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 Class B SO System

Equipment under test:	**AMEC**
Type:	**WideLink B600/B600W**
Applying test standards:	**IEC 62287-2 Ed.2.0: 2017 [Sections 10, 12, 13]**
Test Report No.:	**BSH/4542/001/4322986/16-1**
Applicant:	**Alltek Marine Electronics Corp** **14F-2, No.237, Sec.1, Datong Road, Xizhi District** **New Taipei City, 22161** **TAIWAN**

Hamburg, 24 March 2017
For the Federal Maritime and Hydrographic Agency

Heinrich Bartels
Test engineer

Hans-Karl von Arnim
Head of section

Federal Maritime and Hydrographic Agency
Bernhard-Nocht-Str. 78
D-20359 Hamburg
Germany

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12084-01-01

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

Bundesamt für Seeschifffahrt und Hydrographie
Bundesoberbehörde im Geschäftsbereich
des BMVBS
Bernhard-Nocht-Straße 78
20359 Hamburg

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Schiffsausrüstung (Navigationsausrüstung, Funkausrüstung, Rettungsmittel)

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 08.03.2013 mit der Akkreditierungsnummer D-PL-12084-01 und ist gültig bis 07.03.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 9 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12084-01-01**

Frankfurt am Main, 08.03.2013

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Leiter Abteilung 2

Siehe Hinweise auf der Rückseite

Table of contents:

1 General

1.1 Summary

Applicant:	Alltek Marine Electronics Corp, 14F-2, No.237, Sec.1, Datong Road, Xizhi District, New Taipei City, 22161, TAIWAN
Equipment under test:	
Type:	WideLink B600/B600W
Manufacturer:	Alltek Marine Electronics Corp, 14F-2, No.237, Sec.1, Datong Road, Xizhi District, New Taipei City, 22161, TAIWAN
Place of test:	BSH test laboratory Hamburg, Room 916
Start of test:	13 June 2016
End of test:	16 March 2017

Test standards[1]:

Recommendation ITU-R M.1371-5 (2014)
Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band

IEC 62287-2 Ed. 2.0 (2017)
Maritime navigation and radiocommunication equipment and systems – Class B shipborne equipment of the automatic identification systems (AIS) –
Part 2: Self-organising time division multiple access (SOTDMA) techniques –

IEC 61162-1 Ed. 5.0 (2016)
Maritime navigation and radiocommunication equipment and systems – Digital Interfaces –
Part 1: Single talker and multiple listeners
Part 2: Single talker and multiple listeners, high speed transmission

IEC 61162-2 (1998)
Maritime navigation and radiocommunication equipment and systems – Digital Interfaces –
Part 1: Single talker and multiple listeners
Part 2: Single talker and multiple listeners, high speed transmission

Test No.	Reference IEC 61993-2 Ed. 2	Section	Result (passed / not passed / not applicable / not tested)
2	10	Operational tests	Passed
3	11	Physical tests	not included
4	12	Specific tests of link layer	Passed
5	13	Specific tests of network layer	Passed
6	A.4	DSC functionality tests	Passed

[1] Numbers listed in the titles of the test sections of this report refer to the respective sections of IEC 62287-2 if not stated otherwise.

1.2 Equipment history

For each transponder unit under test a numbered entry is provided here.

1.2.1 EUT system no 1

Transponder				
Type	Widelink B600		Part no.	---
Delivery date	2016-05-02		Serial no.	EUT #1
HW Version:	Delivery date	2016-05-02	Version no.	---
	Installation date	2016-05-02		
SW Version:	Delivery date	2016-05-02	Version no.	V.1.1.1
	Installation date	2016-05-02		
SW Version:	Delivery date	2016-05-23	Version no.	V1.1.4.1
	Installation date	2016-05-23		
SW Version:	Delivery date	2016-06-13	Version no.	V1.1.4.2
	Installation date	2016-06-13		

GPS antenna			
Type	ANT-21	Part no.	
Delivery date	2016-05-02	Serial no.	A3K090001

1.2.2 EUT system no 2

Transponder				
Type	Widelink B600		Part no.	---
Delivery date	2016-06-27		Serial no.	A6K600002
HW Version:	Delivery date	2016-06-27	Version no.	B600MBV2
	Installation date	2016-06-27		
SW Version:	Delivery date	2016-06-27	Version no.	V1.1.4.3
	Installation date	2016-06-27		
SW Version:	Delivery date	2016-07-21	Version no.	V1.1.4.4
	Installation date	2016-07-21		
SW Version:	Delivery date	2016-07-22	Version no.	V1.1.4.5
	Installation date	2016-07-22		
SW Version:	Delivery date	2016-08-23	Version no.	V1.1.4.6
	Installation date	2016-08-23		
SW Version:	Delivery date	2016-08-25	Version no.	V1.1.4.7
	Installation date	2016-08-26		
SW Version:	Delivery date	2016-09-02	Version no.	V1.1.4.8
	Installation date	2016-09-02		
SW Version:	Delivery date	2016-09-13	Version no.	V1.1.4.9
	Installation date	2016-09-13		
SW Version:	Delivery date	2017-02-16	Version no.	V1.1.4.10
	Installation date	2017-02-16		
SW Version:	Delivery date	2017-02-17	Version no.	V1.1.4.11
	Installation date	2017-02-17		
SW Version:	Delivery date	2017-02-20	Version no.	V1.1.4.12
	Installation date	2017-02-20		
SW Version:	Delivery date	2017-02-23	Version no.	V1.1.4.13
	Installation date	2017-02-23		
SW Version:	Delivery date	2017-03-08	Version no.	V1.1.4.14
	Installation date	2017-03-08		

GPS antenna			
Type	ANT-21	Part no.	
Delivery date	2016-05-02	Serial no.	A3K090001

1.2.3 EUT system no 3

Transponder				
Type	Widelink B600		Part no.	---
Delivery date	2016-06-27		Serial no.	A6K600003
HW Version:	Delivery date	2016-06-27	Version no.	B600MBV2
	Installation date	2016-06-27		
SW Version:	Delivery date	2016-06-27	Version no.	V1.1.4.3
	Installation date	2016-06-27		

GPS antenna			
Type	ANT-21	Part no.	
Delivery date	2016-05-02	Serial no.	A3K090001

1.3 Test environment

Here it is intended to record for which time which EUT system is under test.
The test environment is completely equipped as described in Annex A.

Room	BSH Room 916 (9th floor)
Test engineer	H. Bartels
Location	9° 59,103 E 53° 32,822 N
Temperature range	Within the specification of IEC 60945, Section 5.2.1
Humidity	Within the specification of IEC 60945, Section 5.2.1
Air pressure	980 – 1030 mBar

Equipment no.	Start of test	End of test	Test engineer
1	2016-05-13	2016-05-31	Bartels
1	2016-06-01	2016-06-02	Bartels
2	2016-07-01	2016-07-05	Bartels
3	2016-07-06	2016-07-06	Bartels
2	2016-07-21	2016-07-25	Bartels
2	2016-07-23	2016-08-23	Bartels
2	2016-09-05	2016-09-05	Bartels
2	2016-09-19	2016-09-20	Bartels
Documentation	2016-11-29	2016-11-30	Bartels
2	2016-11-30	2016-12-02	Bartels
2	2017-02-16	2017-03-16	Meyszies

Date of test report template: 2016-03-07

1.4 Composition

Minimum Keyboard and Display (MKD)

☒ No display ☐ Internal ☐ Remote

Channel management by DSC

☒ Time sharing ☐ Dedicated receiver

Differential GNSS

☐ No differential GNSS ☒ Differential GNSS by Message 17

1.5 Legend

Result marking (in the “result” column):

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

1.6 General observations

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

	General problems		
Date	Item	Remark	Result
2016-05-31	Area settings	Sometimes the area settings are lost. In the first sw edition it happened every 20..30 minutes. In the second edition it still happens but not so often. Retest 2016-07-05 Ba: A loss of area settings has not been observed during the current test phase.	Passed
2016-05-31	Rx probability	The Rx probability of receiver A is rather bad, about 70 %. The Rx probability of receiver B is good, about 100 %. See the diagram of Rx probability for details under different Rx conditions. Retest 2016-07-05 Ba: The Rx probability is sufficient (See test 10.2.1.5 and 10.2.1.6)	Passed
2016-07-05	Alarm 002	The alarm 002 VSWR exceeded is always active on EUT #2. Tested with different cables and dummy load directly on the antenna connector. It is a problem of EUT #2 only. EUT #3 does not show this failure. Retest 2016-07-12 Ba: After an adjustment of the VSWR setting there is no alarm with correct load.	Passed

2 9 Power supply, environmental and EMC tests

2.1 9.5 Under voltage test (brown out)

9.5.1 Purpose

This test simulates the situation where the nominal supply voltage drops to below acceptable levels and then recovers over a medium time-period.

9.5.2 Method of test

Operate the EUT at the nominal supply voltage as indicated by the manufacturer.

a) Gradually reduce the supply voltage to 40 % of the nominal supply voltage over 30 s.

b) Gradually increase the supply voltage back to 80 % of the nominal supply voltage over 30 s.

9.5.3 Required result

Confirm that

a) the unit shall not enter into any undefined or undesirable state as verified by a performance check,

b) the EUT shall recover and be fully operational as verified by a performance check.

2016-12-02	**Tester: Ba**	**Test details:** Under voltage test (brown out)	
Test item	Check	Remark	Result
Reduce supply voltage within 30 s to 40% of the nominal voltage	Run a performance check and observe the EUT	UTC 08:02 40% = 4.8 V At 7.5 Volt the Power LED is switched off and the EUT stops operation	Passed
Reduce supply voltage within 30 s to 80% of the nominal voltage	Observe the EUT and run a performance check and	At 8 Volt the Power LED is switched on and the EUT starts operation	Passed
Operate the EUT at 80% of the nominal voltage	Run a performance check and	The performance check is successful	Passed

2.2 9.6 Under voltage test (short term)

9.6.1 Purpose

This test simulates the situation where the nominal supply voltage drops to below acceptable levels for a short period and then recovers.

9.6.2 Method of test

Operate the EUT at the nominal supply voltage as indicated by the manufacturer.

a) Reduce the supply voltage to 40 % of the nominal supply voltage over 1 s.

b) Increase the supply voltage back to 80 % of the nominal supply voltage over 1 s.

9.6.3 Required result

The following results are required.

a) The unit shall not enter into any undefined or undesirable state as verified by a performance check.

b) The EUT shall recover and be fully operational as verified by a performance check.

2016-12-02	**Tester: Ba**	**Test details:** Under voltage test (short term)	
Test item	Check	Remark	Result
Reduce supply voltage within 30 s to 40% of the nominal voltage	Run a performance check and observe the EUT	UTC 08:09 40% = 4.8 V At 7.5 Volt the Power LED is switched off and the EUT stops operation	Passed
Reduce supply voltage within 30 s to 80% of the nominal voltage	Observe the EUT and run a performance check and	At 8 Volt the Power LED is switched on and the EUT starts operation	Passed
Operate the EUT at 80% of the nominal voltage	Run a performance check and	The performance check is successful	Passed

3 10 Operational tests

3.1 10.1 General

3.1.1 10.1.1 Tests by inspection

(See 4.1.2, 4.2, 4.3, 6.1)

10.1.1.1 Method of measurement

By inspection of documentation.

10.1.1.2 Required results

The relevant requirements shall be met.

2016-11-29	**Tester: Ba**	**Test details:** Tests by inspection	
Test item	Check	Remark	Result
4.1.2 Quality assurance			
Quality control system	Check the manufacturer's quality control system.	An ISO 9001 certificate from SGS and a Marine Equipment Directive Module D Quality System Certificate from BABT is provided	Passed
4.2 Manuals			
Type of external connectors	Check that information about external connectors is provided, if applicable.	Cables with the external connectors on one end and open wire at the other end are provided. The meaning of the colour of the wires is provided	Passed
Installation	Check that information for correct installation is provided.		Passed
	Check that information for correct positioning of the antennas is provided.		Passed
Compass safe distance	Check that the Compass safe distance value is provided.	A value of 0.55 m is provided in the manual. Remark: It can be changed to 0.30 m based on the CSD measurement	Passed
4.3 Marking and identification (in addition to IEC 60945, 4.9)			
Power supply	Check that details of the power supply are provided.	The power supply voltage is provided on the type label ("12 / 24 V DC")	Passed
Battery replacement	If applicable, check that the date for replacement of batteries is provided.	Not applicable because there is no battery which needs replacement	Passed

6.1 Internal processes			
Inspect the documentation that the following internal processes are implemented	A communication processor, capable of operating in the VHF Maritime Mobile Service band		Passed
	One TDMA transmitter		Passed
	Two TDMA receiving processes		Passed
	One DSC receiving process		Passed
	Means for automatic channel switching in the maritime mobile band by Message 22		Passed
	Means for automatic channel switching in the maritime mobile band by DSC		Passed
	Manual channel switching shall not be provided.		Passed
	An internal GNSS position sensor, resolution 1/10 000 minute, using WGS-84 datum only		Passed

3.1.2 10.1.2 Safety of operation

(See 4.1.3)

10.1.2.1 Purpose

To ensure the safety of operation.

10.1.2.2 Method of measurement

By inspection.

10.1.2.3 Required result

The requirements of 4.1.3 shall be met.

2016-11-29	**Tester: Ba**	**Test details:** Safety of operation		
Test item		Check	Remark	Result
Verify by inspection				
Software modification		It shall not be possible for the operator to augment, amend or erase any program software required for operation in accordance with this equipment standard.	Description in document: WIDELINK B-600 Technical Notes TN-600-001.pdf	Passed
Modification of data		Data used during operation and stored in the system shall be protected in such a way that necessary modifications and amendments by the user cannot endanger its integrity and correctness.		Passed

3.1.3 10.1.3 Additional features

(See 4.1.4)

10.1.3.1 Purpose

To ensure that any additional or optional features do not adversely affect operation of the EUT.

10.1.3.2 Method of measurement

Operate the EUT in standard test environment and enable any additional features provided. Repeat tests that might be affected by the additional feature.

10.1.3.3 Required results

The requirements of 4.1.4 shall be met.

2016-11-30	**Tester: Ba**	**Test details:** Additional features	
Test item	Check	Remark	Result
Enable all additional features. Repeat tests that might be affected by the additional features			
Repetition of test receiving performance at 90% VDL load.	Check that the additional features do not degrade the performance of the equipment.	Document: WIDELINK B-600 Technical Notes TN-600-001.pdf The manufacturer has documented that the additional features have not affected the normal operation.	Passed

3.2 10.2 Modes of operation

(See 6.4)

3.2.1 10.2.1 Autonomous mode

3.2.1.1 10.2.1.1 Transmit position reports

10.2.1.1.1 Purpose

The purpose of this test is to ensure that the EUT transmits in the autonomous mode.

10.2.1.1.2 Method of measurement

Set up standard test environment. Record the VDL communication and check for messages transmitted by the EUT.

10.2.1.1.3 Required result

Confirm that the EUT transmits Messages 18 and 24 part A and B following the autonomous continuous schedules, alternating between channels A and B.

Confirm that the EUT transmits Messages 18 and 24 part A and B following the autonomous continuous schedules, alternating between channels A and B and that Message 27 is not transmitted on the long-range channels when the default setting is used.

2016-05-13	**Tester: Ba**	**Test details:** Transmission of position reports		
Test item		Check	Remark	Result
Setup standard environment				
Message 18		Check that the Message 18 is transmitted continuously.		Passed
Message 24 A		Check that the Message 24 A is transmitted continuously.		Passed
Message 24 B		Check that the Message 24 B is transmitted continuously.		Passed
Message 27		Check that the Message 27 is not transmitted when the default setting is used		Passed
Channels		Check that the transmissions alternate between channel A and B.		Passed

3.2.1.2 10.2.1.2 Receive AIS Class A position reports

10.2.1.2.1 Purpose

The purpose of this test is to ensure that the EUT receives AIS Class A position reports in the autonomous mode.

10.2.1.2.2 Method of measurement

Set up standard test environment. Perform the tests below and validate the required result for each test.

- *Switch on test targets, and then start operation of the EUT.*
- *Start operation of the EUT, and then switch on test targets.*
- *Transmit test targets using same time slots on channels A and B.*
- *Transmit test targets that are not synchronised to time slot boundaries on channels A and B.*

Check the VDL communication and external interface of the EUT and, where provided, display.

10.2.1.2.3 Required result

Confirm that the EUT receives continuously under the conditions above and outputs the received messages on the external interface in accordance with IEC 61162 and, where provided, on the display.

2016-05-13	**Tester: Ba**	**Test details:** Receive Class A position reports		
Test item		Check	Remark	Result
Switch on test targets, and then start operation of EUT. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed
		Check that the VDM sentences are correct according to IEC 61162.		Passed
Optional display		Check that the targets are displayed on the display.	No display implemented	N/A
Targets on same slots on A and B		Check that both targets which use the same slots on A and B are output as VDM.		Passed
Unsynchronized targets		Check that unsynchronized targets are output as VDM.		Passed
Start operation of EUT, and then switch on test targets. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed

3.2.1.3 10.2.1.3 Receive AIS Class B "SO" position reports

10.2.1.3.1 Purpose

The purpose of this test is to ensure that the EUT receives AIS Class B "SO" position reports in the autonomous mode.

10.2.1.3.2 Method of measurement

Set up standard test environment. Simulate at least one additional Class B "SO" test target (bit stuffing shall not exceed 4 bits). Perform the tests below and validate the required result for each test.

- *Switch on test targets, and then start operation of the EUT.*
- *Start operation of the EUT, and then switch on test targets.*
- *Transmit test targets using same time slots on channels A and B.*
- *Transmit test targets that are not synchronised to time slot boundaries on channels A and B.*

Check the VDL communication and external interface of the EUT and, where provided, display.

10.2.1.3.3 Required result

Confirm that the EUT receives continuously under the conditions above and outputs the received messages on the external interface and, where provided, on the display.

2016-05-13	**Tester: Ba**	**Test details:** Receive Class B SO position reports		
Test item		Check	Remark	Result
a) Switch on test targets, and then start operation of the EUT. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed
		Check that the VDM sentences are correct according to IEC 61162.		Passed
Optional display		Check that the targets are displayed on the display.	No display implemented	N/A
Targets on same slots on A and B		Check that both targets which use the same slots on A and B are output as VDM.		Passed
Unsynchronized targets		Check that unsynchronized targets are output as VDM.		Passed
b) Start operation of the EUT, and then switch on test targets. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed

3.2.1.4 10.2.1.4 Receive AIS Class B "CS" position reports

10.2.1.4.1 Purpose

The purpose of this test is to ensure that the EUT receives AIS Class B "CS" position reports in the autonomous mode.

10.2.1.4.2 Method of measurement

Set up standard test environment. Simulate at least one additional Class B "SO" test target (bit stuffing shall not exceed 4 bits). Perform the tests below and validate the required result for each test.

- *Switch on test targets, and then start operation of the EUT.*
- *Start operation of the EUT, and then switch on test targets.*
- *Transmit test targets using same time slots on channels A and B.*
- *Transmit test targets that are not synchronised to time slot boundaries on channels A and B.*

Check the VDL communication and external interface of the EUT and, where provided, display.

10.2.1.4.3 Required result

Confirm that the EUT receives continuously under the conditions above and outputs the received messages on the external interface and, where provided, on the display.

2016-05-13	**Tester: Ba**	**Test details:** Receive Class B CS position reports		
Test item		Check	Remark	Result
a) Switch on test targets, and then start operation of the EUT. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed
		Check that the VDM sentences are correct according to IEC 61162.		Passed
Optional display		Check that the targets are displayed on the display.	No display implemented	N/A
Targets on same slots on A and B		Check that both targets which use the same slots on A and B are output as VDM.		Passed
Unsynchronized targets		Check that unsynchronized targets are output as VDM.		Passed
b) Start operation of the EUT, and then switch on test targets. Check the following items on VDM output of the PI compared with the transmitted values.				
Received targets		Check that the received targets are continuously output as VDM.		Passed

3.2.1.5 10.2.1.5 Receive in time slot adjacent to own transmission

10.2.1.5.1 Purpose

The purpose of this test is to ensure that the EUT receives position reports in the slot adjacent to own transmission in the autonomous mode.

10.2.1.5.2 Method of measurement

Set up standard test environment. Simulate 80 % VDL loading. The reporting interval of the EUT may be decreased for the purpose of this test.

Check the external Interface of the EUT.

10.2.1.5.3 Required result

Confirm that the EUT continuously receives messages in the slots before and after own transmission with an acceptable loss of 5 %.

2016-05-17	**Tester: Ba**	**Test details:** Receive in adjacent slots	
Test item	Check	Remark	Result
Setup standard environment. Simulate 80% VDL load. Test scenario: The EUT is operated in slot assigned mode. Specific targets are transmitted in the slots before and after the EUT Tx slots. The receiving probability of these targets is evaluated.			
Target transmissions in slots adjacent to own Tx slots	Check that target reports are received in the slot before the own Tx slot with < 5% loss.	Channel A: 36 – 49 % loss Channel B: 1 – 4 % loss Retest 2016-07-01 Ba: Channel A: 0.5 % loss Channel B: 1.1 % loss	Passed
	Check that target reports are received in the slot after the own Tx slot with < 5% loss.	Channel A: 19 - 22 % loss Channel B: 0 – 0.5 % loss Retest 2016-07-01 Ba: Channel A: 1.1 % loss Channel B: 0 % loss	Passed

3.2.1.6 10.2.1.6 High VDL loading reception test

10.2.1.6.1 Purpose

The purpose of this test is to ensure that the EUT receives position reports under high VDL loading in the autonomous mode.

10.2.1.6.2 Method of measurement

Set up standard test environment. Simulate 90 % VDL loading.

Check the external Interface of the EUT.

10.2.1.6.3 Required result

Confirm that the EUT continuously receives messages and outputs the received messages on the external interface with a loss of not more than 2 %.

