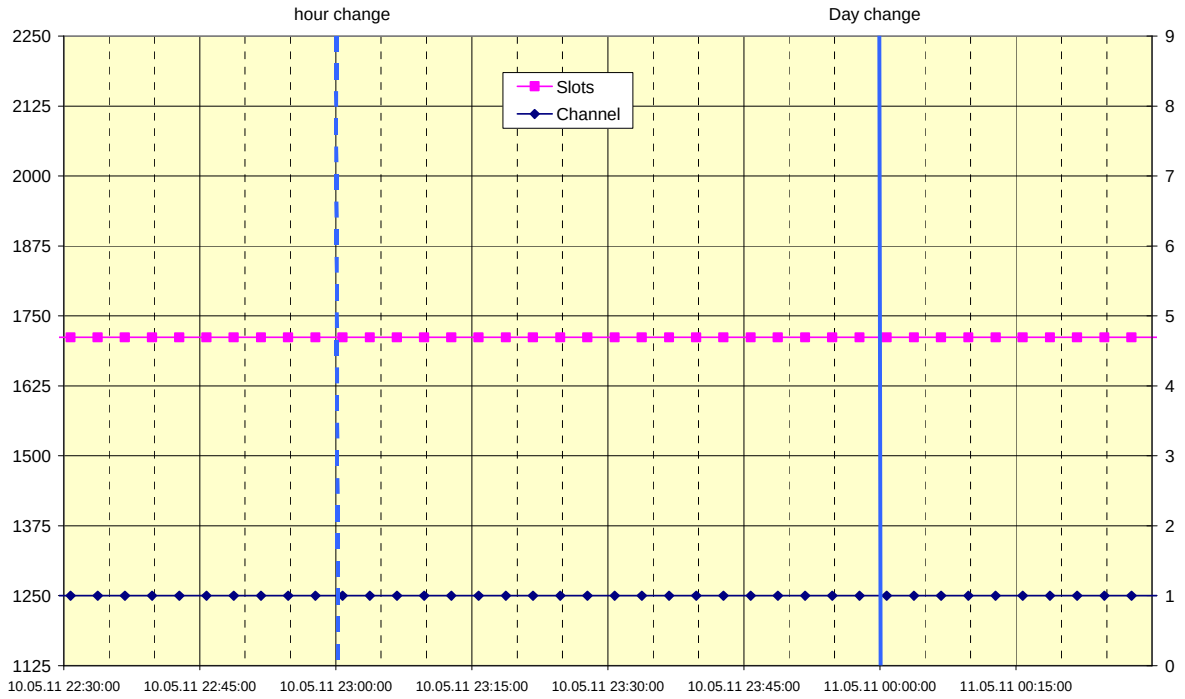
2011-05-11 Ba - AMEC Mando-301 - 8.1.3 Schedule mode B FATDMA message 21



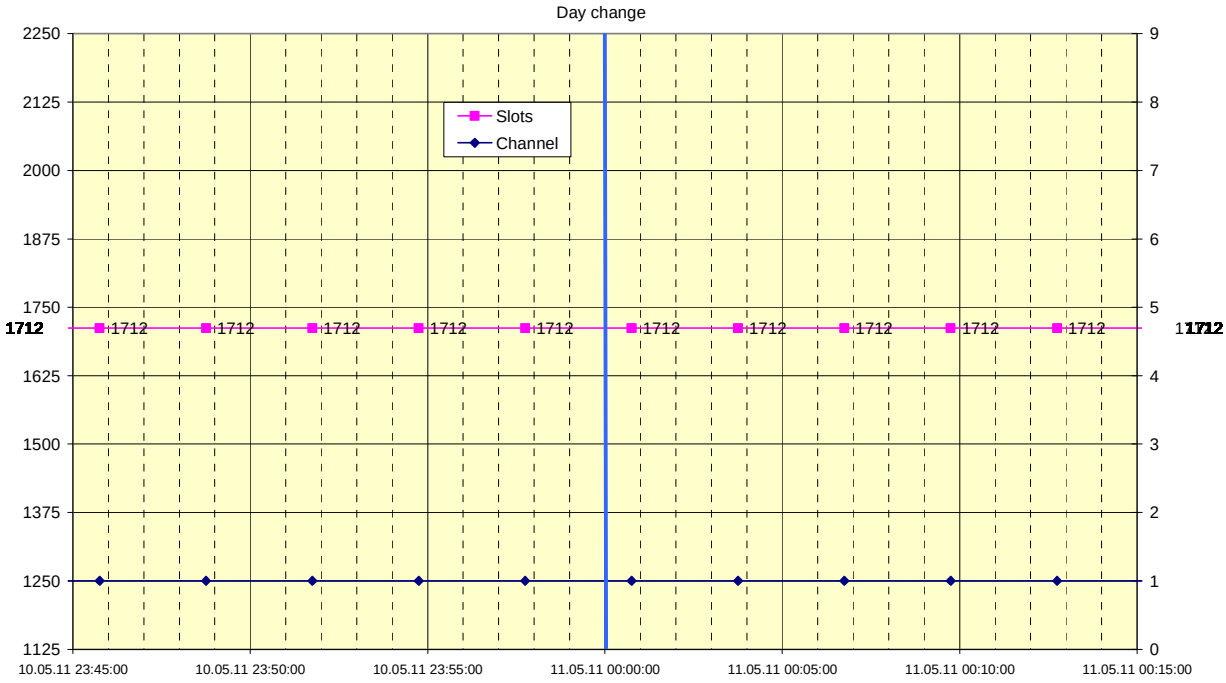
2011-05-11 Ba - AMEC Mando-301 - 8.1.3 Schedule mode B FATDMA message 21



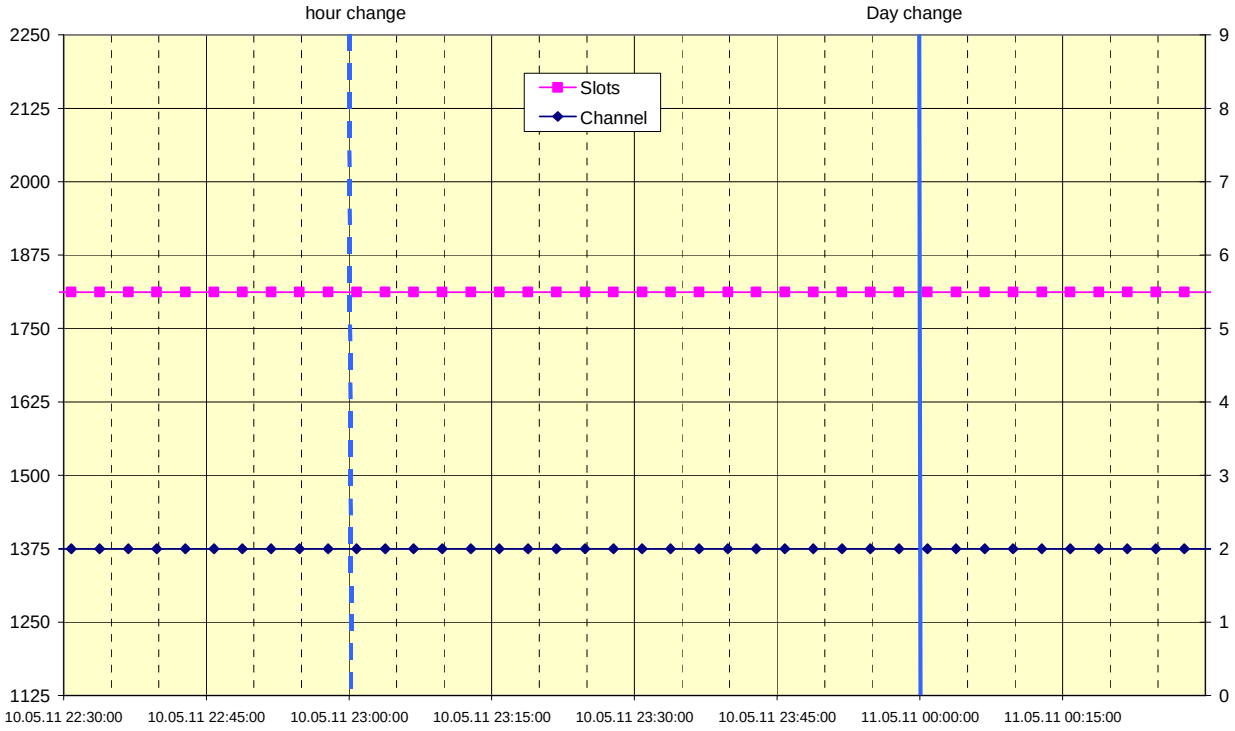
2011-05-11 Ba - AMEC Mando-301 - 8.1.4 Schedule mode C FATDMA message 21, Channel A