2016-05-17	**Tester: Ba**	**Test details:** High VDL loading test	
Test item	Check	Remark	Result
Setup standard environment.			
Simulate 90% VDL load.	Check that target reports are received with < 2% loss.	Channel A: 7.9 % loss Channel B: 0.3 % loss Retest 2016-06-29 Ba: Channel A: 1.1 % loss Channel B: 0.2 % loss	Passed

3.2.2 10.2.2 Single Messages

3.2.2.1 10.2.2.1 Transmit an addressed binary message

10.2.2.1.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Initiate the transmission of an addressed binary Message 6 by the EUT using an ABM sentence input. An acknowledgement Message 7 shall be applied. Record the transmitted messages.

b) Repeat the test without acknowledgement.

c) Repeat test with a Message 6 exceeding 2 slots.

d) Apply more than 3 ABM sentences with 1 slot Message 6 to the EUT.

e) Repeat test a) with the addressed unstructured binary Message 25.

f) Repeat tests a), b) and d) with the addressed structured binary Message 25.

g) Repeat test a) with a single addressed unstructured binary Message 26.

h) Repeat tests a), b), c) and d) with a single addressed structured binary Message 26.

10.2.2.1.2 Required results

Check that

a) the EUT transmits Message 6 as appropriate within 30 s. Check the content of Message 6. Check that the EUT outputs the appropriate ABK sentence.

b) the EUT transmits Message 6 as appropriate. Check that the EUT outputs the appropriate ABK sentence indicating that no acknowledgment has been received. Check that the EUT does not retransmit Message 6.

c) the EUT does not transmit Message 6. Check that the EUT outputs the appropriate ABK sentence indicating that the message could not be sent.

d) the EUT transmits the first 3 Message 6s and does not transmit all following Message 6s within one frame. Check that the EUT outputs the appropriate ABK sentence indicating that the message could not be sent.

e) the EUT transmits Message 25 as appropriate.

f) the EUT transmits Message 25 as appropriate.

g) the EUT transmits Message 26 as appropriate.

h) the EUT transmits Message 26 as appropriate.

2016-05-18	**Tester: Ba**	**Test details:** a) Addressed binary Message 6 with acknowledgement		
Test item		Check	Remark	Result
Transmit an addressed binary message 6 by sending an ABM sentence to the PI PI sentence: File AIABM_bin.sst: Apply an acknowledgement Message 7 on the VDL				
Transmission		Check that message 6 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
Message sequence number		Check that sequence number in VDL message = Sequential message identifier of ABM sentence.		Passed
Repetition		Check that message 6 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 0.		Passed

2016-05-18	**Tester: Ba**	**Test details:** b) Addressed binary message 6 without acknowledgement		
Test item		Check	Remark	Result
Transmit an addressed binary message 6 by sending an ABM sentence to the PI PI sentence: File AIABM_bin.sst: No acknowledgement Message 7 on the VDL				
Transmission		Check that message 6 is transmitted within 30 s.		Passed
Repetition		Check that message 6 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 1.		Passed

2016-05-18	**Tester: Ba**	**Test details:** c) Addressed binary message 6 exceeding 2 slots		
Test item		Check	Remark	Result
Transmit an addressed binary message 6 exceeding 2 slots by ABM to the PI PI sentence: File AIABM_long.sst:				
Transmission		Check that message 6 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** d) More than 3 Message 6 within one frame		
Test item		Check	Remark	Result
Apply more than 3 ABM sentences per frame for transmission of Messages 6 (1 slot) PI sentence: File AIABM_multi.sst:				
First 3 Messages		Check that the first 3 Messages 6 are transmitted within 30 s after the ABM input.		Passed
		Check AIABK sentence, status = 0.		Passed
Further messages within a frame		Check that the further Messages 6 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** e) Addressed unstructured binary message 25		
Test item		Check	Remark	Result
Transmit an addressed unstructured binary message 25 by sending an ABM sentence with Message type 70 to the PI. No acknowledgement is applied PI sentence: File AIABM_msg70.sst				
Transmission		Check that message 25 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
Repetition		Check that message 25 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.	Status = 3	Passed
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed

2016-05-18	**Tester: Ba**	**Test details:** f) Addressed structured binary message 25		
Test item		Check	Remark	Result
(a, b) Transmit an addressed structured binary message 25 by sending an ABM sentence to the PI PI sentence: File AIABM_msg25.sst No acknowledgement is applied				
Transmission		Check that message 25 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content..		Passed
Repetition		Check that message 25 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.		Passed

2016-05-18	**Tester: Ba**	**Test details:** f) Addressed structured binary message 25		
Test item		Check	Remark	Result
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed
(d) Apply more than 3 ABM sentences per frame for transmissions of one slot structured Messages 25 PI sentence: File AIABM_msg25_multi.sst:				
First 3 Messages		Check that the first 3 Messages 25 are transmitted within 30 s after the ABM input.		Passed
		Check AIABK sentence, status = 3		Passed
Further messages within a frame		Check that the further Messages 25 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** g) Addressed unstructured binary message 26		
Test item		Check	Remark	Result
Transmit an addressed unstructured binary message 26 by sending an ABM sentence with Message type 71 to the PI. PI sentence: File AIABM_msg71.sst				
Transmission		Check that message 26 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
Repetition		Check that message 26 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status =3.		Passed
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed

2016-05-18	**Tester: Ba**	**Test details:** h) Addressed structured binary message 26		
Test item		Check	Remark	Result
(a, b) Transmit an addressed structured binary message 26 by sending an ABM sentence to the PI PI sentence: File AIABM_msg26.sst No acknowledgement				
Transmission		Check that message 26 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
Repetition		Check that message 26 is not repeated.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.		Passed
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed
(c) Transmit an addressed binary message 26 exceeding 2 slots by ABM to the PI PI sentence: File AIABM_long.sst:				
Transmission		Check that message 26 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed
(d) Apply more than 3 ABM sentences per frame for transmissions of one slot structured Messages 26 PI sentence: File AIABM_msg26_multi.sst:				
First 3 Messages		Check that the first 3 Messages 26 are transmitted within 30 s after the ABM input.		Passed
		Check AIABK sentence, status = 0		Passed
Further messages within a frame		Check that the further Messages 26 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

3.2.2.2 10.2.2.2 Transmit an addressed safety related Message 12

10.2.2.2.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

Initiate the transmission of an addressed binary Message 12 by the EUT using an ABM sentence input.

10.2.2.2.2 Required results

Check that the EUT does not transmit Message 12.

2016-05-18	**Tester: Ba**	**Test details:** c) Addressed safety related Message 12		
Test item		Check	Remark	Result
Transmit an addressed safety related text message 2 by ABM to the PI PI sentence: File AIABM_bin.sst:				
Transmission		Check that message 12 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed

3.2.2.3 10.2.2.3 Acknowledgement of addressed Messages

10.2.2.3.1 Purpose

The purpose of this test is to ensure that the EUT acknowledges addressed messages in the autonomous mode.

10.2.2.3.2 Method of measurement

Operate standard test environment and the EUT in autonomous mode.

a) *Apply an addressed binary Message 6 with the EUT as destination to the VDL on Channel A. Record transmitted messages on both channels.*

b) *Repeat for Message 12.*

c) *Repeat the test a) on channel B.*

10.2.2.3.3 Required results

Confirm that

a) *the EUT transmits a binary acknowledge Message 7, with the appropriate sequence numbers within 4 s on the channel where the Message 6 was received.*

b) *the EUT transmits a binary acknowledge Message 13, with the appropriate sequence numbers within 4 s on the channel where the Message 12 was received.*

c) *the EUT transmits a binary acknowledge Message 7 on channel B.*

2016-05-18	**Tester: Ba**	**Test details:** a) Acknowledgement of binary message 6		
Test item		Check	Remark	Result
Transmit an addressed binary Message 6 with EUT as destination on channel A of the VDL				
RX of messages (VDM)		Check by VDM output on PI of EUT that Message 6 is received .		Passed
Transmission of ackn. Message 7		Check transmission of ackn. Message 7 by the EUT.		Passed
		Check the content of Message 7.		Passed
		Check that Message 7 is transmitted within 4 s.		Passed
Sequence numbers		Check that sequence number in ackn. = sequence number of R_X message.		Passed
Ackn. channel		Check that ackn. T_X channel = channel A (= Rx channel).		Passed

2016-05-18	**Tester: Ba**	**Test details:** b) Acknowledgement of safety related Message 12		
Test item		Check	Remark	Result
Transmit an addressed safety related Message 12 with EUT as destination on the VDL				
RX of messages (VDM)		Check by VDM output on PI of EUT that Message 6 is received .		Passed
Transmission of ackn. Message 13		Check transmission of ackn Message 13. by the EUT.		Passed
		Check the content of Message 13.		Passed
		Check that Message 13 is transmitted within 4 s.		Passed
Sequence numbers		Check that sequence number in ackn. = sequence number of R_X message.		Passed
Ackn. channel		Check that ackn. T_X channel = channel A (= Rx channel).		Passed

2016-05-18	**Tester: Ba**	**Test details:** c) Acknowledgement on channel B		
Test item		Check	Remark	Result
Transmit an addressed binary Message 6 with EUT as destination on channel B of the VDL				
RX of messages (VDM)		Check by VDM output on PI of EUT that Message 6 is received .		Passed
Transmission of ackn. Message 7		Check transmission of ackn. Message 7 by the EUT.		Passed
Ackn. channel		Check that ackn. T_X channel = channel B.		Passed

3.2.2.4 10.2.2.4 Transmit a broadcast binary Message 8

10.2.2.4.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Initiate the transmission of a broadcast binary Message 8 by the EUT using a BBM sentence input. Record the transmitted messages.

b) Repeat test with a Message 8 exceeding 2 slots.

c) Apply more than 3 BBM sentences with 1 slot Message 8 to the EUT.

d) Repeat test a) with the broadcast unstructured binary Message 25.

e) Repeat tests a) and c) with the broadcast structured binary Message 25.

f) Repeat test a) with a single broadcast unstructured binary Message 26.

g) Repeat tests a), b) and c) with a single broadcast structured binary Message 26.

10.2.2.4.2 Required results

Check that

a) the EUT transmits Message 8 as appropriate within 30 s. Check the content of Message 8. Check that the EUT outputs the appropriate ABK sentence.

b) the EUT does not transmit Message 8. Check that the EUT outputs the appropriate ABK sentence indicating that the message could not be sent.

c) the EUT transmits the first 3 Message 8s and does not transmit all following Message 8s. Check that the EUT outputs the appropriate ABK sentence indicating that the message could not be sent.

d) the EUT transmits Message 25 as appropriate.

e) the EUT transmits Message 25 as appropriate.

f) the EUT transmits Message 26 as appropriate.

g) the EUT transmits Message 26 as appropriate.

2016-05-18	**Tester: Ba**	**Test details:** a) Message 8		
Test item		Check	Remark	Result
Apply a BBM sentence with message type 8 for transmission of a binary message to the PI. PI sentence: File AIBBM_bin.sst:				
Transmission of Message 8		Check the VDO output on PI.		Passed
		Check that Message 8 is transmitted within 30 s after BBM input.		Passed
Channel		Check T_X on channel according to BBM.		Passed
AIABK acknowledgement		Record and check the AIABK acknowledgement with message type 8, status = 3		Passed
		Check that Message sequence number in ABK = Sequential message identifier of BBM sentence.		Passed
Message content		Check message content.		Passed

2016-05-18	**Tester: Ba**	**Test details:** b) Message 8 exceeding 2 slots		
Test item		Check	Remark	Result
Transmit an broadcast binary message 8 exceeding 2 slots by BBM to the PI PI sentence: File AIBBM_long.sst:				
Transmission		Check that message 8 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** c) More than 3 Message 8 within one frame		
Test item		Check	Remark	Result
Apply more than 3 BBM sentences per frame for transmission of Messages 8 (1 slot) PI sentence: File AIBBM_multi.sst:				
First 3 Messages		Check that the first 3 Messages 8 are transmitted within 30 s after the BBM input.		Passed
		Check AIABK sentence, status = 3.		Passed
Further messages within a frame		Check that the further Messages 8 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** d) Broadcast unstructured binary message 25		
Test item		Check	Remark	Result
Transmit a broadcast unstructured binary message 25 by sending a BBM sentence with Message type 70 to the PI. PI sentence: File AIBBM_msg70.sst				
Transmission		Check that message 25 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 0.		Passed
		Check Message type = 70		Passed
		Check that Message sequence number in ABK = Sequential message identifier of BBM sentence.		Passed

2016-05-18	**Tester: Ba**	**Test details:** e) Broadcast structured binary message 25		
Test item		Check	Remark	Result
(a) Transmit a broadcast structured binary message 25 by sending an BBM sentence to the PI PI sentence: File AIABM_msg25.sst No acknowledgement				
Transmission		Check that message 25 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.		Passed
		Check Message type = 25		Passed
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed
(c) Apply more than 3 ABM sentences per frame for transmissions of structured Messages 25 (1 slot) PI sentence: File AIABM_msg25_multi.sst:				
First 3 Messages		Check that the first 3 Messages 25 are transmitted within 30 s after the ABM input.		Passed
		Check AIABK sentence, status = 3.		Passed
Further messages within a frame		Check that the further Messages 25 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

2016-05-18	**Tester: Ba**	**Test details:** f) Broadcast unstructured binary message 26		
Test item		Check	Remark	Result
Transmit a broadcast unstructured binary message 26 by sending a BBM sentence with Message type 71 to the PI. PI sentence: File AIBBM_msg71.sst				
Transmission		Check that message 26 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.		Passed
		Check Message type = 71		Passed
		Check that Message sequence number in ABK = Sequential message identifier of ABM sentence.		Passed

2016-05-18	**Tester: Ba**	**Test details:** g) Broadcast structured binary message 26		
Test item		Check	Remark	Result
(a) Transmit a broadcasts structured binary message 26 by sending an BBM sentence to the PI. PI sentence: File AIBBM_msg26.sst				
Transmission		Check that message 26 is transmitted within 30 s.		Passed
		Check the VDO output on PI for correct format and content.		Passed
		Check the VDL transmission for correct content.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 3.		Passed
		Check Message type = 26		Passed
		Check that Message sequence number in ABK = Sequential message identifier of BBM sentence.		Passed
(b) Apply a BBM sentence to the PI for a broadcast binary message 26 exceeding 2 slots. PI sentence: File AIBBM_Msg26_long.sst:				
Transmission		Check that message 26 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed
(c) Apply more than 3 BBM sentences per frame for transmissions of structured Messages 26 (1 slot). PI sentence: File AIBBM_msg26_multi.sst:				
First 3 Messages		Check that the first 3 Messages 26 are transmitted within 30 s after the ABM input.		Passed
		Check AIABK sentence, status = 3.		Passed
Further messages within a frame		Check that the further Messages 26 are not transmitted.		Passed
		Check that there is an AIABK sentence for each ABK, status = 2.		Passed

3.2.2.5 10.2.2.5 Transmit a broadcast safety related Message 14

10.2.2.5.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

Initiate the transmission of a broadcast binary Message 14by the EUT using an BBM sentence input.

10.2.2.5.2 Required results

Check that the EUT does not transmit Message 14.

2016-05-18	**Tester: Ba**	**Test details:** Broadcast safety related Message 14		
Test item		Check	Remark	Result
Apply a BBM sentence to transmit a broadcast safety related text message 14. PI sentence: File AIBBM_safety.sst:				
Transmission		Check that message 14 is not transmitted.		Passed
		Check that there is no VDO output on PI.		Passed
AIABK acknowledgement		Check AIABK sentence, status = 2.		Passed

3.2.2.6 10.2.2.6 ITDMA and RATDMA transmission

(See 7.3.4.2, 7.6)

10.2.2.6.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Apply a 1 slot binary broadcast message (Message 8) to the PI of the EUT less than 30 s before the next scheduled transmission. Record transmitted messages.

b) Apply a 1 slot binary broadcast message (Message 8) to the PI of the EUT more than 30 s before the next scheduled transmission. Record transmitted messages.

10.2.2.6.2 Required results

Confirm that

a) the EUT transmits this Message 8 within 30 s using ITDMA.

b) the EUT transmits this Message 8 within 30 s using RATDMA.

2016-05-18	**Tester: Ba**	**Test details:** ITDMA and RATDMA transmission		
Test item		Check	Remark	Result
Apply binary broadcast Messages 8 to the PI port of the EUT. File name: AIBBM_bin.sst.				
a) Transmissions < 30 s before next scheduled position report. Reporting interval = 15 s		Check that Message 8 is transmitted within 30 s.		Passed
		Check that ITDMA is used for slot allocation.		Passed
b) Transmissions > 30 s before next scheduled position report. Reporting interval = 3 min		Check that Message 8 is transmitted within 30 s.	See Note) Message 8 is transmitted with RATDMA within 4 s	Passed
		Check that RADMA is used for channel access.		Passed

Note)
With 30s, 15s and 5 s reporting interval the time from the BBM input to the next scheduled Message 18 is always shorter than 30 s.

Therefore test b) has to be performed with 3 minutes reporting interval.

With 3 minutes reporting interval a slot allocation for Message 8 is generally not possible, because Message 18 is already running in ITDMA mode to allocate the next Message 18.

Therefore with 3 minutes reporting interval always RATDMA is used, independent if the BBM is more or less than 30 s before the next scheduled transmission of message 18.

3.2.3 10.2.3 Polled mode / Interrogation response

(See 4.1.5, 7.3.4.3.4)

10.2.3.1 Purpose

The purpose of this test is to ensure that the EUT responds to interrogations.

10.2.3.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Apply interrogation Message 15 with the EUT as destination:

a) interrogation for Message 19 with transmission offset = 0;

b) interrogation for Message 19 with transmission offset = 10;

c) interrogation for Message 18 with transmission offset = 0;

d) interrogation for Message 24 with transmission offset = 0.

Record transmitted messages and frame structure.

10.2.3.3 Required results

Confirm that

a) the EUT transmits the appropriate interrogation response message within 30 s.

b) the EUT transmits the appropriate interrogation response message as requested after defined transmission offset.

c) the EUT transmits the appropriate interrogation response Message 18 within 30 s.

d) the EUT transmits the appropriate interrogation response Messages 24A within 30 s and 24B within 1 min of Message 24A.

Confirm that the EUT transmits the response on the same channel as the interrogation was received.

2016-05-18	**Tester: Ba**	**Test details:** Interrogation responses	
Test item	Check	Remark	Result
a) Apply an interrogation Message 15 requesting Message 19 with slot offset = 0 on the VDL. The request is transmitted on channel A.			
R_X of request by EUT	Check that the request message is received by the EUT (VDM).		Passed
T_X of response (VDO)	Check that response is transmitted by EUT.		Passed
Response on VDL	Check that the response is transmitted within 30 s.		Passed
Response channel	Check that the response is transmitted on the request channel.		Passed

b) Apply an interrogation Message 15 requesting Message 19 with given slot offset = 10. The request is transmitted on channel B.			
R_X of request by EUT	Check that the request message is received by the EUT (VDM).		Passed
T_X of response (VDO)	Check that response is transmitted by EUT.		Passed
Response on VDL	Check that the response is transmitted with the defined slot offset.		Passed
Response channel	Check that the response is transmitted on the request channel.		Passed
c) Apply an interrogation Message 15 requesting Message 18 with slot offset = 0. The request is transmitted on channel A.			
R_X of request by EUT	Check that the request message is received by the EUT (VDM).		Passed
T_X of response (VDO)	Check that response is transmitted by EUT.		Passed
Response on VDL	Check that the response is transmitted within 30 s.		Passed
Response channel	Check that the response is transmitted on the request channel.		Passed
d) Apply an interrogation Message 15 requesting Message 24 with slot offset = 0. The request is transmitted on channel B.			
R_X of request by EUT	Check that the request message is received by the EUT (VDM).		Passed
T_X of response (VDO)	Check that response Message 24 A and 24B is transmitted by EUT.		Passed
Response on VDL	Check that Message 24 A is transmitted within 30 s after the interrogation.		Passed
	Check that Message 24 B is transmitted within 1 min after 24 A		Passed
Response channel	Check that Message 24 A and 24 B are transmitted on the request channel.	Message 24 A and 24 B are always transmitted on channel A, independent of the request channel Retest 2016-06-15 Ba: The response is transmitted on the request channel	Passed

3.3 10.3 Channel selection

(See 6.2)

3.3.1 10.3.1 Valid channels

10.3.1.1 Purpose

The purpose of this test is to ensure that the EUT responds appropriately when given instructions to change to valid channels.

10.3.1.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Switch the EUT to different channels within the operating band as specified in 6.2 by transmission of channel management Message 22, broadcast and addressed to the EUT.

Record the VDL Messages on the designated channels and check "band flag" and "Message 22 flag" in Message 18.

10.3.1.3 Required results

Confirm that the EUT switches to the correct channel and uses the correct "band flag" and "Message 22 flag".

2016-05-18	**Tester: Ba**	**Test details:** Valid channels		
Test item		Check	Remark	Result
Apply a Message 4 and a broadcast Message 22 with area settings and valid channels to the VDL. Position is inside the channel management area.				
Broadcast Message 22		Check that channels are used.		Passed
		Check that the Band flag in Message 18 = 1 (whole band).		Passed
		Check that the Message 22 flag in Message 18 = 1 (Message 22 is supported).		Passed
		Check TXT output at PI.		Passed
		Check ACA output at PI.		Passed
Apply a Message 4 and a broadcast Message 22 with area settings and other valid channels to the VDL.				
Other valid channels		Check that channels are used.		Passed
		Check TXT output at PI.		Passed
		Check ACA output at PI.		Passed
Apply an addressed Message 22 with valid channels to the VDL. Position inside a valid area.				
Addressed Message 22		Check that channels are used.	Channels are only used with Message 4 See Note) Retest 2016-06-15 Ba: The channels are changed also without Message 4	Passed
		Check TXT output at PI.	(with Message 4) Retest 2016-06-15 Ba: Without message 4	Passed
		Check ACA output at PI.	(with Message 4) Retest 2016-06-15 Ba: Without message 4	Passed

Note)
For an addressed message 22 a Message 4 is not required because the message is addressed explicitly to a specific station. Different to a broadcast message the 120 NM evaluation is not necessary for an addressed messages.

In ITU-R M.1371-5, Annex 8, section 3.20 there are 2 alternatives:

- As a broadcast message, accompanied by a Message 4 for evaluation of the message within 120 NM
- Alternatively as an addressed message. For this alternative Message 4 is not mentioned

3.3.2 10.3.2 Invalid channels

10.3.2.1 Purpose

The purpose of this test is to ensure that the EUT responds appropriately when given instructions to change to invalid channels.

10.3.2.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Apply a Message 22 with 25 kHz channels not specified in Recommendation ITU-R M. 1084-5.

Record the VDL messages on the designated channels.

10.3.2.3 Required results

Confirm that the EUT disregards Message 22.

2016-05-18	**Tester: Ba**	**Test details:** Invalid channels	
Test item	Check	Remark	Result
Apply an addressed Message 22 with invalid channels with 25 kHz spacing to the VDL. Position is inside a valid channel management area.			
Addressed Message 22, Invalid channels	Check that channels are not used.	Invalid channels are accepted, the frequencies are set to 0, The Rx malfunction alarm is activated, and the unit does not receive any messages Retest 2016-06-15 Ba: The channels are not used	Passed
	Check that there is no TXT ID 36 output on PI.	There is a TXT output Retest 2016-06-15 Ba: There is a TXT output indicating “Channel A invalid” or “Channel B invalid”	Passed
	Check that there is no ACA output on PI.	Retest 2016-06-15 Ba: There is no ACA output	Passed

3.4 10.4 Internal GNSS receiver

(See 6.3)

The following relevant tests according to the IEC 61108 series shall be performed:

- *position accuracy, static;*
- *position accuracy, dynamic;*
- *COG/SOG accuracy;*
- *position update;*
- *status indications (including RAIM, when implemented);*
- *differential mode.*

The test of the Internal GNSS receiver is not part of this test report.

3.5 10.5 AIS information

3.5.1 10.5.1 Information content

(See 6.5.1)

10.5.1.1 Purpose

The purpose of this test is to ensure that the EUT transmits all parameters in static and dynamic Class B AIS Messages.

10.5.1.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Apply all static data to the EUT.

Record all Messages on VDL and check the content of position report Message 18 and static data reports, Messages 24A and 24B.

10.5.1.3 Required results

Confirm that data transmitted by the EUT complies with static data and position sensor data.

2016-05-18	**Tester: Ba**	**Test details:** Content of Message 18		
Test item		Check	Remark	Result
Internal GNSS is in use, no external position/speed sensor inputs. Apply Heading sensor data if the optional heading input is implemented.				
MMSI		Check MMSI.		Passed
Speed		Check the SOG value.		Passed
Position accuracy flag		Check PA flag.		Passed
Position		Check the values of LAT and LON.		Passed
Heading		Check that the values of heading.	511 if no heading provided, Otherwise the correct heading	Passed
COG		Check the COG value.	Default with internal GNSS (not moving), Otherwise the correct COG	Passed
Time stamp		Check time stamp.		Passed
Class B unit flag		Check that the Class B unit flag = 0 (Class B SOTDMA).	= 0	Passed
Display flag		Check that the Class B Display flag is according to the composition.	= 0 (no display)	Passed
DSC flag		Check that the DSC flag is set to 1.	= 0 (inactivated	Passed
Band flag		Check that the Band flag is set to 1.	= 1	Passed
Message 22 flag		Check that the Message 22 flag is set to 1.	= 1	Passed
RAIM flag		Check the RAIM flag.	= 1	Passed
Other content		Other content of message 18 like mode flag or comm state are checked in separate tests.		

2016-05-18	**Tester: Ba**	**Test details:** Content of Message 24		
Test item		Check	Remark	Result
Content of message 24 A				
MMSI		Check value in Message 24A.		Passed
Part number		Check part number = 0.		Passed
Name of ship		Check value in Message 24A.		Passed
Content of message 24 B				
MMSI		Check value in Message 24B.		Passed
Part number		Check part number = 1.		Passed
Type of ship and cargo type		Check value in Message 24B.	= 36	Passed
Vendor ID		Check Manufacturer's ID.	AMC	Passed
		Check Unit model code.	0	Passed
		Check Unit serial number.	If the serial number is set to A1K600002 the value 10002 is transmitted in Message 24. "A" and "K60" are fixed parts of the serial number on the label and in VER output. The actual serial number has to be set during production	Passed
Call sign		Check Call sign.		Passed
Dimension of ship/ reference for position		Check dim/ref A value.		Passed
		Check dim/ref B value.		Passed
		Check dim/ref C value.		Passed
		Check dim/ref D value.		Passed
Type of EPFS		Check Type of EPFS.	= 0, should be 15 for internal GNSS (This value is new in ITU-R M.1371-5) Retest 2016-06-15 Ba: Type of EPFS = 15	Passed

3.5.2 10.5.2 Information update intervals

(See 6.5.2)

3.5.2.1 10.5.2.1 Autonomous reporting interval

10.5.2.1.1 Purpose

The purpose of this test is to ensure that the EUT adopts the correct reporting interval for its SOG.

10.5.2.1.2 Method of measurement

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

a) Start with own SOG of 1 kn; record all Messages on VDL for at least 30 min and evaluate reporting interval for position report of the EUT by calculating average transmission offset over test period.

b) Increase speed to 3 kn.

c) Increase speed to 15 kn.

d) Increase speed to 24 kn.

e) Reduce speed to 22 kn.

f) Reduce speed to 13 kn.

g) Reduce speed to 1 kn.

Record all messages on VDL and check transmission offset between two consecutive transmissions.

10.5.2.1.3 Required results

Confirm that

a) the reporting interval is 3 min (±10 s);

b) the reporting interval is 30 s (±3 s);

c) the reporting interval is 15 s (±1,5 s);

d) the reporting interval is 5 s (±0,5 s);

e) the reporting interval is 15 s;

f) the reporting interval is 30 s;

g) the reporting interval is 3 min.

This test is performed in two steps:

- one test sequence to evaluate the rescheduling to the different reporting intervals
- one test sequence to evaluate the average transmission offset and transmission intervals. In this test the EUT is operated with each reporting interval for at least 30 minutes.

2016-05-19	**Tester: Ba**	**Test details:** Change of reporting rate by speed,		
Test item		Check	Remark	Result
Increase speed according to the test items.				
a) Speed = 1 kn		Check that reporting interval is 3 minutes.		Passed
b) Speed = 3 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.		Passed
		Check that reporting interval is 30 s.		Passed
c) Speed = 15 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.		Passed
		Check that reporting interval is 15 s.		Passed
d) Speed = 24 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.		Passed
		Check that reporting interval is 5 s.		Passed
Decrease speed according to the test items.				
e) Speed = 22 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.		Passed
		Check that reporting interval is 15 s.		Passed
f) Speed = 13 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.		Passed
		Check that reporting interval is 30 s.		Passed
g) Speed = 1 kn		Check releasing slot of the old reporting interval.		Passed
		Check slot allocation for new reporting interval.	The first message of the 3 minutes interval on channel B is not allocated. Retest 2016-06-16 Ba: The first message of the 3 minutes interval is allocated on both channels.	Passed
		Check that reporting interval is 3 minutes.		Passed

2016-05-19	**Tester: Ba**	**Test details:** Average values	
Test item	Check	Remark	Result
Modify speed to establish the required reporting intervals. Run the test of each reporting interval for at least 30 min.			
a) Speed = 1 kn	Check that the average reporting interval is 3 minutes +/- 10s.	Test 2016-05-20	Passed
	Check that the transmission slots are randomly distributed over the selection interval of 20% of 180 s = 36 s = 1350 slot.		Passed
	Check that the slot offsets are in a range of 180 s +/- 36s = 6750 +/- 1350 slots = 5400…8100 slots.		Passed
b) Speed = 3 kn	Check that the average reporting interval is 30 s +/- 3 s.		Passed
	Check that the transmission slots are randomly distributed over the selection interval 20% of 30s = 6 s = 225 slots.		Passed
	Check that the slot offsets are in a range of 30 s +/- 6 s = 1125 +/- 450 slots = 900…1350 slots.		Passed
b) Speed = 15 kn	Check that the average reporting interval is 15 s +/- 1.5 s		Passed
	Check that the transmission slots are randomly distributed over the selection interval 20% of 15s = 3 s = 112.5 slots.		Passed
	Check that the slot offsets are in a range of 15 s +/- 3 s = 562.5 +/- 112.5 slots = 450…675 slots.		Passed
b) Speed = 24 kn	Check that the average reporting interval is 5 s +/- 0.5 s.		Passed
	Check that the transmission slots are randomly distributed over the selection interval 20% of 5s = 1 s = 37.5 slots.		Passed
	Check that the slot offsets are in a range of 5 s +/- 1 s = 178.5 +/- 37.5 slots = 150…225 slots.		Passed

3.5.2.2 10.5.2.2 Polite behavior

10.5.2.2.1 Purpose

The purpose of this test is to ensure that the EUT adopts the correct reporting interval dependent on VDL loading and SOG.

10.5.2.2.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Simulate a VDL loading of 55 %. Record all messages.

a) Start with own SOG of 1 kn.
b) Increase speed to 20 kn.
c) Reduce VDL loading to 40 %.
d) Reduce VDL loading to 30 %.
e) Increase VDL loading to 45 %.
f) Increase VDL loading to 55 %.
g) Increase speed to 30 kn.
h) Reduce VDL loading to 40 %.
i) Reduce VDL loading to 30 %.
j) Increase VDL loading to 45 %.
k) Increase VDL loading to 55 %.
l) Reduce speed to 10 kn.
m) Reduce VDL loading to 30 %.

Record all messages on the VDL.

10.5.2.2.3 Required results

Confirm that

a) the reporting interval is 3 min,
b) the reporting interval of 30 s has been established,
c) the reporting interval of 30 s is maintained,
d) the reporting interval decreases to 15 s within 4 min to 5 min,
e) the reporting interval of 15 s is maintained,
f) the reporting interval increases to 30 s within 4 min to 5 min,
g) the reporting interval decreases to 15 s,
h) the reporting interval of 15 s is maintained,
i) the reporting interval decreases to 5 s within 4 min to 5 min,
j) the reporting interval of 5 s is maintained,
k) the reporting interval increases to 15 s within 4 min to 5 min,
l) the reporting interval increases to 30 s,
m) the reporting interval of 30 s is maintained.

2016-05-20	**Tester: Ba**	**Test details:** Test of polite behaviour					
Apply speed and VDL load according to the test items. Check the required reporting interval							
No.	SOG (kn)	VDL load (%)	Interval			UTC start	Remark	Result
			Norm.	Redu.	Required			
a	1	55	3 min	3 min	**3 min**	09:10		Passed
b	20	55	15 s	30 s	**30s**	09:20		Passed
c	20	40	15 s	30 s	**30s**	09:30		Passed
d	20	30	15 s	30 s	**15 s within 4…5 min**	09:40		Passed
e	20	45	15 s	30 s	**15 s**	09:50		Passed
f	20	55	15 s	30 s	**30 s within 4…5 min**	10:00		Passed
g	30	55	5 s	15 s	**15 s**	10:10		Passed
h	30	40	5 s	15 s	**15 s**	11:40	Test 2016-05-24	Passed
i	30	30	5 s	15 s	**5 s within 4…5 min**	11:50		Passed
j	30	45	5 s	15 s	**5 s**	12:00		Passed
k	30	55	5 s	15 s	**15 s within 4…5 min**	12:10		Passed
l	10	55	30 s	30 s	**30 s**	12:20	Within 4 minutes	Passed
m	10	30	30 s	30 s	**30 s**	12:30		Passed

3.5.2.3 10.5.2.3 Static data reporting interval

10.5.2.3.1 Purpose

The purpose of this test is to ensure that the EUT maintains the static data-reporting interval.

10.5.2.3.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Record the transmitted messages and check for static data Messages 24A and 24B.

Repeat the test at an assigned reporting interval of 5 s for Message 18.

10.5.2.3.3 Required results

Confirm that the EUT transmits Messages 24A and 24B every 6 min. Confirm that Message 24B is transmitted within 1 min of transmission of Message 24A, and on the same channel. Transmissions shall alternate between channels A and B, and shall be independent of the Message 18 reporting interval.

2016-05-19	**Tester: Ba**	**Test details:** ITDMA transmission of Message 24	
Test item	Check	Remark	Result
Record the VDL data of at least 30 frames operating with autonomously scheduled transmissions. Set the reporting interval of message 18 to 30 s.			
Reporting interval	Check that the reporting interval of Message 24A and 24B is 6 min.		Passed
	Check that Message 24B is transmitted within 1 min after 24A.		Passed
	Check that Message 24B is transmitted on the same channel as 24A.		Passed
Message type for allocation	Check that the slots for Message 24A and 24B are allocated by Message 18 with ITDMA comm state.	3 min: no allocation 30s: Part 0 is allocated, Part 2 not 15 and 5 s: Both parts are allocated	Passed
Number of slots	Check that the number of slots = 1 (value in comm state = 0).	Value in comm state = 1 (2 slots are allocated) Retest 2016-06-16 Ba: Value in comm state = 0	Passed
Keep flag	Check that the keep flag = 1.		Passed
Slot allocation	Check that the slots allocated by Message 18 are used for Tx of Message 24A and 24B.		Passed
Alternating channels	Check that the pairs of Message 24A/24B are transmitted on alternating channels.		Passed
Independent transmission schedule	Check that the transmission schedule of Message 24A/24B is independent of the Tx schedule of Message 18.	The distance between the two parts of Message 24 depends on the Message 18 reporting interval. This is necessary for correct slot allocation by Message 18	Passed

Set the reporting interval of message 18 by rate assignment to 5 s.			
Reporting interval	Check that the reporting interval of Message 24A and 24B is 6 min.		Passed
	Check that Message 24B is transmitted within 1 min after 24A.		Passed
	Check that Message 24B is transmitted on the same channel as 24A.		Passed
Message type for allocation	Check that the slots for Message 24A and 24B are allocated by Message 18 with ITDMA comm state.		Passed
Number of slots	Check that the number of slots = 1 (value in comm state = 0).		Passed
Keep flag	Check that the keep flag = 1.		Passed
Slot allocation	Check that the slots allocated by Message 18 are used for Tx of Message 24A and 24B.		Passed
Alternating channels	Check that the pairs of Message 24A/24B are transmitted on alternating channels.		Passed
Independent transmission schedule	Check that the transmission schedule of Message 24A/24B is independent of the Tx schedule of Message 18.		Passed

3.6 10.6 Initialisation period

(See 6.5.2, 6.5.4)

10.6.1 Purpose

The purpose of this test is to ensure that the EUT starts to transmit within the permissible initialisation period.

10.6.2 Method of measurement

Set up standard test environment with SOG >2 kn.

a) Switch on the EUT from cold (off-time minimum 1 h) with the EUT operating in autonomous mode.

b) Switch off the EUT for between 15 min to 60 min and switch on again.

c) Make the GNSS sensor position unavailable.

Record transmitted messages.

10.6.3 Required results

Confirm that the EUT

a) starts regular transmission of Message 18 within 2 min and valid position within 30 min after switch on,

b) starts regular transmission of Message 18 within 2 min and valid position within 5 min after switch on,

c) continues transmission with last known position and time stamp "63" (positioning system inoperative) with a reporting interval of 3 min. Change to default position values (91, 181) after 30 min.

2016-06-13	**Tester: Ba**	**Test details:** Initialisation period		
Test item		Check	Remark	Result
Power is off for at least 1 hour Apply a speed > 2 kn.				
a) Switch power on.		Check that EUT starts transmission of Message 18 within 2 min.	UTC 10:29 1:48	Passed
		Check that EUT has a valid position within 30 min.	< 2 minutes	Passed
b) Switch power off for 15 … 60 min.		Check that EUT starts transmission of Message 18 within 2 min.	Power off: UTC 10:40 Power on: UTC 11:01:00 First msg: UTC 11:02:43	Passed
		Check that EUT has a valid position within 5 min.	< 1 min	Passed
c) Make GNSS unavailable.		Check that EUT continues transmission with last known position.	UTC 11:10	Passed
		Check that time stamp = 63.		Passed
		Check that reporting interval = 3 min.		Passed
After 30 min		Check that position = default.		Passed

3.7 10.7 Alarms and indications, fall-back arrangements

(See 6.6)

3.7.1 10.7.1 Built in integrity test

10.7.1.1 Purpose

The purpose of this test is to ensure that the EUT has a BIIT.

10.7.1.2 Method of measurement

Check manufacturer's documentation on BIIT.

10.7.1.3 Required result

Verify that an indication is provided if a malfunction is detected and the appropriate ALR sentence is output on the PI.

2016-07-06	**Tester: Ba**	**Test details:** Built in integrity test		
Test item		Check	Remark	Result
Check manufacturer's documentation on BIIT.		Check that a malfunction indication is provided.	Test end documentation check	Passed
		Check that an appropriate ALR sentence is output on the PI if a malfunction is detected.		Passed

3.7.2 10.7.2 Transceiver protection

(See 7.6)

10.7.2.1 Purpose

The purpose of this test is to ensure that the EUT is capable of withstanding open and short circuit to the VHF-antenna terminals.

10.7.2.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode with SOG > 23 kn.

a) Open circuit VHF-antenna terminals of the EUT for at least 5 min.

b) Short circuit VHF-antenna terminals of the EUT for at least 5 min.

c) Reconnect the VHF-antenna.

10.7.2.3 Required results

Check that

a) an alarm sentence ALR with alarm ID 002 is sent to the PI,

b) an alarm sentence ALR with alarm ID 002 is sent to the PI,

c) the EUT shall be operative again after refitting the antenna, without damage to the transceiver and check that an alarm sentence ALR with a deactivated alarm ID 002 is sent to the PI.

2016-07-06	**Tester: Ba**	**Test details:** Transceiver protection		
Test item		Check	Remark	Result
Apply a speed > 23 kn (5 s reporting interval).				
a) open circuit the VHF antenna terminal for at least 5 min.		Check that ALR ID 002 is output.	Test has been performed with EUT No. 3 because EUT No. 2 always activates ALR ID 002. UTC 06:48	Passed
		Check that the malfunction indication is activated.		Passed
b) open circuit the VHF antenna terminal for at least 5 min.		Check that ALR ID 002 is output.	UTC 06:55	Passed
		Check that the malfunction indication is activated.		Passed
c) Reconnect the VHF antenna.		Check that ALR ID 002 is output indicating the deactivation.	UTC 07:01	Passed
		Check that the EUT is not damaged and continuous normal operation.		Passed
		Check that the malfunction indication is deactivated.		Passed

3.7.3 10.7.3 Transmitter shutdown procedure

10.7.3.1 Purpose

The purpose of this test is to ensure that the EUT has a shutdown procedure that is independent of the operating system software.

10.7.3.2 Method of measurement

Check manufacturer's documentation on transmitter shutdown procedure.

10.7.3.3 Required result

Verify that a transmitter shutdown procedure, independent of the operating software, is provided (see 6.6.2).

2016-11-29	**Tester: Ba**	**Test details:** Transmitter shutdown procedure		
Test item		Check	Remark	Result
Check manufacturer's documentation on Transmitter shutdown procedure.		Verify the transmitter shutdown procedure.	Description in document: WIDELINK B-600 Technical Notes TN-600-001.pdf	Passed
		Verify that the transmitter shutdown procedure is independent of software.		Passed

3.7.4 10.7.4 Position sensor fallback conditions

10.7.4.1 Purpose

The purpose of this test is to ensure that the EUT uses position source, position accuracy flag, RAIM flag and position information in accordance with Table 3.

10.7.4.2 Method of measurement

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

Apply position sensor data such that the EUT operates as follows:

- *internal DGNSS in use (corrected by Message 17);*
- *internal DGNSS in use (corrected by a beacon), if implemented;*
- *internal GNSS in use;*
- *no sensor position in use.*

Check the position accuracy and RAIM flag in the VDL Message 18 and, where provided, the ALR sentence.

10.7.4.3 Required result

Verify that the use of position source, position accuracy flag, RAIM flag and position information complies with Table 3.

Verify that the position sensor status is maintained for the next scheduled report and changed for subsequent reports.

Verify that the EUT does not accept Message 17 from a station using a non-base station MMSI.