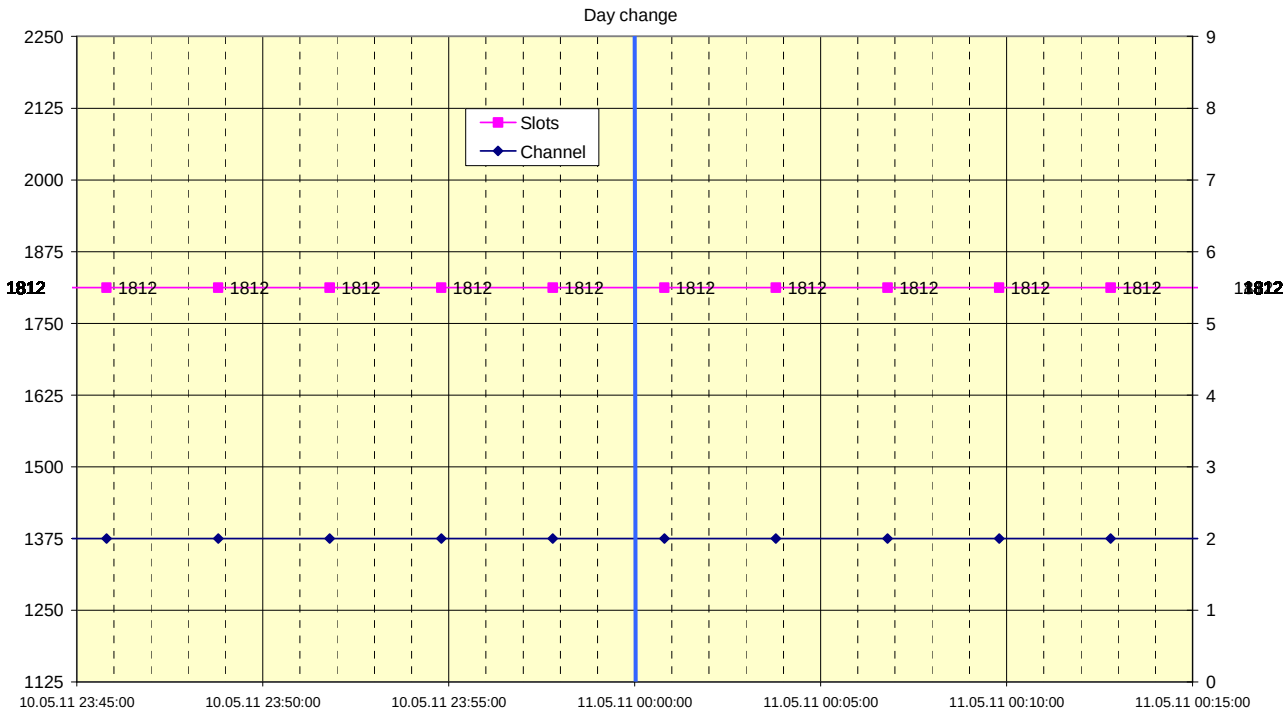
2011-05-11 Ba - AMEC Mando-301 - 8.1.4 Schedule mode C FATDMA message 21, Channel A



2011-05-11 Ba - AMEC Mando-301 - 8.1.4 Schedule mode C FATDMA message 21, Channel B



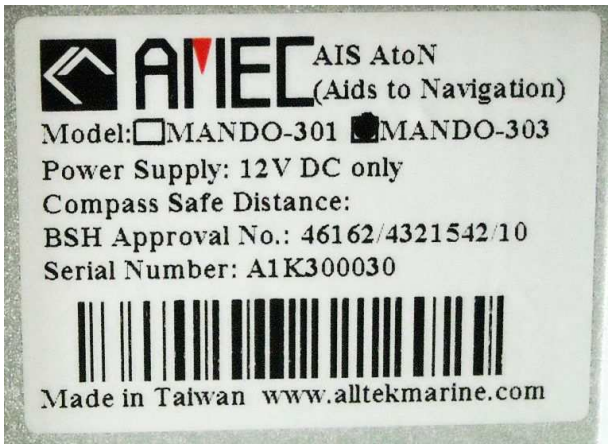
2011-05-11 Ba - AMEC Mando-301 - 8.1.4 Schedule mode C FATDMA message 21, Channel B



Annex D Photos of equip m ent under test

D.1 Transponder Unit

D.1.1 Type 3 unit Mando-303

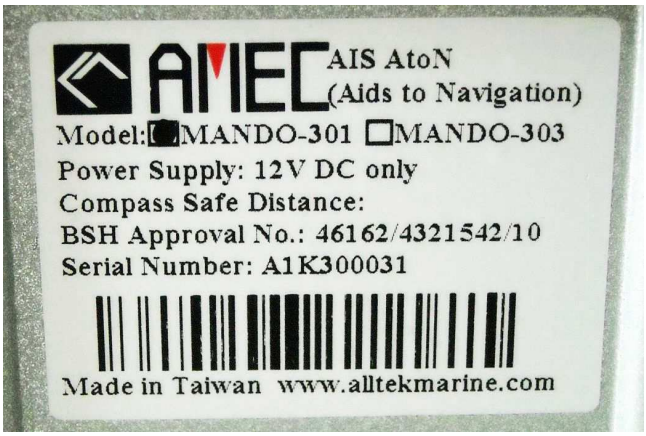



AMEC
MANDO-303 AIS AtoN


GPS
CON1
CON2
PWR
VHF


GPS
VHF

D.1.2 Type 1 unit Mando-301




AMEC
MANDO-301 AIS AtoN


GPS
CON1
CON2
PWR
VHF

D.2 GPS antenna