2016-07-05	**Tester: Ba**	**Test details:** Check of position sensor fall-back conditions		
Test item		Check	Remark	Result
Provide GNSS signal according to the test items, changing upwards				
No GNSS signal available		Check that position = default.		Passed
		Check that PA flag = 0.		Passed
		Check the RAIM flag = 0.		Passed
		Check that ALR ID 007 is output.		Passed
		Check that ALR ID 026 is output.		Passed
		Check that ALR ID 029 is output.		Passed
		Check that ALR ID 030 is output.		Passed
Provide a GNSS signal		Check that position is correct.		Passed
		Check that PA flag = 0.		Passed
		Check the RAIM flag (0 or 1 if RAIM is optionally implemented).	RAIM = 1	Passed
		Check that ALR ID 026 is output indicating inactivation of alarm.		Passed
		Check that ALR ID 026 is output indicating inactivation of alarm.		Passed
		Check that ALR ID 029 is output indicating inactivation of alarm.		Passed
		Check that ALR ID 030 is output indicating inactivation of alarm.	ALR ID 030 is still active because SOG = 0	Passed

	Check that the status is changed after the next scheduled position report	See Note)	Passed
Provide a beacon signal (Optional)	Check that position is correct.	Beacon input is not implemented	N/A
	Check that PA flag = 1.		N/A
	Check the RAIM flag (0 or 1 if RAIM is optionally implemented).		N/A
	Check that the status is changed		N/A
Provide Message 17 on VDL (Optional)	Check that position is correct.		Passed
	Check that PA flag = 1.		Passed
	Check the RAIM flag (0 or 1 if RAIM is optionally implemented).		Passed
	Check that the status is changed after the next scheduled position report	See Note)	Passed
Provide GNSS signal according to the test items, changing upwards			
Remove Message 17 on VDL (Optional)	Check that position is correct		Passed
	Check that PA flag = 0		Passed
	Check the RAIM flag (0 or 1 if RAIM is optionally implemented).	= 1	Passed
	Check that the status is changed after the next scheduled position report	See Note)	Passed
Remove the beacon signal (Optional)	Check that position is correct.		N/A
	Check that PA flag = 0.		N/A
	Check the RAIM flag (0 or 1 if RAIM is optionally implemented).		N/A
	Check that the status is changed		N/A
Remove the GNSS signal	Check that time stamp = 63		Passed
	Check that PA flag = 0.		Passed
	Check the RAIM flag = 0.		Passed
	Check that the status is changed after the next scheduled position report	See Note)	Passed

Note)
In the test with 3 min reporting interval resulting from SOG = 0 in a stationary test the next scheduled position report already represents the new sensor status.

This seems to be appropriate and is therefore accepted.

2016-07-05	**Tester: Ba**	**Test details:** Check of Message 17 from an non-base station MMSI		
Test item		Check	Remark	Result
Connect sensor inputs and correction data according to the test items.				
• GNSS is available. • Apply correction data by Message 17 from a non-base station MMSI.		Check that PA flag = 0.	UTC 13:45	Passed

3.8 10.8 User interface

3.8.1 10.8.1 Status indication

(See 6.7.1)

10.8.1.1 Purpose

The purpose of this test is to ensure that the status indicators provided on the EUT function correctly.

10.8.1.2 Method of measurement

Perform the following.

a) Set up standard test environment and operate the EUT in autonomous mode.

b) Send Message 23 with a quiet time to EUT.

c) Disable GNSS reception.

Check status indications.

10.8.1.3 Required results

Check that

a) power indicator is on and the no transmission indicator is off,

b) no transmission indicator is on and reverts to off after quiet time elapse,

c) the error indicator is on.

2016-06-02	**Tester: Ba**	**Test details:** Status indication		
Test item		Check	Remark	Result
Operate the EUT according to the test items.				
a) Operate under normal conditions in autonomous mode.		Check that the power indicator is on.		Passed
		The “No transmission” indicator is off.		Passed
		Check that the “Error” indicator is off.		Passed
b) Disable transmission by message 23 with quiet time.		Check that the power indicator is on.		Passed
		The “No transmission” indicator is on.		Passed
		Check that the “Error” indicator is off.		Passed
c) Disable GNSS reception (quiet time is finished).		Check that the power indicator is on.		Passed
		The “No transmission” indicator is off.		Passed
		Check that the “Error” indicator is on.		Passed

3.8.2 10.8.2 Message display

(See 6.7.1)

This test is only applicable if a message display is provided.

10.8.2.1 Purpose

The purpose of this test is to ensure that, if a display is provided, the EUT displays the required information.

10.8.2.2 Method of measurement

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

a) *Apply to the VDL Message 12 addressed to EUT.*
b) *Apply to the VDL Message 12 not addressed to EUT.*
c) *Apply to the VDL Message 14 to EUT.*
d) *Apply an active AIS- SART position report to EUT.*
e) *Apply a test mode AIS-SART position report to EUT.*
f) *Disable VHF antenna.*

10.8.2.3 Required results

Verify that

a) *the EUT displays Message 12,*
b) *the EUT does not display Message 12,*
c) *the EUT displays Message 14,*
d) *the EUT displays the AIS- SART position report Message 1, at least ID and position,*
e) *the EUT displays the AIS-SART position report Message 1, at least ID and position only if unit set to AIS-SART test mode,*
f) *the EUT displays the alarm status and that the error indicator is on.*

2016-06-02	**Tester: Ba**	**Test details:** Test of optional Message display		
Test item		Check	Remark	Result
Apply messages according to the test items.				
a) Apply message 12 addressed to the EUT		Check that the message is displayed.	A message display is not provided	N/A
		Check that the content is correct.		N/A
b) Apply message 12 not addressed to the EUT		Check that the message is not displayed.		N/A
c) Apply message 14		Check that the message is displayed.		N/A
		Check that the content is correct.		N/A
d) Apply an active SART message 1		Check that the SART is displayed.		N/A
		Check that the MMSI is displayed.		N/A
		Check that the position is displayed.		N/A
e) Apply an SART test message 1 EUT in SART test mode		Check that the SART is displayed.		N/A
		Check that the MMSI is displayed.		N/A
		Check that the position is displayed.		N/A
e) Apply an SART test message 1 EUT not in SART test mode		Check that the SART is not displayed.		N/A
f) Disconnect VHF antenna		Check that the alarm status is displayed.		N/A
		Check that the error indicator is on.		N/A

3.8.3 10.8.3 Static data input

(See 6.4, 6.7.2)

10.8.3.1 Purpose

The purpose of this test is to ensure that static data can be input to the EUT according to the manufacturer's documentation and the MMSI cannot be changed once input.

10.8.3.2 Method of measurement

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

a) Enter all static data except MMSI.

b) Enter an MMSI outside the valid range.

c) Enter an MMSI according to the manufacturer's initialisation procedure.

d) Enter a new MMSI.

e) Enter all other static data.

10.8.3.3 Required results

Verify that

a) the static data is correctly stored according to the manufacturer's initialisation procedure,

b) the unit does not accept the MMSI,

c) the unit accepts the MMSI as entered by the user,

d) the unit does not accept the MMSI as entered by the user,

e) static data can be changed.

2016-06-02	**Tester: Ba**	**Test details:** Static data input		
Test item		Check	Remark	Result
Input static data according to manufacturer's documentation. At test start no valid MMSI is stored in the EUT.				
a) Enter all static data except MMSI and check that they are correctly stored.		Enter and check ships name.	By SSD input	Passed
		Enter and check type of ship and cargo.	By VSD input	Passed
		Enter and check call sign.	By SSD input	Passed
		Enter and check dimension of ship/ reference for position.	By SSD input	Passed
b) Enter an MMSI outside the valid range.		Check that the MMSI is not accepted.	Using configuration tool	Passed
c) Enter an MMSI inside the valid range.		Check that the MMSI is accepted and correctly stored.	Using configuration tool	Passed
d) Enter a new MMSI inside the valid range.		Check that the new MMSI is not accepted.	Using configuration tool	Passed
e) Enter all static data except MMSI and check that they are correctly stored.		Enter and check ships name.	With SSD and configuration tool	Passed
		Enter and check type of ship and cargo.		Passed
		Enter and check call sign.		Passed
		Enter and check dimension of ship/ reference for position.		Passed

4 11 Physical tests

The physical radio tests are not part of this test report.

5 12 Specific tests of link layer

5.1 12.1 TDMA synchronisation

5.1.1 12.1.1 Synchronisation test using UTC direct and indirect

12.1.1.1 Purpose

The purpose of this test is to ensure that the EUT can operate UTC direct and indirect.

12.1.1.2 Method of measurement

Set up standard test environment; choose test conditions in a way that the EUT operates in the following synchronisation modes:

a) *UTC direct;*

b) *UTC indirect (internal synchronisation source disabled; at least one other station UTC direct synchronised);*

c) *BASE direct (internal GNSS disabled; base station with UTC direct synchronisation within range);*

d) *UTC indirect (internal GNSS receiver disabled; only Class B SO station UTC direct synchronised).*

Check all CommState parameters in position report. Check reporting interval.

12.1.1.3 Required results

Confirm that

a) *the SynchState = 0;*

b) *the SynchState = 1;*

c) *the SynchState = 1;*

d) *the SynchState = 1.*

2016-05-23	**Tester: Ba**	**Test details:** TDMA Synchronisation		
Test item		Check	Remark	Result
Operate the EUT in an environment according to the test items and check the synchronisation state.				
a)	Operate with GPS.	Check that sync state is 0 (UTC direct).		Passed
b)	Disable GPS. At least one AIS Class A station with UTC direct.	Check that sync state is 1 (UTC indirect).		Passed
c)	GPS disabled, one base station with UTC direct within range.	Check that sync state is 1 (UTC indirect).		Passed
d)	GPS disabled, At least one AIS Class B SO station with UTC direct.	Check that sync state is 1 (UTC indirect).		Passed

5.1.2 12.1.2 Synchronisation test without UTC, EUT receiving semaphore

12.1.2.1 Purpose

The purpose of this test is to ensure that the EUT can synchronise to a semaphore.

12.1.2.2 Method of measurement

Set up standard test environment; choose test conditions such that the EUT operates with other units acting as follows.

a) The EUT is receiving a mobile station that is acting as semaphore with no Base Stations being received.

b) Introduce a Base Station that is acting as a semaphore with different timing.

c) Enable internal synchronisation source.

Check all CommState parameters in position report. Check reporting interval.

12.1.2.3 Required results

Confirm that

a) transmitted SynchState = 3;

b) the EUT shall change synchronisation source to the Base Station;

c) synchronisation mode shall revert to UTC direct, SynchState = 0.

2016-05-23	**Tester: Ba**	**Test details:** TDMA Synchronisation		
Test item		Check	Remark	Result
Operate the EUT in an environment according to the test items and check the synchronisation state.				
a) GPS disabled At least one AIS Class A station as semaphore.		Check that sync state is 3.	UTC 09:10	Passed
		Check that the EUT synchronizes to the Class A station.		Passed
b) GPS disabled, Class A without UTC and one base station as semaphore, different timing.		Check that sync state is 2 (Base direct)	Sync mode = 1 (Sync mode of base station = 3) Retest 2016-06-16 Ba: Sync mode = 2	Passed
		Check that the EUT synchronizes to the base station.	Remark: the EUT does not consider the distance to the base station.	Passed
c) Enable GPS.		Check that sync state is 0 (UTC direct)	UTC 09:20 Sync state = 0 There is a timing offset of 1s, resulting in 1/ 2 slot timing error. See Note) Retest 2016-06-16 Ba: UTC 13:11 The problem still exists Retest 2016-07-04 Ba: The timing is correct after enabling GPS	Passed

Note)
At a start of the EUT (Power on) with valid GPS the timing is correct. If the GPS is applied again after a phase without GPS there is an offset of 1 s (1 s too early, e.g. slot in Message 8 is 376 instead of 413). This seems to be reproducible, it happened in two tests.

5.2 12.2 Time division (frame format)

12.2.1 Purpose

The purpose of this test is to ensure that the EUT uses SOTDMA correctly.

12.2.2 Method of measurement

Set the EUT to maximum reporting interval of 5 s by applying a speed of >23 kn. Record VDL Messages and check for used slots. Check parameter slot number in CommState of position report. Check slot length (transmission time).

12.2.3 Required results

Slot number used and slot number indicated in CommState shall match. Slot number shall not exceed 2249. Slot length shall not exceed 26,67 ms.

2016-05-31	**Tester: Ba**	**Test details:** TDMA Synchronisation	
Test item	Check	Remark	Result
Operate the EUT with 5 s reporting interval (SOG > 23 kn).			
Slot number	Check that slot number used and slot number indicated in CommState match.		Passed
Slot count	Check that slot number does not exceed 2249.		Passed
Slot length	Check that slot length does not exceed 26,67 ms.		Passed

5.3 12.3 Synchronisation jitter

12.3.1 Definition

Synchronisation jitter (transmission timing error) is the time between nominal slot start as determined by the UTC synchronisation source and the initiation of the "transmitter on" function.

12.3.2 Purpose

The purpose of this test is to ensure that the synchronisation jitter is within the allowable tolerances.

12.3.3 Method of measurement

Set up standard test environment. Set the EUT to 5 s reporting interval using:

a) UTC direct synchronisation;

b) UTC indirect synchronisation by disconnecting the synchronisation source of the EUT.

Record VDL Messages and measure the time between the nominal beginning of the slot (Nominal T_0) and the start flag and calculate it back to T_0.

12.3.4 Required results

The synchronisation jitter shall not exceed:

a) ±104 µs using UTC direct synchronisation;

b) ±312 µs using UTC indirect synchronisation.

2016-05-24	**Tester: Ba**	**Test details:** Synchronisation jitter		
Test item		Check	Remark	Result
Operate the EUT with a reporting interval of 5 s (speed > 23 kn). Record the time T_2 using the VDL analyser and and calculate it back to T_0.				
a) UTC direct		Check that T_0 is in the range of +/- ±104 µs.	The timing is about 80 µs too late. Therefore some Messages are outside the limit Retest 2016-06-16 Ba: The timing is correct.	Passed
b) UTC indirect		Check that T_0 is in the range of +/- ±312 µs.	The timing is about 300 µs too late. Therefore some Messages are outside the limit Retest 2016-06-16 Ba: The timing is correct.	Passed

5.4 12.4 Data encoding (bit stuffing)

(See 7.2.3.6)

12.4.1 Purpose

The purpose of this test is to ensure that the EUT conforms to the data encoding requirements.

12.4.2 Method of measurement

Set up standard test environment.

Set ship's name to HEX-Values "7E 3B 3C 3E 7E" so that bit stuffing will be applied and check the VDL (note that this might require that the manufacturer provides means to input this data).

12.4.3 Required results

Confirm that transmitted VDL Messages 24A and 24B conform to data input.

Data in Hex	7E 3B 3C 3E 7E
Binary (Bytes)	01111110_00111010_00111100_00111110_01111110
Binary (6 bit)	011111_100011_101000_111100_001111_100111_1110xx _ # (< O ‘ 8
Name in 6 bit ASCII text (Table 47 of 1371)	_#(<O’8 (‘= 27h, Apostrophe) (xx bits set to 0
Binary (after 40 bit header)	xxxx01_111110_001110_100011_110000_111110_011111_10xxxx v > S h v O
Coded in 6 bit ASCII in VDM/ VDO (IEC 61162-1 Table C.1)	XXXXXXx**v>ShvO**x

Note: the ship's name does not affect message 24 B. Therefore there is no need to check 24 B.

2016-05-25	**Tester: Ba**	**Test details:** Data encoding (bit stuffing)		
Test item		Check	Remark	Result
Input name "_#(<O'8" to the EUT.				
Evaluate Message 24A		Check that the VDO is according to the ships name (sequence "v>ShvO").	VDO = "v>ShvO"	Passed
		Check that the VDM is according to the ships name (sequence "v>ShvO").		Passed
		Check that receiver shows name as "_#(<O'8".		Passed

5.5 12.5 Frame check sequence

12.5.1 Purpose

The purpose of this test is to ensure that the EUT rejects Messages with invalid CRC.

12.5.2 Method of measurement

Apply simulated position report Messages with wrong CRC bit sequence to the VDL.

a) Check test output; if a display interface is provided, check this.

b) Repeat test 12.1.2 and check that a station transmitting Messages with wrong CRC are not used for synchronisation.

12.5.3 Required results

Confirm that Messages with invalid CRC are not accepted by the EUT in cases a) and b).

2016-05-25	**Tester: Ba**	**Test details:** Frame check sequence		
Test item		Check	Remark	Result
Transmit position report message from VDL generator.				
a) Set CRC bit sequence to valid.		Check that the position reports are output as VDM on the PI port.		Passed
		If implemented: Check that the target is displayed on the MKD.	Not implemented	N/A
a) Set CRC bit sequence to wrong.		Check that the position reports are not output as VDM on the PI port.		Passed
		If implemented: Check that the target is not displayed on the MKD.	Not implemented	N/A
b) GPS disabled One AIS Class A with UTC direct, with incorrect CRC		Check that sync state is 3.		Passed
		Check that the EUT does not synchronize to the Class A station.		Passed
b) GPS disabled, One Class A without UTC and one base station as semaphore, both with incorrect CRC		Check that sync state is 3.		Passed
		Check that the EUT does not synchronize to the Class A station and to the base station.		Passed

5.6 12.6 Slot allocation (Channel access protocols)

5.6.1 12.6.1 Network entry

12.6.1.1 Method of measurement

Set up standard test environment; switch on EUT. Record transmitted scheduled position reports for the first 3 min of transmission after initialisation period. Check CommState for channel access mode.

12.6.1.2 Required results

EUT shall start autonomous transmissions of Message 18 (position report) with ITDMA CommState with Keep Flag set true for first minute of transmission and Message 18 with SOTDMA CommState thereafter.

2016-05-26	**Tester: Ba**	**Test details:** Channel access protocol	
Test item	Check	Remark	Result
Switch on EUT and record data with VDL analyser. Operate the EUT with 5 s reporting interval (speed > 23 kn).			
Initial message type	Check that the network entry is done with Message 18 with ITDMA comm state.		Passed
Keep flag	Check that the keep flag is set in the ITDMA comm state.		Passed
Slot offsets	Check that the slot offsets the ITDMA comm state are in the range 375 +/- 37.5= 337.5 … 412.5.		Passed
Slot use	Check that the allocated slots are used.		Passed
Comm state	Check that the Comm state is changed to SOTDMA after the first frame.		Passed
Timeout	Check that the timeout in the 2nd frame is between 2 and 6 (Decremented from initial 3…7).		Passed

5.6.2 12.6.2 Autonomous scheduled transmissions (SOTDMA)

12.6.2.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Record transmitted scheduled position reports Message 18 and check frame structure. Check CommState of transmitted messages for channel access mode and parameters number of received stations, slot timeout, slot number and slot offset.

b) Repeat the test with 50 % channel loading ensuring there are at least 4 free slots in each SI.

12.6.2.2 Required results

Check that

a) nominal reporting interval is achieved ±20 % (allocating slots in selection interval SI). Confirm that the EUT allocates new slots NTS within SI after 3 min to 8 min. Check that slot offset indicated in CommState matches slots used for transmission. Check that Class B "CS" are not included in the number of received stations. Check that during DSC monitoring periods there are no time out values of "0";

b) only free slots are used for transmission.

2016-05-26	**Tester: Ba**	**Test details:** Autonomous scheduled transmissions (SOTDMA)		
Test item		Check	Remark	Result
a) Record the VDL data of 10 frames operating with autonomously scheduled transmissions. Evaluate the following test items using the recorded data. Set the condition so that the reporting rate is 5 s (SOG > 23 kn).				
Reporting rate		Check that the reporting rate is 5 s, 12 messages per frame.		Passed
Nominal increment and selection interval		Check that the allocated slots match the nominal and selection interval of 5 s reporting interval.		Passed
Slot interval		Check that the slot intervals are in the range 187.5 +/- 37.5 = 150 … 225.		Passed
Timeout		Check that the timeout is counting down from 3...7 to 0.		Passed
Slots used		Check that the slots indicated in CommState match the slots used.		Passed
Slots allocated at timeout 0		Check that the slots are used in the next frame.		Passed
		Check the slot offset is 2250 +/-SI (2212.5...2287.5).		Passed
CommState sub message		Check that for timeout 3, 5, 7 the number of received stations is included.		Passed
		Check that Class B CS stations are not counted as received stations.		Passed
		Check that for timeout 2, 4, 6 the correct slot number is included.		Passed
		Check that for timeout 1 the correct value of UTC is included.		Passed
		Check that for timeout 0 the slot increment is included.		Passed

Alternating channels	Check that the position reports are transmitted on alternating channels.		Passed
b) Apply 50 % channel load on both channels			
Free slots	Check that only free slots are used for transmission		Passed

5.6.3 12.6.3 Autonomous scheduled transmissions (ITDMA)

12.6.3.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Set NavStatus of EUT to "at anchor" giving a reporting interval of 3 min. Record transmitted scheduled position reports.

12.6.3.2 Required results

Check that EUT transmits Message 18 with ITDMA CommState and allocates slots using ITDMA and that slot offset indicated in CommState matches slots used for transmission. Check that nominal reporting interval is achieved ±20 %.

2016-05-26	**Tester: Ba**	**Test details:** Autonomous scheduled transmissions (ITDMA)	
Test item	Check	Remark	Result
Record the VDL data of at least 20 frames operating with autonomously scheduled transmissions. Evaluate the following test items using the recorded data. Set the condition so that the reporting rate is 3 min (SOG < 2 kn).			
Reporting rate	Check that the reporting rate is 3 min.	See test 10.5.2.1	Passed
Message type	Check that ITDMA comm state is used.		Passed
Slot interval	Check that the slot intervals are 3 min +/- 20 %.		Passed
Slot increment	Check that the slot increment = 13500 +/- 10 %.		Passed
Number of slots	Check that the number of slots = 1 (value in comm state = 5).		Passed
Keep flag	Check that the keep flag = 0.		Passed
Alternating channels	Check that the position reports are transmitted on alternating channels.		Passed

5.6.4 12.6.4 Transmission of Messages 24A and 24B (ITDMA)

12.6.4.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Record transmitted messages.

12.6.4.2 Required results

Confirm that EUT transmits Messages 24A and 24B using the ITDMA access scheme. The SOTDMA CommState of Messages 18 shall, as far as possible, be changed to ITDMA CommState to allocate slots for Messages 24A and 24B.

2016-05-26	**Tester: Ba**	**Test details:** ITDMA transmission of Message 24		
Test item		Check	Remark	Result
Record the VDL data of at least 20 frames operating with autonomously scheduled transmissions. Set the condition so that the reporting rate is 30 s.				
Reporting interval		Check that the reporting rate of msg 24A and 24B is 6 min.	See also test 10.5.2.3	Passed
		Check that msg 24A and 24B are transmitted on the same channel.		Passed
Message type for allocation		Check that the comm state of 2 Message 18 are changed to ITDMA to allocate the slots for message 24 A and 24 B.		Passed
Number of slots		Check that the number of slots = 1 (value in commstate = 0).	Number of slots = 2 (value in commstate = 1). Retest 2016-06-16 Ba: Number of slots = 1 (value in commstate = 0).	Passed
Keep flag		Check that the keep flag = 1.		Passed
Slot allocation		Check that the slots allocated by Message 18 are used for T_X of Message 24A and 24 B.		Passed
Alternating channels		Check that the pairs of Message 24A and 24B are transmitted on alternating channels.		Passed

5.6.5 12.6.5 Assigned operation

(See 4.1.5, 7.3.4.3.3)

5.6.5.1 12.6.5.1 Message 16 with slot assignment

12.6.5.1.1 Purpose

The purpose of this test is to ensure that the EUT can be assigned to use specific slots.

12.6.5.1.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode (SOG <2 kn).

a) *Transmit an assigned mode command Message 16 to the EUT with initial slot offset and increment.*

b) *Increase speed to 25 kn while still assigned to a reporting interval of 10 s.*

c) *Every 3 min send further assignment Messages with the same slot assignment.*

d) *Transmit an assigned mode command Message 16 with a non-base station MMSI to the EUT with initial slot offset and increment.*

e) *Transmit an assigned mode command Message 16 to an MMSI different to the MMSI of the EUT with initial slot offset and increment.*

Record transmitted Messages.

12.6.5.1.3 Required results

Confirm that

a) *the EUT transmits a Message 18 in the designated slots. Check that the assigned mode flag is set to 1,*

b) *the EUT stays in assigned mode using the assigned slots,*

c) *the EUT continues in assigned mode when it receives a further assignment commands by Message 16. Verify that the slot timeout value is updated for every received Message 16,*

d) *the EUT ignores Message 16 and continues autonomous mode operation,*

e) *the EUT ignores Message 16 and continues autonomous mode operation. Confirm that the EUT reverts to autonomous mode with autonomous reporting interval 4 min to 8 min after the last Message 16.*

2016-05-26	**Tester: Ba**	**Test details:** Slot offset and increment		
Test item		Check	Remark	Result
a) Operate the EUT with SOG < 2 kn, autonomous reporting interval = 3 min. Apply an assignment Message 16 on channel A with offset to first assigned slot = 40 and slot increment parameter = 2 (increment = 375, interval = 10s).				
VDM output		Check VDM output of Message 16.		Passed
First message		Check that the first Message in assigned mode is sent 40 slots after Message 16.		Passed
Assigned mode flag		Check that the assigned mode flag is set to 1.		Passed
Initialisation phase (First frame)		Check that EUT continues after the first Message of the assigned mode with the network entry phase.	There is not slot allocation. This is acceptable because the slots are reserved by a base station	Passed
		Check that an ITDMA comm state is used.		Passed
Alternating channels		Check that position reports are transmitted alternating on channel A and B.		Passed
Increment		Check that the increment is 375 slots.		Passed
Timeout		Check that all slots of the first frame have the same timeout.		Passed
		Check that the timeout is between 3 and 7.		Passed
		Check that the timeout is decremented after 1 min.		Passed
CommState		Check that after the first frame a SOTDMA comm state is used.		Passed
b) Increase SOG to 25 kn (autonomous reporting interval = 5s)				
Mode		Check that the assigned mode continues.		Passed
c) Repeat Message 16 with same assignment every 3 min				
Mode		Check that the assigned mode continues.		Passed
Timeout		Check that the time-out value is updated for every received Message 16.		Passed
c) Stop transmission of Message 16				
End of assigned mode		Check that EUT reverts to autonomous mode after time-out (4…8 min after last received Message 16).		Passed
		Check that the assigned mode flag in autonomous mode is set to 0.		Passed
		Check that the Slot offset of all messages with time-out 0 is set to 0 to release the old slots.		Passed
		Check that EUT initialises autonomous mode like network entry.		Passed

d) Transmit Message 16 with slot assignment from a non-base station MMSI			
Mode	Check that the EUT ignores Message 16.		Passed
e) Transmit Message 16 with slot assignment addressed to an MMSI different to the EUT			
Mode	Check that the EUT ignores Message 16.		Passed

5.6.5.2 12.6.5.2 Message 16 with rate assignment

12.6.5.2.1 Purpose

The purpose of this test is to ensure that the EUT can be assigned reporting intervals.

12.6.5.2.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode (SOG <2 kn).

a) Transmit an assigned mode command Message 16 to the EUT with a designated reporting interval of 5 s.

b) Transmit an assigned mode command Message 16 to the EUT with the assigned reporting interval of 10 s.

c) Increase speed to 25 kn while still assigned to a reporting interval of 10 s.

d) Every 3 min send further assignment Messages with a reporting interval of 10 s.

e) Transmit an assigned mode command Message 16 to the EUT with a non-base station MMSI.

Record transmitted Messages.

12.6.5.2.3 Required results

Confirm that

a) the EUT transmits with the designated reporting interval of 5 s. Check that the assigned mode flag is set to 1,

b) the reporting interval is 10 s,

c) the EUT stays in assigned mode with a reporting interval of 10 s,

d) the EUT continues in assigned mode when it receives a further assignment commands by Message 16. Verify that the slot timeout value in the CommState is not updated by the received Message 16,

e) confirm that the EUT ignores Message 16 and continues autonomous mode operation. Confirm that the EUT reverts to autonomous mode with autonomous reporting interval 4 min to 8 min after the last Message 16.

2016-05-26	**Tester: Ba**	**Test details:** Rate assignment		
Test item		Check	Remark	Result
a) Operate the EUT with SOG < 2 kn, autonomous reporting interval = 3 min. Apply an assignment message 16 with offset = 120 (reporting interval = 5s).				
VDM output		Check VDM output of Message 16.		Passed
Assigned mode flag		Check that the assigned mode flag is set to 1.		Passed
Initialisation phase (First frame)		Check that EUT starts the assigned mode with a network entry phase.		Passed
		Check that an ITDMA comm state is used.		Passed
Alternating channels		Check that position reports are transmitted alternating on channel A and B.		Passed
Increment		Check that the reporting interval is 5 s.		Passed
Timeout		Check that the timeout of the first frame is between 3 and 7.		Passed
		Check that the timeout is decremented after 1 min.		Passed
CommState		Check that after the first frame a SOTDMA comm state is used.		Passed
b) Send an assignment message 16 with offset = 60 (reporting interval = 10s)				
Reporting interval		Check that the reporting interval is 10 s.	UTC 12:33	Passed
c) Increase SOG to 25 kn (autonomous reporting interval = 5s)				
Mode		Check that the assigned mode with 10 s interval continues.		Passed
d) Repeat Message 16 with same assignment every 3 min				
Mode		Check that the assigned mode continues.		Passed
Timeout		Check that the time-out values are not updated for every received Message 16.		Passed
d) Stop transmission of Message 16				
End of assigned mode		Check that reverts to autonomous mode after time-out (4…8 min).		Passed
		Check that the assigned mode flag in autonomous mode is set to 0.		Passed
		Check that the slots of the assigned mode schedule are released with time-out 0 and slot offset = 0.		Passed
		Check that EUT initialises autonomous mode like network entry.		Passed
e) Transmit Message 16 with rate assignment from a non-base station MMSI				
Mode		Check that the EUT ignores Message 16.		Passed

5.6.5.3 12.6.5.3 Assigned mode using invalid reporting rates

12.6.5.3.1 Method of measurement

Operate standard test environment and EUT in autonomous mode. Transmit an assigned mode command Message 16 using a base station MMSI to the EUT with

a) the number of reports per 10 min which is not a multiple of 20,

b) the number of reports per 10 min which is higher than 120.

12.6.5.3.2 Required results

Confirm that

a) the EUT transmits position reports Message 18 at a reporting rate that corresponds to the next highest multiple of 20 reports per 10 min,

b) the EUT transmits position reports Message 18 at a reporting interval of 5 s.

2016-05-26	**Tester: Ba**	**Test details:** Assigned Mode	
Test item	Check	Remark	Result
Send a Message 16 rate assignment with invalid offset values.			
a) Offset value = 110 (not a multiple of 20) EUT = destination ID A	Check that the reporting rate is 120/10min = 12/min = 5 s .	UTC 14:05	Passed
b) Offset value = 300 (> 120 messages/10 min) EUT = destination ID B	Check that the reporting interval is 5 s.	UTC 14:17	Passed

5.6.5.4 12.6.5.4 Slot assignment to FATDMA reserved slots

12.6.5.4.1 Definition

This test checks the operation of Message 16 assignment of slots reserved by Message 20.

12.6.5.4.2 Method of measurement

Set up the standard test environment and operate EUT in autonomous mode. Transmit a Data Link Management message (Message 20) using a base station MMSI to the EUT with slot offset and increment. Transmit an Assigned Mode Command (Message 16) using a base station MMSI to the EUT and command it to use one or more of those FATDMA allocated slots.

Record transmitted messages.

12.6.5.4.3 Required results

Confirm that the EUT uses the slots commanded by Message 16 for own transmissions.

2016-05-26	**Tester: Ba**	**Test details:** Slot assignment to FATDMA reserved slots	
Test item	Check	Remark	Result
Apply a Message 4 and 20 from VDL Generator with slot offset and increment for slot reservation: Offset = 23, slots = 5, time-out = 7, incr. = 25. Apply a Message 16 from VDL Generator assigning one or more of these reserved slots: Offset = 25, incr. = 5 (= 75 slots).			
R_x of Message 4	Check that Message 4 has been received by EUT (VDM output).		Passed
R_x of Message 20	Check that Message 20 has been received by EUT (VDM output).		Passed
Slot use	Check that slots assigned by the Message 16 are used by the EUT.		Passed

5.6.6 12.6.6 Group assignment

NOTE In the tests of the following subclauses use a base station MMSI to transmit Message 23 with a geographic region so that the EUT is inside this region, unless mentioned otherwise.

5.6.6.1 12.6.6.1 Entering interval assignment

12.6.6.1.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode with a reporting interval of 15 s (SOG = 15 kn). Perform the following tests after time-out of the previous test.

a) Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval of 30 s assigned.

b) Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval of 5 s assigned.

c) Using a non-base station MMSI, transmit a Group Assignment command (Message 23) to the EUT with a reporting interval of 5 s assigned.

d) Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval of 2 s assigned.

e) Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval field setting 9 (next shorter autonomous reporting interval).

f) Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval field setting 10 (next longer autonomous reporting interval).

Monitor the VDL.

12.6.6.1.2 Required result

Verify that

a) EUT enters assigned operation mode and transmits position report Message 18 with 30 s reporting interval. Verify that EUT builds up the assigned transmission scheduled according to the network entry procedure. Verify that unused slots of the previous reporting schedule are released. Verify that the EUT reverts to autonomous mode after a time out of 4 min to 8 min building up the autonomous transmission schedule according to the network entry procedure and releases unused slots from previous schedule.

b) EUT enters assigned operation mode and transmits position report Message 18 with 5 s reporting interval. Verify that EUT builds up the assigned transmission scheduled according to network entry procedure. Verify that unused slots of the previous reporting schedule are released. Verify that the EUT reverts to autonomous mode after a time out of 4 min to 8 min building up the autonomous transmission schedule according to the network entry procedure and releases unused slots from the previous schedule.

c) EUT does not react on Message 23.

d) EUT does not react on Message 23.

e) EUT enters assigned operation mode and transmits position report Message 18 with 5 s reporting interval.

f) EUT enters assigned operation mode and transmits position report Message 18 with 30 s reporting interval.

2016-05-27	**Tester: Ba**	**Test details:** Entering interval assignment		
Test item		Check	Remark	Result
a) Operate the EUT with an autonomous reporting interval of 15 s. Apply a group assignment Message 23 with a reporting interval of 30 s (value 5).				
VDM output		Check VDM output of Message 23.	UTC 11:25	Passed
Initialisation phase		Check that EUT starts immediately with rescheduling to the new reporting rate.		Passed
Assigned mode flag		Check that Assigned mode flag = 1.		Passed
Reporting rate		Check that the reporting interval = 30 s.		Passed
Alternating channels		Check that position reports are transmitted alternating on channel A and B.		Passed
Slot deallocation		Check that the slot of the autonomous reporting interval are released using time-out = 0 and slot offset = 0.		Passed
Initialisation/ Slot allocation		Check that the slots of the assigned reporting interval are allocated according to the network entry procedure.		Passed
Timeout		Check that the assigned timeout is between 2 and 6 in the next frame.		Passed
End of assigned mode		Check that the EUT reverts to autonomous mode after 4…8 min.		Passed
b) Apply a group assignment message 23 with a reporting interval of 5 s (value 8).				
VDM output		Check VDM output of Message 23.	UTC 11:44	Passed
Initialisation phase		Check that EUT starts immediately with rescheduling to the new reporting rate.		Passed
Assigned mode flag		Check that Assigned mode flag = 1.		Passed
Reporting rate		Check that the reporting interval = 5 s.		Passed
Alternating channels		Check that position reports are transmitted alternating on channel A and B.		Passed
Slot deallocation		Check that the slot of the autonomous reporting interval are released using time-out = 0 and slot offset = 0.		Passed
Initialisation/ Slot allocation		Check that the slots of the assigned reporting interval are allocated according to the network entry procedure.		Passed
Timeout		Check that the assigned timeout is between 2 and 6 in the next frame.		Passed
End of assigned mode		Check that the reverts to autonomous mode after 4…8 min.		Passed

c) Apply a group assignment message 23 with a reporting interval of 5 s (value 8) from a non-base station MMSI.			
Mode	Check that the EUT ignores message 23.	UTC 11:40	Passed
d) Apply a group assignment message 23 with a reporting interval of 2 s (value 11).			
Mode	Check that the EUT ignores message 23.	UTC 11:38	Passed
e) Apply a group assignment message 23 with reporting interval = next shorter interval (value 9).			
VDM output	Check VDM output of Message 23.	UTC 11:56	Passed
Mode	Check that the EUT enters assigned mode.		Passed
Reporting interval	Check that the reporting interval = 5 s.		Passed
f) Apply a group assignment message 23 with reporting interval = next longer interval (value 10).			
VDM output	Check VDM output of Message 23.	UTC 12:04	Passed
Mode	Check that the EUT enters assigned mode.		Passed
Reporting interval	Check that the reporting interval = 30 s.		Passed

5.6.6.2 12.6.6.2 Assignment by region

12.6.6.2.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode with a reporting interval of 15 s and use a base station MMSI to transmit Message 23.

a) Transmit a Group Assignment command (Message 23) to the EUT (define station type 0 and geographic region so that the EUT is inside this region). Set the reporting rate to 5 s and apply message to VDL.

b) Transmit a Group Assignment command (Message 23) to the EUT (define station type 0 and geographic region so that the EUT is outside this region). Set the reporting rate to 5 s and apply message to VDL.

12.6.6.2.2 Required result

Verify that

a) EUT switches to assigned mode and transmits position reports with 5 s interval. Verify that EUT reverts to normal operation mode after timeout period,

b) EUT declines Message 23.

2016-05-27	**Tester: Ba**	**Test details:** Assignment by region		
Test item		Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode. Operate the EUT with a reporting interval is 15 seconds (SOG = 15 kn).				
a) Transmit Message 23, EUT inside region (Reporting interval value = 8 = 5s)		Check that Message 23 is received (VDM output).		Passed
		Check that the EUT enters assigned mode.		Passed
		Check that the reporting interval is changed to 5 s.		Passed
		Verify that EUT reverts to normal operation mode after 4... 8 min.		Passed
EUT outside the addressed region				
Transmit Message 23, EUT outside region (Reporting interval = 5 s)		Verify that EUT declines Message 23. Reporting interval = 15 s.		Passed

5.6.6.3 12.6.6.3 Assignment by station type

12.6.6.3.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode with a reporting interval of 15 s and transmit Message 23 with a reporting interval of 5 s.

a) Transmit a Group Assignment command with a station type to 0 (all stations).

b) Transmit a Group Assignment command with a station type to 1 (Class A).

c) Transmit a Group Assignment command with a station type to 2 (All Class B).

d) Transmit a Group Assignment command with a station type to 3 (SAR aircraft).

e) Transmit a Group Assignment command with a station type to 4 (Class B SO).

f) Transmit a Group Assignment command with a station type to 5 (Class B CS).

g) Transmit a Group Assignment command with a station type to 6 (Inland AIS).

12.6.6.3.2 Required result

Verify that

a) EUT switches to assigned mode with 5 s reporting interval,

b) EUT declines Message 23,

c) EUT switches to assigned mode with 5 s reporting interval,

d) EUT declines Message 23,

e) EUT switches to assigned mode with 5 s reporting interval,

f) EUT declines Message 23,

g) EUT declines Message 23.

2016-05-27	**Tester: Ba**	**Test details:** Assignment by station type		
Test item		Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode. Apply sensor information in that way that reporting interval is 15 s (SOG = 15 kn). Transmit Message 23 with different station types according to the test item, Type of ship and cargo = 0, Reporting interval = 5 s, position of EUT inside the addressing area.				
a) Station type = 0		Check that EUT enters assigned mode.		Passed
		Check reporting interval = 5 s.		Passed
Transmit Message 23 with different station types according to the test item,				
b) Station type = 1 (Class A),		Check that Message 23 is ignored.	UTC 13:05	Passed
		Check reporting interval = 15 s.		Passed
c) Station type = 2 (all types of Class B mobile stations),		Check that EUT enters assigned mode.	UTC 13:07	Passed
		Check reporting interval = 5 s.		Passed
d) Station type = 3 (SAR airborne mobile station),		Check that Message 23 is ignored.		Passed
		Check reporting interval = 15 s.		Passed
e) Station type = 4 (Class B SO mobile stations only),		Check that EUT enters assigned mode.	UTC 13:19	Passed
		Check reporting interval = 5 s.		Passed
f) Station type = 5 (Class B CS mobile stations only),		Check that Message 23 is ignored.	UTC 13:06	Passed
		Check reporting interval = 15 s.		Passed
g) Station type = 6 (Inland Waterways)		Check that Message 23 is ignored.		Passed
		Check reporting interval = 15 s.		Passed

5.6.6.4 12.6.6.4 Addressing by ship and cargo type

12.6.6.4.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode with a reporting interval of 15 s and use a base station MMSI to transmit Message 23.

a) Transmit a Group Assignment command (Message 23) to the EUT. Set the reporting interval to 5 s and the ship and cargo value to the value which is configured in the EUT.

b) Transmit a Group Assignment command (Message 23) to the EUT. Set the reporting interval to 5 s and the ship and cargo value to a value different to the value which is configured in the EUT.

c) Configure the ship and cargo type of the EUT to 72. Transmit a Group Assignment command (Message 23) to the EUT. Set the reporting interval to 5 s and the ship and cargo type value to 70.

12.6.6.4.2 Required result

Verify that

a) EUT switches to assigned mode and transmits position reports with 5 s reporting interval,

b) EUT declines Message 23,

c) EUT switches to assigned mode and transmits position reports with 5 s reporting interval.

2016-05-27	**Tester: Ba**	**Test details:** Addressing by ship and cargo type		
Test item		Check	Remark	Result
Operate EUT in autonomous mode with 15 s reporting interval (SOG = 15 kn). Set EUT to ship and cargo type =36. Set station type of Message 23 = 0, reporting interval = 5s and position of EUT inside the addressing area.				
Transmit Message 23 Ship and cargo type = 36		Check that EUT enters assigned mode.	UTC 13:27	Passed
		Check reporting interval = 5 s.		Passed
Transmit Message 23 Ship and Cargo type not 36		Check that Message 23 has been received (VDM output).	UTC 13:26	Passed
		Check that message 23 is ignored and the reporting interval is 15 s.		Passed
Set EUT to ship and cargo type = 72				
Transmit Message 23 Ship and Cargo type = 70		Check that EUT enters assigned mode.	UTC 19:33	Passed
		Check reporting interval = 5 s.		Passed

5.6.6.5 12.6.6.5 Quiet time command

12.6.6.5.1 Method of measurement

Set up the standard test environment and operate EUT in autonomous mode with 15s reporting interval.

Transmit a Group Assignment message (Message 23) to the EUT with a quiet time command.

Record transmitted messages.

12.6.6.5.2 Required results

Confirm that the EUT continues transmission for one frame to release the allocated slots and then stops transmission. Confirm that the EUT starts transmission after the quiet time according to the network entry procedure. The quiet time period starts with the reception of Message 23.

2016-05-27	**Tester: Ba**	**Test details:** Addressing by ship and cargo type		
Test item		Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode with 15 s reporting interval (SOG = 15 kn).				
Transmit Message 23 EUT inside area, station type = 0 Quiet time = 8 min		Check that EUT releases all slots with time-out = 0 and Slot offset = 0.	UTC 13:38	Passed
		Check that the EUT stops transmission after one frame.		Passed
After end of quiet time		Check that the EUT starts transmission after end of quiet time.	UTC 13:47	Passed
		Check that the EUT starts transmission with a network entry procedure.		Passed

5.6.6.6 12.6.6.6 Reverting from interval assignment

12.6.6.6.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Transmit a Group Assignment command (Message 23) to the EUT with a reporting interval of 5 s assigned. Monitor the VDL until at least 1 min after timeout occurred. Repeat 10 times (transmissions of Message 23 shall not be synchronised to the initial transmission schedule of the EUT).

Measure the time T_{rev} between the reception of Message 23 and the first transmission after timeout.

12.6.6.6.2 Required result

Verify that the time out is randomly distributed between 4 min and 8 min.

2016-05-30	**Tester: Ba**	**Test details:** Reverting from interval assignment		
Test item		Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode with 15 s reporting interval. Repeat the following test 10 times				
Transmit Message 23 EUT inside area, station type = 0 Reporting interval = 5 s		Check that Message 23 has been received. Record R_x time		Passed
		Check that EUT transmits position reports with reporting interval of 5 s.		Passed
End of assigned mode		Check that the slots of the assigned reporting interval are released using time-out = 0 and slot offset = 0		Passed
		Check that the slot of the autonomous reporting interval (15 s) are allocated according to the network entry procedure		Passed
After 10 times group assignment				
Time-out		Check that the time-out time is randomly distributed between 4 and 8 minutes	Test 2016-06-01 Ba: 40 group assignments have been evaluated	Passed

5.6.6.7 12.6.6.7 Assignment priority test – Message 16 and 23

12.6.6.7.1 Purpose

The purpose of this test is to ensure that the EUT selects the correct assignment Message when given both addressed and group assignments.

12.6.6.7.2 Method of Measurement

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

a) Transmit a Message 23, addressed to the EUT, to assign a reporting interval of 15 s. Check that the EUT reporting interval is 15 s. Transmit a Message 16, addressed to the EUT, assigning a reporting interval of 10 s while still assigned by Message 23.

b) Transmit a Message 16, addressed to the EUT, to assign a reporting interval of 15 s. Check that the EUT reporting interval is 15 s. Transmit a Message 23, addressed to the EUT, assigning a reporting interval of 10 s while still assigned by Message 16.

12.6.6.7.3 Required result

Confirm that:

a) the EUT adopts the reporting interval of Message 16;

b) the EUT continues with the reporting interval of Message 16.

2016-05-30	**Tester: Ba**	**Test details:** Assignment priority – Message 16 and 23	
Test item	Check	Remark	Result
a) Operate EUT in autonomous mode, reporting interval = 30 s			
Transmit Message 23 with reporting interval = 15 s	Verify that EUT enters assigned mode with 15 s reporting interval.	UTC 06:42	Passed
During assigned mode: Transmit Message 16 with 10 s reporting interval	Check that EUT changes the reporting interval to 10 s.	UTC 06:45	Passed
b) Message 23 during Message 16 assignment			
Transmit Message 16 with reporting interval = 15 s	Verify that EUT enters assigned mode with 15 s reporting interval.	UTC 06:55	Passed
During assigned mode: Transmit Message 23 with 10 s reporting interval	Check that EUT continues with 15 s reporting interval.	UTC 06:56	Passed

5.6.6.8 12.6.6.8 Assignment priority test – Message 22 and 23

12.6.6.8.1 Purpose

The purpose of this test is to ensure that the EUT selects the correct assignment Message when given group assignments by Messages 22 and 23.

12.6.6.8.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Transmit a Message 22 defining a region with the EUT inside that region Tx/Rx mode = 0.

a) Transmit an Assigned mode command (Message 23) to the EUT with Tx/Rx mode 1.

b) Transmit Message 22 to the EUT with regional settings specifying Tx/Rx mode 2.

c) Transmit an Assigned mode command (Message 23) to the EUT with Tx/Rx mode 1.

d) During assigned mode transmit a Message 22 to the EUT individually addressed and specifying Tx/Rx mode 2.

e) Within 10 min transmit a Message 22 with regional area settings specifying Tx/Rx mode 0.

f) Transmit an Assigned mode command (Message 23) to the EUT with Tx/Rx mode 1 every min for 15 min.

g) After timeout of the last Message 23 transmit a Message 22 with regional settings specifying Tx/Rx mode 0.

Record transmitted messages.

12.6.6.8.3 Required result

The following results are required.

a) Check that Tx/Rx mode = 1. The Tx/Rx mode field setting of Message 23 takes precedence over the Tx/Rx mode field setting of Message 22.

b) Check that Tx/Rx mode = 1. The EUT reverts to the Tx/Rx mode = 2 defined by Message 22 after the timeout of Message 23.

c) Verify that Tx/Rx mode = 1.

d) Check that Tx/Rx mode = 2. The Tx/Rx mode field setting of Message 22 takes precedence over the Tx/Rx mode field setting of Message 23.

e) Check that Tx/Rx mode = 2. The Tx/Rx mode setting of Message 22 are ignored.

f) Check that the Tx/Rx mode remains at 2 min for 10 min after applying Message 22. Check that the Tx/Rx mode is changed to 1 when receiving Message 23 later than 10 min after Message 22. Check that after timeout of the last Message 23 the Tx/Rx mode reverts to 2 according to the individually addressed Message 22.

g) Check that Tx/Rx mode = 0. The Tx/Rx mode setting of Message 22 are accepted.

2016-05-30	**Tester: Ba**	**Test details:** Assignment priority – Message 22 and 23		
Test item		Check	Remark	Result
Operate EUT in autonomous mode with 15 s reporting interval. Apply a channel management area with Tx/Rx mode = 0. Test for priority of Message 22 to an area				
a) Transmit Message 23 with Tx/Rx mode = 1.		Verify that Message 23 is received and content is correct.	UTC 08:21 Retest 2016-06-16 Ba: UTC 10:55	Passed
		Check that reporting interval is 15 s on channel A (Tx/Rx mode = 1).		Passed
b) Transmit Message 22 with Tx/Rx mode = 2.		Verify that Message 22 is received (ACA output).	UTC 08:23 There is a NAK output Note) The Tx/Rx mode 2 shall be accepted and stored but not yet used before time-out of Message 23 group assignment.	Passed
		Check T_x/R_x mode = 1 as defined by Message 23.	Retest 2016-06-16 Ba: UTC 10:57 Tx/Rx mode = 1	Passed
Wait for Assigned mode time-out.		Check that reporting rate = autonomous reporting rate.		Passed
		Check T_x/R_x mode = 2 =mode of Message 22 (T_x on channel B).	Tx/Rx mode = 0 Retest 2016-06-16 Ba: UTC 11:01 Tx/Rx mode = 2	Passed
Test for priority of Message 22 individually addressed				
c) Transmit Message 23 with T_x/R_x mode = 1.		Verify that Message 23 is received and content is correct.		Passed
		Confirm that EUT transmit position reports on channel A with 15 s reporting interval (Tx/Rx mode = 1).		Passed
d) Transmit Message 22 individually addressed (MMSI) with T_x/R_x mode = 2.		Verify that Message 22 is received and content is correct.		Passed
		Check T_x/R_x mode = 2 = mode of Message 22 (T_x on channel B).		Passed
		After receiving Message 22 all messages in the frame are shifted by 1 slot (e.g. from 266 to 267). This could be reproduced in a repetition of the test. Retest 2016-06-16 Ba: The slots are not shifted		Passed
e) Within 10 min transmit Message 22 to an area with T_x/R_x mode 0.		Verify that Message 22 is received and content is correct.		Passed
		Check that Tx/Rx mode = 2, the mode of Message 22 is ignored.		Passed

f) Transmit Message 23 with T_x/R_x mode 1 every minute for 15 min.	Verify that Message 23 is received and content is correct.		Passed
	Check that Message 23 is ignored for the first 10 minute.		Passed
	Confirm that EUT changes to Tx/Rx mode 1 after 10 minutes.		Passed
Wait for Assigned mode time-out.	Check that reporting rate = autonomous reporting rate.		Passed
	Check T_x/R_x mode = 2 = mode of Message 22 (T_x on channel B).		Passed
g) Transmit Message 22 to an area with Tx/Rx mode = 0.	Verify that Message 22 is received (ACA output).		Passed
	Check T_x/R_x mode = 0.		Passed
	After receiving Message 22 all messages in the next 3 frames are shifted by 1 slot (e.g. from 1180 to 1181 to 1182). This could be reproduced in a repetition of the test. Retest 2016-06-16 Ba: The slots are not shifted		Passed

5.6.7 12.6.7 Base station reservations

12.6.7.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode with 5 s reporting interval (SOG = 25 kn). Apply a Message 4 to the VDL using a base station MMSI.

a) Transmit a Data Link Management message (Message 20) on Channel A from a Base Station within 120 NM to the EUT with slot offset = 5 and increment = 10. Record transmitted messages.

b) Repeat the test with a Base Station beyond 120 NM.

c) Repeat the test without Base Station Report (Message 4).

d) Repeat the test reserving 100 % of the slots.

e) Repeat the test with a Base Station within 120 NM and maintain transmission of Message 20. Stop transmission Message 4.

f) Repeat test a) using a non-base station MMSI.

12.6.7.2 Required results

The following results are required.

a) For the Base Station within 120 NM, confirm that EUT does not use slots allocated by Message 20 for own transmissions until timeout of 4 min to 8 min. Confirm that the EUT does not use the same slots on Channel B.

b) For the Base Station beyond 120 NM confirm that the EUT treats the slots as free.

c) Confirm that the EUT treats the slots as free.

d) Confirm that the EUT stops transmission.

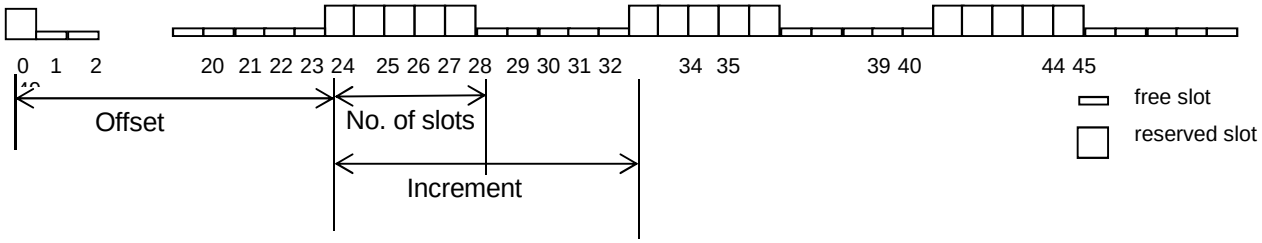
e) Confirm that the EUT ignores the slot reservations of a Message 20 which is received after the normal target time-out of Message 4.

f) Confirm that the EUT treats the slots as free.

Test scenario:
Message 20 is transmitted in slot 0 of each frame
Message 20 parameters:

Offset number 1:	25
Number of slots:	5
Time out 1:	7
Increment:	10

FATDMA reservation:



2016-05-30	**Tester: Ba**	**Test details:** FATDMA reserved slots		
Test item		Check	Remark	Result
Operate EUT with 5 s reporting interval (SOG = 25 kn) according to the description below.				
a) Transmit base station report Message 4 with distance < 120 NM. Transmit Message 20 for 5 frames on channel B with slot reservations.		Check that the reserved slots on channel B are not used by the EUT.	UTC 09:42	Passed
		Check that the reserved slots on channel A are not used because of priority rules.		Passed
After time-out of Message 20 of 4…8 minutes.		Check that all slots are used again.		Passed
b) Repeat test with base station distance > 120 NM.		Check that all slots are used.	UTC 10:26	Passed
c) Repeat test without Message 4.		Check that all slots are used.	UTC 11:13	Passed
d) Repeat test with 100% slot reservation.		Check that EUT stops transmission.	UTC 11:38 Tx on the reservation channel is stopped	Passed
e) Transmit Message 4, distance < 120 NM, and Message 20 with slot reservation.		Check that the reserved slots are not used.		Passed
Stop message 4, Continue Message 20.		Check that messages 20 which are received after normal target time-out of Message 4 are ignored and all slots are used.		Passed
f) Repeat test a) using a non-base station MMSI.		Check that the reservation is ignored and all slots are used.	UTC 10:59	Passed

5.7 12.7 Message formats

5.7.1 12.7.1 Received messages

(See 7.6)

12.7.1.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Apply messages according to Table 8 to the VDL including multiple slot messages up to 5 slots. Record messages output by the PI of EUT.

12.7.1.2 Required results

Confirm that EUT outputs corresponding message with correct field contents and format via the PI or responds as appropriate.

For the VDM frame the following items shall be checked:

Field	Value for single sentence	Values for multi sentences
Number of sentences	1	Number of sentences
Check sentence number	1	1, 2, …
Sequential message identifier	Null field	0…9, counting up for each multi sentence group
Channel	A, B	
Fill bits	Depending on message type, in most cases 0	

2016-05-31	**Tester: Ba**	**Test details:** Received messages		
Test item		Check	Remark	Result
Apply all Messages of table 8 to the VDL. Evaluate the VDM output				
Message 1		Check single sentence frame.		Passed
		Check message content.		Passed
Message 2		Check single sentence frame.		Passed
		Check message content.		Passed
Message 3		Check single sentence frame.		Passed
		Check message content.		Passed
Message 4		Check single sentence frame.		Passed
		Check message content.		Passed
Message 5		Check multi (2) sentence frame.		Passed
		Check message content.		Passed
Message 6 Addressed to EUT		Check single sentence frame.		Passed
		Check message content.		Passed
Message 6 Addressed to other station		Check that there is no VDM output.		Passed
Message 7 Addressed to EUT		Check single sentence frame.		Passed
		Check message content.		Passed
Message 7 Addressed to other station		Check that there is no VDM output.		Passed
Message 8		Check single sentence frame.		Passed
		Check message content.		Passed

Message 9	Check single sentence frame.		Passed
	Check message content.		Passed
Message 10	Check that there is no VDM output.		Passed
Message 11	Check single sentence frame.		Passed
	Check message content.		Passed
Message 12 Addressed to EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 12 Addressed to other station	Check that there is no VDM output.		Passed
Message 13 Addressed to EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 13 Addressed to other station	Check that there is no VDM output.		Passed
Message 14 Single slot	Check single sentence frame.		Passed
	Check message content.		Passed
Message 15 EUT as destination	Check single sentence frame.		Passed
	Check message content.		Passed
Message 15 EUT is not destination	Check that there is no VDM output.	There is a VDM output	Passed
Message 16 Addressed to EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 16 Addressed to other station	Check that there is no VDM output.	There is a VDM output	Passed
Message 17	Check multi (2) sentence frame.		Passed
	Check message content.		Passed
Message 18	Check single sentence frame.		Passed
	Check message content.		Passed
Message 19	Check single sentence frame.		Passed
	Check message content.		Passed
Message 20	Check single sentence frame.		Passed
	Check message content.		Passed
Message 21	Check single or multi sentence frame.	Single sentence	Passed
	Check message content.		Passed
Message 22 for an area	Check single sentence frame.		Passed
	Check message content.		Passed
Message 22 Addressed to the EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 22 Addressed to other station	Check that there is no VDM output.	There is a VDM output	Passed
Message 23	Check single sentence frame.		Passed
	Check message content.		Passed
Message 24 A	Check single sentence frame.		Passed
	Check message content.		Passed
Message 24 B	Check single sentence frame.		Passed
	Check message content.		Passed

Message 25 Broadcast	Check single sentence frame.		Passed
	Check message content.		Passed
Message 25 Addressed to EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 25 Addressed to other station	Check that there is no VDM output.	There is a VDM output Retest 2016-06-16 Ba: There is no VDM	Passed
Message 26 Broadcast	Check single sentence frame.		Passed
	Check message content.		Passed
Message 26 Addressed to EUT	Check single sentence frame.		Passed
	Check message content.		Passed
Message 26 Addressed to other station	Check that there is no VDM output.	There is a VDM output Retest 2016-06-16 Ba: There is no VDM	Passed
Message 26 Maximum length (1064 bit)	Check multi sentence frame.	There is no VDM output Retest 2016-06-16 Ba: There is a VDM output	Passed
	Check message content.		Passed
Message 27	Check that there is no VDM output.		Passed
Message of undefined type	Check single sentence frame.		Passed
	Check message content.		Passed

5.7.2 12.7.2 Transmitted messages

12.7.2.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Initiate the transmission of messages relevant for a mobile station according to Table 8 by the EUT.

Record transmitted messages.

12.7.2.2 Required results

Confirm that EUT transmits messages with correct field contents and format or responses as defined in Table 8.

For the VDM frame the following items shall be checked:

Field	Value for single sentence	Values for multi sentences
Number of sentences	1	Number of sentences
Check sentence number	1	1, 2, …
Sequential message ident.	Null field	0…9, counting up for each multi sentence group
Channel	A, B	
Fill bits	Depending on message type, in most cases 0	

The messages not listed in the following table cannot be transmitted by a Class B SO.

2016-06-02	**Tester: Ba**	**Test details:** Transmitted messages		
Test item		Check	Remark	Result
Apply all Messages of table 8 to the VDL. Evaluate the VDM output				
Message 6		Check single sentence frame.	See test 10.2.2.1	Passed
Apply ABM sentence		Check message content.		Passed
Message 7		Check single sentence frame.	See test 10.2.2.3	Passed
Apply Msg 6 to VDL		Check message content.		Passed
Message 8		Check single sentence frame.	See test 10.2.2.4	Passed
Apply BBM sentence		Check message content.		Passed
Message 13		Check single sentence frame.	See test 10.2.2.3	Passed
Apply Msg 12 to the VDL		Check message content.		Passed
Message 18		Check single sentence frame.	See test 10.2.1.1	Passed
Automatically transmitted		Check message content.		Passed
Message 19		Check multi (2) sentence frame.	Single sentence	Passed
Apply Msg 15 interrogation on VDL		Check message content.	See test 10.2.3	Passed
		Check message content.		Passed
Message 24 A		Check single sentence frame.	See test 12.6.4	Passed
Automatically transmitted		Check message content.		Passed
Message 24 B		Check single sentence frame.	See test 12.6.4	Passed
Automatically transmitted		Check message content.		Passed
Message 25 broadcast		Check single sentence frame.	See test 10.2.2.4	Passed
Apply BBM sentence		Check message content.		Passed
Message 25 addressed		Check single sentence frame.	See test 10.2.2.1	Passed
Apply ABM sentence		Check message content.		Passed
Message 26 broadcast		Check single sentence frame.	See test 10.2.2.4	Passed
Apply BBM sentence		Check message content.		Passed
Message 26 addressed		Check single sentence frame.	See test 10.2.2.1	Passed
Apply ABM sentence		Check message content.		Passed

6 13 Specific tests of network layer

6.1 13.1 Regional area designation by VDL Message

13.1.1 Purpose

The purpose of this test is to ensure that the EUT transmits on the correct channels when transiting adjacent regional areas.

13.1.2 Method of measurement

Set up the standard test environment.

a) *With no Message 4. Apply channel management messages (Message 22) to the VDL defining two adjacent regional areas, 1 and 2, with different channel assignments for both regions and a transitional zone extending 4 NM either side of the regional boundary,*

b) *With a Base Station within 120 NM transmitting Message 4. Apply the same channel management Messages as in a). Make the EUT approach region 1 from outside region 2 more than 5 NM away from the region boundary, transmitting on default channels. Record transmitted Messages on all 6 channels. This can be accomplished by either using a dedicated test input for simulated position information or a GNSS simulator*

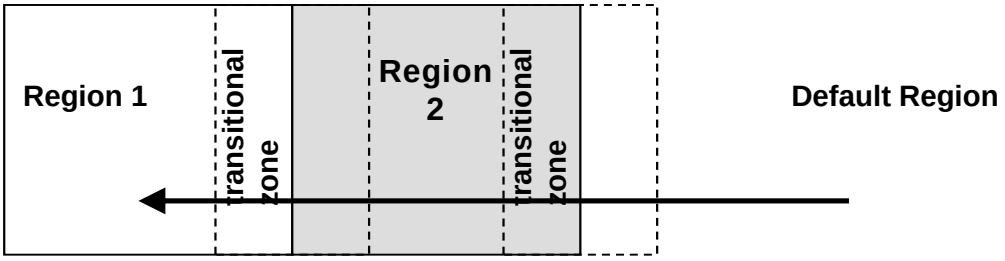


Figure 11 – Regional transitional zones

Table 14 – Regional area scenario

	Primary channel	***Secondary channel***
Region 1	*CH A 1*	*CH B 1*
Region 2	*CH A 2*	*CH B 2*
Default region	*AIS 1*	*AIS 2*

c) Operate the unit in an area with Tx/Rx mode 1.

d) Operate the unit in an area with Tx/Rx mode 2.

e) Transmit Message 22 using a non-base station MMSI.

13.1.3 Required results

The following results are required.

a) Check that the channel management regions are not stored and not used by the EUT.

b) Check that the EUT transmits and receives on the primary channels assigned for each region, alternating channels and halving the reporting interval when passing through the transitional zones (see Table 15). Check that the EUT reverts to default autonomous operation on the regional channels after leaving the transitional zones. Check that TXT and ACA sentences are output when defining the area, crossing the boundary of the area and on request. The In-use flag shall be set to "1" if the position is inside the area which is defined by the two corner points of the area setting (e.g. the grey area defining region 2 in Figure 11).

Table 15 – Required channels in use

	Area	***Channels in use***
1	*Default region*	*AIS 1, AIS 2*
2	*First transitional zone*	*AIS 1, CH A 2*
3	*Region 2*	*CH A 2, CH B 2*
4	*Second transitional zone*	*CH A 2, CH A 1*
5	*Region 1*	*CH A 1, CH B 1*

c) Check that the EUT transmits on only channel A with the nominal reporting interval (the number of transmissions doubles on the active channel when transmitting on one channel only).

d) Check that the EUT transmits on channel B only with the nominal reporting rate.

e) When using a non-base station MMSI, verify that the EUT does not accept the channel management.

2016-05-31	**Tester: Ba**	**Test details:** Check of message 22 acceptance		
Test item		Check	Remark	Result
Transmit message 22 with a new area settings for area 1 and 2				
a) Transmit message 22 from a base station not transmitting message 4		Check that the area setting is not stored	UTC 08:15	Passed
Transmit message 22 from a base station transmitting message 4, distance > 120 NM		Check that the area setting is not stored		Passed
e) Transmit message 22 from a base station transmitting message 4, distance < 120 NM MMSI of message 4 and 22 is a non-base station MMSI		Check that the area setting is not stored		Passed

Test b) is performed in 2 parts:

- The first part checks the general behaviour including check of ACA and TXT output, check of the borders of area a transitional zone, check of the correct frequency use.

2016-05-31	**Tester: Ba**	**Test details:** b) Part 1 - Channel management by VDL message 22		
Test item		Check	Remark	Result
Set up EUT in autonomous mode transmitting on channel AIS 1/AIS 2, apply 2 Messages 22 on the VDL, defining 2 adjacent areas with channels A 1, B 1 and A 2, B 2. *The position is outside of both areas.*				
PI output		Check that the Messages 22 are output as VDM on PI.		Passed
		Check ACA and TXT output on PI when the areas are stored.		Passed
		Check ACA and TXT output on PI on request.		Passed
Item 1: Position in high sea area		Check that channels AIS 1 and AIS 2 are in use.		Passed
Item 2: Move position into outer TZ of region 2		Check the limit of the TZ (5 NM = 8.8 minutes).	UTC 11:42	Passed
		Check that channels AIS 1 and A 2 are used.		Passed
		Check that reporting rate is doubled.		Passed
Item 3: Move position into inner TZ of region 2 (crossing the area border)		Check ACA and TXT output.	UTC 11:55	Passed
		ACA: check in use flag of area 2 = 1.		Passed
		ACA: check time of in use flag.		Passed
		Check the border of area.		Passed
Item 4: Move position into region 2 (out of TZ)		Check the limit of the TZ (4 NM = 7 minutes).		Passed
		Check that channels A 2 and B 2 are used.		Passed
		Check that reporting rate is changed back to normal reporting rate.		Passed
Item 5: Move position into TZ between region 1 and 2, inside area 2		Check that channels A 2 and A 1 are used.	UTC 12:09	Passed
		Check the limit of the TZ (4 NM = 7 minutes).		Passed
		Check that reporting rate is doubled.		Passed
Item 6: Move position into area 1 (inside the TZ) (crossing the area border)		Check ACA and TXT output.	UTC 12:14	Passed
		Check the border of area.		Passed
Item 7: Move position into region 1 (out of TZ)		Check that channels A 1 and B 1 are used.	UTC 12:17	Passed
		Check the limit of the TZ (4 NM = 7 minutes).		Passed
		Check that reporting rate is changed back to normal reporting rate.		Passed

Item 8: Move position into TZ of region 1 to high sea	Check that channels A 1 and AIS 1 are used.	UTC 12:20	Passed
	Check that reporting rate is doubled.		Passed
Item 9: Move position out of area 1 (inside the TZ) (crossing the area border)	Check ACA and TXT output.	UTC 12:23	Passed
	Check the border of area.		Passed
Move position out of the TZ, into high sea	Check that channels AIS 1 and AIS 2 are used.	UTC 12:25	Passed
	ACA: check in use flags of area 1 = 0 and time of in use flag.		Passed
	Check that reporting rate is changed back to normal reporting rate.		Passed

- The second part concentrates on the correct slot allocation and usage during a transition from one (high sea) area into another on the different channels.

2016-05-31	**Tester: Ba**	**Test details:** b) Part 2 - Channel management by VDL message 22	
Test item	Check	Remark	Result
The same area and movement is used as in test part 1.			
Item 1: In high sea area	Check that channels AIS 1 and AIS 2 are in use.		Passed
Item 2: Move position into transitional area of region 2, first frame after transition	Check that EUT continues T_X on AIS 1 and AIS 2 for 1 frame.	Retest 2016-07-04 The EUT activates Alarm 006 “General failure” and stops transmission after entering the TZ of the area. Therefor the Retest could not be continued. See log file It seems to be a problem of assigning an invalid frequency to the transmitter. Retest 2016-07-22 Ba: The EUT continues transmission on AIS1 and AIS2	Passed
	Check that EUT releases the slots on AIS 2 by Message 1 with time-out 0 and no slot offset.		Passed
	Check that channels AIS 1 and **A 2** are used for $\mathbf{R_x}$.		Passed

Item 3: In outer transitional area of region 2, next frames after transition	Check allocation of additional slots on channel A (AIS 1) using ITDMA comm state	All slots on AIS1 are released and a new transmission schedule with 5 s reporting interval is allocated This is not appropriate but seems to be acceptable.	Passed
	Check complete slot allocation on channel B (A 2) using ITDMA comm state.		Passed
	Check that channels AIS 1 and A 2 are used for T_x.		Passed
	Check that channels AIS 1 and A 2 are used for R_x.		Passed
	Check that reporting rate is doubled.		Passed
	Check that messages on AIS 1 are output on PI (VDM/VDO) as channel “A” and A 2 as channel “B”.		Passed
Item 4: Move into inner transitional area of region 2, crossing the area border	Check that messages on AIS 1 are output on PI (VDM/VDO) as channel “B” and A 2 as channel “A” (channels reverted).	AIS1 is output as A and A2 is output as B (same as in outer TZ) Retest 2016-07-22 Ba: Tx/Rx A: A2 Tx/Rx B: 2084 = 161.825 MHz 2084 is Channel A of another stored area which has been in use before this test. See Note 2) Retest 2016-08-23 Ba: The correct channels are used.	Passed
	Check that the usage of slots continues	After crossing the border the messages allocated for AIS1 are transmitted on A2 (channel A of the area 2). The Messages allocated for A2 are not transmitted unless leaving the transitional zone. Then they are transmitted to release the slots. In a third test the behaviour was ok. It requires further evaluation. Retest 2016-07-22 Ba: The Tx continues using the correct slots.	Passed

Item 5: Move position into the area of region 2 (out of TZ), first frame after transition	Check that EUT continues T_X on AIS 1 and A 2 for 1 frame.	There is only Tx on A2, but for both channels In a third test the behaviour was ok. It requires further evaluation. Retest 2016-07-22 Ba: The EUT continues Tx on AIS1 and A2	Passed
	Check that EUT releases all slots on AIS 1.	No Tx on AIS1, but the slots allocated for A2 are released Retest 2016-07-22 Ba: All slots on AIS1 are released	Passed
	Check that EUT releases every second slot on channel A 2(for reversion to normal reporting rate).		Passed
	Check that channels A 2 and **B 2** are used for **R_x**.		Passed
Item 6: Inside area of region 2, next frames after transition	Check allocation of slots on channel B (B 2) using ITDMA comm state.		Passed
	Check that channels A 2 and B 2 are used for T_x.		Passed
	Check that channels A 2 and B 2 are used for R_x.		Passed
	Check that reporting rate is back to normal reporting rate.		Passed
	Check that messages on A 2 are output on PI (VDM/VDO) as channel “A” and B 2 as channel “B”.	A2 and B2 are used for Rx. The channels in the VDM are reversed. Messages received on A2 are output as “B” and Messages on B2 are output as “A” Tx messages (VDO) are output correctly Retest 2016-07-22 Ba: The Tx and Rx channels are output correctly in VDM and VDO	Passed

Note)
The channels on the diagram are:

Column	Colour	Channel
Left (Channel A)	Black	A2 (channel A of area 2)
Left (Channel A)	Orange	AIS1 (channel A of high sea)
Right (Channel B)	Black	B2 (channel B of area 2)
Right (Channel B)	Orange	AIS2 (channel B of high sea)

2016-06-02	**Tester: Ba**	**Test details:** Check of T_x/R_x-Mode		
Test item		Check	Remark	Result
Transmit message 22 to an area with Tx/Rx mode according to the test item.				
c) Set T_x/R_x-Mode in Message 22 to 1.		Check that mode is correctly stored.		Passed
		Check that channel A only is used for T_x.		Passed
		Check that channels A and B are used for R_x.		Passed
		Check that the reporting rate is correct.	15 s	Passed
d) Set T_x/R_x-Mode in Message 22 to 2.		Check that mode is correctly stored.		Passed
		Check that channel B only is used for T_x.		Passed
		Check that channels A and B are used for R_x.		Passed
		When Message 22 with Tx/Rx mode 0 has been received (after Tx/Rx mode = 1 or 2) there is for one frame an offset of 1 slot (e.g. Message 18 is transmitted in slot 672 instead of 671). A similar problem has been observed in test 12.6.6.8 Retest 2016-07-04 Ba: The same problem now also happens when changing from Tx/Rx mode 0 to 1 or 2. That means, every time when the Tx/Rx mode is changed by Message 22. The problem does not happen when the Tx/Rx mode is changed by Message 23. Retest 2016-07-25 Ba: There is no slot shift with Message 22		Passed

6.2 13.2 Channel management by addressed Message 22

13.2.1 Purpose

The purpose of this test is to ensure that the EUT uses the regional operating settings of an addressed Message 22.

13.2.2 Method of measurement

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

a) *Send Message 4 within 120 NM and Message 22 with valid regional operating settings that are different from the default operating settings to the EUT. The regional operating area includes the current position of own station.*

b) *Send an addressed Message 22 to the EUT with regional operating settings different from the previous command.*

c) *Move the EUT out of the regional operating area defined by the previous addressed command and into an area without regional operating settings.*

13.2.3 Required results

Check that

a) *the EUT uses the regional operating settings commanded to it in a),*

b) *the EUT uses the regional operating settings commanded to it in b),*

c) *the EUT reverts to default.*

2016-06-02	**Tester: Ba**	**Test details:** Test of addressed Message 22		
Test item		Check	Remark	Result
a) Send a valid Message 22, position inside.		Check, that the EUT uses the regional operating settings.		Passed
b) Send an addressed message 22 to the EUT with different regional operating settings.		Check, that the EUT uses the regional operating settings.	UTC 08:27	Passed
b) Send an addressed Message 22, addressed **as ID 2**, to the EUT with different regional operating settings.		Check, that the EUT uses the regional operating settings.	The addressed Message 22 is not accepted for 10 minutes after the first addressed Message 22 See Note) Retest 2016-06-16 Ba: After receiving the addressed Message 22 with new channels the EUT generates an error ID 006 General failure and stops transmission. Remark: the same happens if the channels are changed by Message 22 with an area. Retest 2016-07-04 Ba: UTC 09:18 An addressed Message 22 is accepted also within 10 min after the first addressed Message 22.	Passed
c) Move the EUT out of the regional operating area defined by the previous addressed telecommand.		Check, that the EUT reverts to default.		Passed

Note)
The purpose of the 10 minutes protection of an addressed Message 22 is to protect this individual station from being overwritten by a broadcast Message 22 which is normally regularly transmitted every few minutes.

It shall not inhibit an addressed Message 22.

6.3 13.3 Invalid regional operating areas

13.3.1 Purpose

The purpose of this test is to ensure that the EUT rejects invalid regional operating areas (three regional operating areas with same corner).

13.3.2 Method of measurement

Set up standard test environment and operate the EUT in autonomous mode. Perform, after completion of all other tests related to change of regional operating settings, the following.

a) *Send three different valid regional operating settings with adjacent regional operating areas, their corners within 8 NM of each other, to the EUT using Message 22. The current own position of the EUT shall be within the regional operating area of the third regional operating setting.*

b) *Move current own position of the EUT consecutively to the regional operating areas of the first two valid regional operating settings.*

13.3.3 Required test results

Check that:

a) *the EUT uses the operating settings that were in use prior to receiving the third regional operating setting,*

b) *the EUT consecutively uses the regional operating settings of the first two received regional operating areas.*

2016-06-02	**Tester: Ba**	**Test details:** Test for invalid regional operating areas		
Test item		Check	Remark	Result
Msg 22 input				
a) Send three different valid regional with adjacent corners by message 22, Position inside third area.		Check, that the third area is refused and settings are not used.	UTC 12:20	Passed
b) Move own position to the first 2 areas.		Check, that the EUT uses the operational settings of these areas.		Passed

6.4 13.4 Continuation of autonomous mode reporting interval

13.4.1 Purpose

The purpose of this test is to ensure that the EUT maintains autonomous reporting interval in a transitional zone.

13.4.2 Method of test

When in the presence of an assigned mode command, and in a transition zone, check that the EUT continues to report at the autonomous reporting interval.

13.4.3 Required result

Ensure that the autonomous reporting interval is maintained.

2016-06-02	**Tester: Ba**	**Test details:** Continuation of autonomous mode reporting rate		
Test item		Check	Remark	Result
Set the EUT into a transitional zone. Send assignment commands message 16 to the EUT.				
Rate assignment command in a transitional zone.		Check that the rate assignment command is ignored in a transitional zone.		Passed
Slot assignment command in a transitional zone.		Check that the slot assignment command is ignored in a transitional zone.		Passed

6.5 13.5 Slot reuse and FATDMA reservations

(See 7.3.2.4)

13.5.1 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Assure that at test receiver location the signal level received from EUT exceeds the signal level received from test transmitter.

a) *Transmit test targets on channel A with 50 % channel load. Channel B is free. This test covers Rule 0 and 1.*

b) *Transmit near and distant test targets with 100 % channel load on channel A in all selection intervals which are under observation. Channel B is free. There shall be enough different targets to allow the EUT to meet the requirement to reuse only one slot of each target per frame.*

c) *Transmit near and distant test targets with 100 % channel load on channel B in all selection intervals which are under observation. Channel A is free.*

d) *Transmit Message 4 with a position distance < 120 NM and Message 20 with slot reservations on channel A. Transmit near and distant test targets in the unreserved slots on channel A. Channel B is free.*

13.5.2 Required results

Confirm that

a) *only free slots are used for transmission on channel A, confirm that only slots which are free on channel A are used for transmissions on channel B,*

b) *slots of the most distant test targets are used for transmission on channel A. Check that not more than one slot of a station is reused in a frame,*

c) *for transmission on channel A that the candidate slots on channel A are organized according to the most distance station on channel B,*

d) *only unreserved slots are used on channel A. Confirm that slots of the most distant test targets are used for transmission. Confirm that for transmissions on channel B only slots which are not reserved on channel A are used after the next regular time-out 0.*

2016-06-02	**Tester: Ba**	**Test details:** Slot reuse		
Test item		Check	Remark	Result
Operate the EUT with 5 s reporting interval. a) Test for using free slots if they are available.				
• Apply 50% VDL load on channel A. • Apply 0% VDL load on channel B.		Check that only free slots are used on channel A.	All slots are used Retest 2016-07-01 Ba: All slots are used Retest 2016-07-06, EUT#3: Same result, all slots are used Retest 2016-07-21 Ba: Only free slots are used	Passed
		Check that only slots which are free on channel A are used on channel B.	All slots are used Retest 2016-07-01 Ba: All slots are used Retest 2016-07-21 Ba: Only free slots are used	Passed
b) Test for using slots of most distant targets				
• Apply 100% VDL load on channel A. • Apply 0% VDL load on channel B.		Check that only the slots of odd numbered targets are used.	All slots are used Retest 2016-07-01 Ba: All slots are used Retest 2016-07-06, EUT#3: Same result, all slots are used Retest 2016-07-21 Ba: Near targets are re-used See Note) Retest 2016-08-23 Ba: • In a first test only distant targets are reused. • In a repetition of the test after c) and d) also near targets are reused Retest 2016-09-19 Ba: Only distant targets are reused, also after a repetition of the test after test c).	Passed
		Check that the slot of a target is not used twice in a frame on channel A (slot reuse channel).	Test 2016-07-21 Ba: Targets are re-used more than once in a frame Test c) shows the same problem on channel B (slot reuse channel) Retest 2016-08-23 Ba: The targets are reused only once per frame	Passed

2016-06-02	**Tester: Ba**	**Test details:** Slot reuse		
Test item		Check	Remark	Result
c) Test for using slots of most distant targets				
• Apply 0% VDL load on channel A. • Apply 100% VDL load on channel B.		Check that only the slots of odd numbered targets are used on channel A.	All slots are used Retest 2016-07-01 Ba: All slots are used Retest 2016-07-21 Ba: Slots of near targets on the other channel are re-used See Note) Retest 2016-08-23 Ba: Slots of near targets on the other channel are re-used Test b) shows the same result, also in the first test See Note) Retest 2016-09-19 Ba: Slots of near targets on the other channel are not re-used	Passed
d) Check for slot reservation by message 20 < 120 NM in combination with near and distant targets				
• Apply message 20 with slot reservations on channel A and message 4 with distance < 120 NM. • Transmit near and distant test targets in the unreserved slots on channel A.		Check that only unreserved slots are used on channel A.		Passed
		Check that the most distant targets are reused on channel A.	All unreserved slots are used Retest 2016-07-01 Ba: Will be retested when a) to c) are ok Retest 2016-07-21 Ba: Near targets are re-used See Note) Retest 2016-08-23 Ba: Near targets are re-used Retest 2016-09-19 Ba: Near targets are not reused	Passed
		Check that on channel B only slots which are not reserved on channel A by Message 20 are selected at time-out 0.	Test 2016-07-21 Ba: The slots are not re-used Retest 2016-08-23 Ba: Slots which are reserved on channel A are re-used on channel B Retest 2016-09-19 Ba: Slots which are reserved on channel A are not re-used on channel B	Passed Passed

6.6 13.6 Long-range application by broadcast

(See 7.8)

6.6.1 13.6.1 Long-range broadcast

Method of measurement

Set up standard test environment, enable the EUT to transmit Message 27 and operate EUT in autonomous mode. Use base stations MMSI to transmit Message 4 and Message 23. Record the transmitted messages from the EUT. The designated long-range channels are defined in 8.3.

a) Do not apply Message 4 and Message 23.

b) Apply the Message 4 with the long range control bit set to 1 and 0. Place the EUT inside the RF footprint (Message 4 receiving area) of a base station.

c) Apply the Message 4 with the long range control bit set to 1 and 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the RF footprint area, but outside the base station coverage area.

d) Apply the Message 4 with the long range control bit set to 1 and 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area..

e) Repeat the test d) using different MMSIs for Message 4 and Message 23.

f) Apply the Message 4 with the long range control bit set to 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area. After 6 minutes, remove transmissions of Message 23.

g) Apply the Message 4 with the long range control bit set to 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area. After 6 min. remove transmissions of Message 4.

Required results

Check that EUT transmits the appropriate messages, e.g. in addition to the normal transmission of Messages 1 and 5 with adequate reporting interval on AIS 1 and AIS2, confirm that:

a) EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

b) Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

c) Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

d) EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval when the Message 4 long-range control bit is set to 1. EUT stops transmitting Message 27 when the Message 4 long-range control bit is set to 0. Verify fields after station type in received Message 23 are ignored.

e) Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

f) EUT begins transmission of Message 27 no sooner than 4 minutes and no later than 8 minutes after Message 23 was removed.

g) EUT begins transmission of Message 27 beyond 3 minutes after Message 4 was removed.

2017-02-23	**Tester: Me**	**Test details:** Long range broadcast	
Test item	Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode. Enable the EUT to transmit Message 27, e.g. by configuring the long range broadcast channels, Message 4 and 23 in the following test steps are transmitted from the same base station MMSI.			
a) no message 4 and message 23	Check that message 27 is transmitted		Passed
	Check Tx channels C and D		Passed
	Check that the transmission is alternating between C and D		Passed
	Check reporting interval = 3 min		Passed
	Check message 27 content		Passed
a) Apply 50% VDL channel load This test has been added to verify that the requirement of ITU-R M.1371-5, Annex 4, section 3.3.2 “Access scheme” for slot selection are fulfilled considering the slot reservation on the AIS channels AIS1 and AIS2.			
Apply the channel load on channel A with message 1	Check that only slots which are free on channel A are used		Passed
Apply the channel load on channel B with message 26	Check that only slots which are free on channel B are used	Retest 2017-03-09: Only free slots are used	Passed
b) Apply message 4 only without message 23			
Apply message 4 with long range control bit set to 0	Check that message 27 is transmitted with 3 min interval		Passed
Apply message 4 with long range control bit set to 1	Check that message 27 is transmitted with 3 min interval		Passed
c) Apply message 4 and message 23 with station type 10 (long range coverage area), EUT outside the coverage area			
Apply message 4 with long range control bit set to 0	Check that message 27 is transmitted with 3 min interval		Passed
Apply message 4 with long range control bit set to 1	Check that message 27 is transmitted with 3 min interval		Passed
d) Apply message 4 and message 23 with station type 10 (long range coverage area), EUT inside the coverage area			
Apply message 4 with long range control bit set to 0	Check that EUT stops transmission of message 27		Passed
	Verify that the information (Tx/Rx mode, Reporting interval) of message 23 after station type is ignored		Passed
Apply message 4 with long range control bit set to 1	Check that message 27 is transmitted with 3 min interval		Passed
e) Apply message 23 with station type 10, EUT inside the coverage area, apply message 4 with a different MMSI than message 23			
Apply message 4 with long range control bit set to 0	Check that message 27 is transmitted with 3 min interval		Passed
Apply message 4 with long range control bit set to 1	Check that message 27 is transmitted with 3 min interval		Passed

f) Apply message 4 and message 23 with station type 10 (long range coverage area), EUT inside the coverage area			
Apply message 4 with long range control bit set to 0	Check that message 27 is not transmitted		Passed
Stop messages 23 after 6 minutes	Check that EUT starts transmission of Message 27 after the time-out of message 23 (4... 8 min)		Passed
g) Apply message 23 with station type 10 (long range coverage area), EUT inside the coverage area			
Apply message 4 with long range control bit set to 0	Check that message 27 is not transmitted		Passed
Stop message 4 after 6 minutes	Check that EUT starts transmission of Message 27 later than 3 minutes after end of message 4		Passed

6.6.2 13.6.2 Multiple assignment operation

Method of measurement

Set up standard test environment, enable the EUT to transmit Message 27 and operate EUT in autonomous mode with a reporting interval of 10 s. Use base stations MMSI to transmit Message 4 and Message 23. Record the transmitted messages from the EUT.

a) Transmit a Group Assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 2 s and the station type to 0 (all stations).

b) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping their RF footprints. Broadcast the Message 23 from multiple base stations with station type 10 to define the base station coverage areas not overlapping. Place the EUT inside the overlapped RF footprint area.

c) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping RF footprints. Broadcast the Message 23 from multiple base stations with station type 10 to define the base station coverage areas partially overlapping the base station coverage areas. Place the EUT inside the overlapped base station coverage area.

d) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping RF footprints. Broadcast the Message 23 from one base station with station type 10 to define the base station coverage areas. Do not broadcast Message 23 from other base stations. Place the EUT inside the RF footprint area of base station not broadcasting Message 23.

Required results

Verify that:

a) EUT switches to assigned mode and transmits position reports with 2 s reporting interval. EUT reverts to autonomous mode after timeout period

b) Irrespective of the Message 4 long-range control bit status of both base stations, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

c) EUT transmits Message 27.

d) Irrespective of the Message 4 long range control bit status of both base stations, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

2017-02-23	**Tester: Ba**	**Test details:** Multiple assignments		
Test item		Check	Remark	Result
Set up the standard test environment and operate EUT in autonomous mode. Enable the EUT to transmit Message 27, e.g. by configuring the long range broadcast channels, SOG = 10 kn, reporting interval = 10 s				
a) Transmit Message 23 EUT inside area, station type = 0, Reporting interval = 5 s		Check that Message 23 is received (VDM output)	See test 12.6.6.1	Passed
Reporting rate		Check that the reporting interval is changed to 5 s		Passed
Message 23 timeout		Verify that EUT reverts to normal operation mode after 4... 8 min		Passed
b) Apply message 4 and 23 with station type 10 (long range coverage area) from two different base station, the coverage area not overlapping EUT outside the coverage areas				
• Long range control bit of station 1 is set to 0 • Long range control bit of station 2 is set to 1		Check that message 27 is transmitted with 3 min interval	See test 13.6.1 c)	Passed
c) Apply message 4 and 23 with station type 10 (long range coverage area) from two different base station, the coverage areas are overlapping EUT inside the overlapping part of the coverage areas				
• Long range control bit of station 1 is set to 0 • Long range control bit of station 2 is set to 1		Check that message 27 is transmitted with 3 min interval		Passed
d) Apply message 4 and 23 with station type 10 (long range coverage area) from one base station and message 4 from a second base station EUT is outside the message 23 coverage area of base station 1				
• Long range control bit of station 1 is set to 0 • Long range control bit of station 2 is set to 1		Check that message 27 is transmitted with 3 min interval	See test 13.6.1 c)	Passed
• Long range control bit of station 1 is set to 1 • Long range control bit of station 2 is set to 0		Check that message 27 is transmitted with 3 min interval	See test 13.6.1 b)	Passed

6.7 13.7 Other features

(See 4.1.4)

The performance of other features provided shall be self-certified by the manufacturer.

2016-11-30	**Tester: Ba**	**Test details:** Other features	
Test item	Check	Remark	Result
Performance of other features.	Check the manufacturers documentation for the performance of other features	Document: WIDELINK B-600 Technical Notes TN-600-001.pdf The manufacturer has documented the performance of other features	Passed

7 Annex D DSC functionality

(normative)

7.1 A.4 DSC functionality tests

7.1.1 A.4.1 General

For the tests in this subclause, set the EUT into assigned mode using channels AIS 1 and AIS 2 with a reporting interval of 10 s.

A.4.2 Method of measurement

Send a sequence of valid calls consisting of:

- *DSC test signal number 2;*
- *DSC test signal number 3;*
- *DSC test signal number 2;*
- *DSC test signal number 4;*
- *DSC test signal number 2.*

A.4.3 Required results

Check that the EUT AIS operation is not affected by the interleaved calls.

2016-07-05	**Tester: Ba**	**Test details:** Sequence of 5 calls	
Test item	Check	Remark	Result
Activate DSC function. Set reporting interval by rate assignment to 10 s and record VDL.			
Start DSC transmission of test sequence.	Check that the transmission schedule of the AIS position reports is not affected by the transmission of the DSC calls.	UTC 10:50 / 10:51 UTC 11:05 / 11:06 UTC 11:20 / 11:21 During the DSC reception the Tx slots are shifted by 1 or 2 slots (see diagrams). Retest 2016-07-25 Ba: There is no slot shift during DSC reception.	Passed

7.1.2 A.4.4 Regional area designation

Perform the following tests using DSC test signal number 2.

Send DSC test signal number 2 to the EUT but with symbol numbers appropriate to the geographical regions and channels specified in the test. Note the transition boundary is 5 NM in this test.

7.1.3 A.4.5 Scheduling

A.4.5.1 General

The purpose of this test is to confirm that the EUT's AIS reporting is not affected during the DSC monitoring times and a response is not transmitted.

A.4.5.2 Method of measurement

Send DSC test signal number 2 to the EUT, with EOS = 127 and another signal with EOS=117 (RQ).

A.4.5.3 Required results

Check that the EUT's AIS reporting is not affected during the DSC monitoring times. Check that the EUT accepts the channel management, but a response is not transmitted in either case of EOS = 127 and 117.

2016-07-05	**Tester: Ba**	**Test details:** Scheduling		
Test item		Check	Remark	Result
Set reporting interval to 15 s and record VDL				
Send DSC call test signal number 2.		Check that the AIS reporting is not affected during the DSC monitoring times.	During the DSC reception the Tx slots are shifted by 1 or 2 slots (see diagrams). If there are no DSC calls during the DSC reception times the AIS schedule is not affected. Retest 2016-07-25 Ba: There is no slot shift during DSC reception.	Passed
		Check that no response is transmitted.		Passed
Send a DSC call with EOS=117 (RQ).		Check that not response is transmitted.		Passed

7.1.4 A.4.6 DSC flag in Message 18

A.4.6.1 General

The purpose of this test is to confirm that the DSC flag is set properly when DSC functionality is available.

A.4.6.2 Method of measurement

Perform the following:

a) *enable DSC monitoring;*

b) *disable DSC monitoring.*

A.4.6.3 Required results

Check that

a) *the DSC flag is set to one,*

b) *the DSC flag is set to zero.*

2016-06-13	**Tester: Ba**	**Test details:** DSC flag	
Test item	Check	Remark	Result
Record Message 18 on VDL			
DSC enabled	Check that the DSC flag is set.		Passed
DSC disabled	Check that the DSC flag is not set.		Passed

7.1.5 A.4.7 DSC monitoring time plan

A.4.7.1 General

The purpose of this test is to confirm that DSC commands are received during DSC monitoring times and, if time-sharing is used, are not received outside those times.

A.4.7.2 Method of measurement

Perform the following:

a) transmit DSC test signal 2 during monitoring time,

b) transmit DSC test signal 2 outside monitoring time.

A.4.7.3 Required results

Check that

a) the DSC call is received,

b) the DSC call is not received.

2016-07-05	**Tester: Ba**	**Test details:** DSC monitoring time plan		
Test item		Check	Remark	Result
Delete all area settings				
Send a DSC area setting outside the monitoring time.		If time-sharing is used: Check that the channels are not changed.	Time-sharing is implemented	Passed
		If time-sharing is **not** used: Check that the channels are changed according to the area setting.		N/A
Send a DSC area setting inside the monitoring time.		Check that the channels are changed according to the area setting.		Passed

7.1.6 A.4.8 Replacement or erasure of dated or remote regional operating settings

A.4.8.1 Method of measurement

Set up standard test environment. Send a valid regional operating setting to the EUT by Message 22 with the regional operating area including the own position of the EUT. Consecutively send a further seven (7) valid regional operating settings to EUT, using both Message 22 and DSC test signal number 2, with regional operating areas not overlapping to the first and to each other. Perform the following in the order shown:

a) *send a ninth Message 22 to the EUT with valid regional operating areas not overlapping with the previous eight regional operating areas;*

b) *Step 1: set own position of EUT into any of the regional operating areas defined by the second to the ninth telecommands sent to the EUT previously;*

   Step 2: send a tenth telecommand to the EUT, with a regional operating area which partly overlaps the regional operating area to which the EUT was set by Step 1 but which does not include the own position of the EUT;

c) *Step 1: move own position of EUT to a distance of more than 500 NM from all regions defined by previous commands;*

   Step 2: consecutively set own position of EUT to within all regions defined by the previous telecommands.

A.4.8.2 Required results

After the initialisation, the EUT shall operate according to the regional operating settings defined by the first Message 22 sent.

a) *Check that the most distant area is removed.*

b) *Step 1: check that the EUT changes its operating settings to those of that region which includes own position of the EUT.*

   Step 2: check that the EUT reverts to the default operating settings.

NOTE Since the regional operating settings to which the EUT was set in Step 1 are erased due to Step 2, and since there is no other regional operating setting due to their non-overlapping definition, the EUT returns to default.

c) *Step 1: check that the EUT operates with the default settings.*

   Step 2: check that the EUT operates with the default settings.

2016-07-05	**Tester: Ba**	**Test details:** Test of replacement or erasure of dated or remote regional operating settings		
Test item		Check	Remark	Result
Send by DSC and msg 22 • 1 area including own position by MSG 22 (Msg: B Msg 22 Test 13.3.1 Area 1) • 7 areas not overlapping, not including own position, first 3 by msg 22, last 4 by DSC				
Check active area.		Check that EUT uses the channels of area 1.		Passed
a) Send a 9. msg 22 to the EUT not overlapping the previous areas .		Check that the most distant area is deleted.	Area 8 is deleted	Passed
b) step 1: Set own position to any of the 7 areas.		Check channels of area 2.		Passed
		Check channels of area 3.		Passed
		Check channels of area 4.		Passed
		Check channels of area 5.		Passed
		Check channels of area 6.		Passed
		Check channels of area 7.		Passed
		Check channels of area 8.		Passed
		Check channels of area 9.		Passed
b) step 2: Send an area 10 by DSC, overlapping the area 2 of step 1 not including own position.		Check that the EUT returns to the default operating settings (the area is deleted).		Passed
c) Step 1: Erasure by distance: Move own position of EUT to a distance of more than 500 miles from all regions defined by previous commands.		Check that the EUT operates with the default settings.		Passed
Step 2: Check of erasure: Set own position of EUT to within all regions defined by the previous telecommands.		Check area 2 = default.		Passed
		Check area 3 = default.		Passed
		Check area 4 = default.		Passed
		Check area 5 = default.		Passed
		Check area 6 = default.		Passed
		Check area 7 = default.		Passed
		Check area 8 = default.		Passed
		Check area 10 = default.		Passed

7.1.7 A.4.9 Test of addressed telecommand

A.4.9.1 Method of measurement

Set up a standard test environment and operate EUT in autonomous mode. Perform the following tests in the following order:

a) send a DSC test signal number 2 with valid regional operating settings that are different from the default operating settings, to the EUT with a regional operating area, which contains the current position of own station;

b) send an addressed DSC channel management command to the EUT with different regional operating settings than the previous command;

c) move the EUT out of the regional operating area defined by the previous addressed telecommand into an area without regional operating settings.

A.4.9.2 Required results

Check that

a) the EUT uses the regional operating settings commanded to it in a),

b) the EUT uses the regional operating settings commanded to it in b),

c) the EUT reverts to default.

2016-07-05	**Tester: Ba**	**Test details:** Test of addressed telecommand	
Test item	Check	Remark	Result
All areas are erased by the previous test.			
a) Send a DSC call with a new area, position inside.	Check that the EUT uses the regional operating settings.		Passed
b) Send an addressed DSC call to the EUT with different regional operating settings.	Check that the EUT uses the settings of the new message.		Passed
c) Move the position out of the area.	Check that the EUT uses the default channels.		Passed

7.1.8 A.4.10 Invalid regional operating areas

A.4.10.1 General

Test for invalid regional operating areas (three regional operating areas with same corner).

A.4.10.2 Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Perform the following tests in the following order after completion of all other tests related to change of regional operating settings:

a) send three different valid regional operating settings with adjacent regional operating areas, their corners within eight miles of each other, to the EUT by DSC test signal number 2. The current own position of the EUT shall be within the regional operating area of the third regional operating setting;

b) move current own position of the EUT consecutively to the regional operating areas of the first two valid regional operating settings.

A.4.10.3 Required results

Check that

a) the EUT uses the operating settings that were in use prior to receiving the third regional operating setting,

b) the EUT consecutively uses the regional operating settings of the first two received regional operating areas.

2016-07-05	**Tester: Ba**	**Test details:** Test for invalid regional operating areas	
Test item	Check	Remark	Result
a) Send three different valid regional with adjacent corners by DSC area call, Position inside 3rd area.	Check that the default channels are used.	UTC 09:01	Passed
b) Move own position to the first area.	Check that the EUT uses the operational settings of the first area.		Passed
Move own position to the second area.	Check that the EUT uses the operational settings of the second area.		Passed

Annex A Test equipment

A.1 Test equipment summary

#	description	type	identification
1	VDL Analyser / Generator	AIS Test unit MKII	S/N AA08PN Bund BSH/2012, 7200002112 BSH PC10745 AISLog
2	Target simulator software	Furuno Navintra	BSH PC 14731
3	Presentation Interface Monitor	BSH	BSH PC 10756 BSH VC 13416 SW NewMoni V3.2
4	GMDSS-AIS-Testbox (DSC)	Futronic I/S	200 30 405
5	16 Port Serial Device Server	Moxa NPort 5610 RS232	S/N 756
6	16 Port Serial Device Server	Moxa NPort 5630 RS485/RS422	S/N 9440
7	Active retransmitting GPS antenna	RA - 48	4800199
8	Trimble GPS reference receiver	4000RS, Part number 21000-76	S/N 3428A06700
	Auxiliaries:		
9	True RMS Multimeter DMM 916	Tektronix	S/N 138531
11	Unbalanced Standard Attenuator	Rhode & Schwarz DPR BN 18024/50	BUND KK 11201
12	2 fixed voltage power supply (24 V/10A)	SITOP	BUND 102452, 102453
14	2 adjustable power supplies (30 V/5 A)	PS 405 D	S/N 2737, 2768

A.1.1 VDL Analyser / Generator

The VDL analyser/generator:

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

The VDL analyser is controlled by a user interface software running on a standard PC. This user interface software composes the transmission messages and decodes and displays the

received messages.

A.1.2 Target simulator

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

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

A.1.3 Presentation Interface Monitor

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

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

For that purpose it includes the functions:

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

A.1.4 Sensor Data Simulator

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

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

A.1.5 DSC Test box

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

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

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

Special PC software is used to generate the DSC calls and to display, log and evaluate received DSC calls. It communicates via the serial remote control interface to the DSC Test box.

A.1.6 Serial Interface Server

The Serial Interface Server consists on two Serial Interface boxes which provides 16 serial lines each which can be connected in a flexible way to the EUT and to equipment of the test environment like the DSC Test box.

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

- One interface box with 16 serial lines according to RS-422 and IEC 61162-1/2
- One interface box with 16 serial lines according to RS-232

A.1.7 Laboratory Network

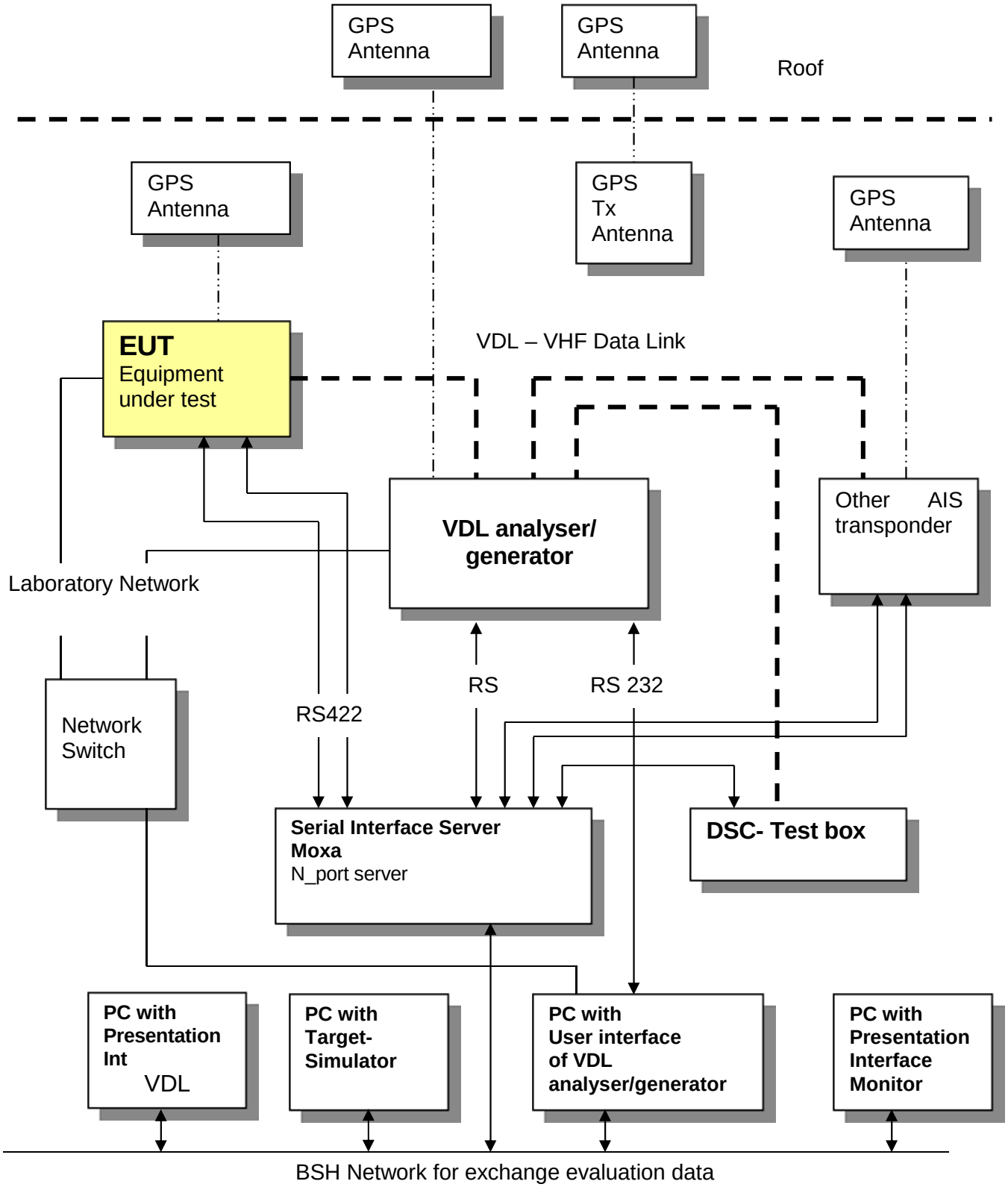
A special laboratory network connects controlling PCs with equipment of the test environment (VDL Generator/ analyser) and with EUT if equipped with an Ethernet interface.

A.1.8 GPS Re-transmitter

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

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

A.2 Test environment overview



Annex B Test sentences

B.1 IEC 61162 Test Sentences

Many of the test sentences are modified manually during the test according to the requirements of the actual test items.
Mainly the MMSI in all addressed sentences are adapted to the actual MMSI of the EUT or of the unit the EUT communicates with.
In addition the files containing these sentences contain also some control information used by the monitor program like:

<UTC> is replaced by the actual UTC time at time of output
<WAIT EVENT> waiting for user action before next output
<WAIT xxxx> waiting xxx ms before next output

This control information is not shown in the following sentence examples because it is not sent to the EUT.

B.1.1 Messages (ABM, BBM)

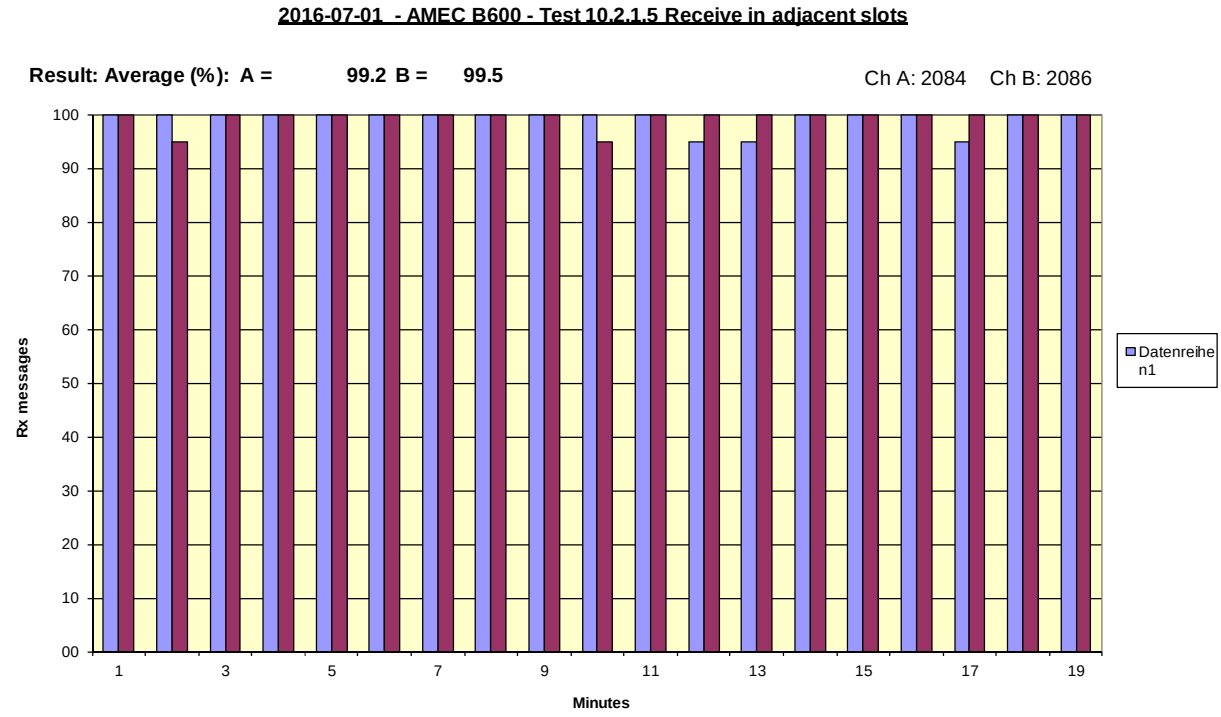
The addressed messages include a MMSI number which is changed according to the actual MMSI number of the EUT

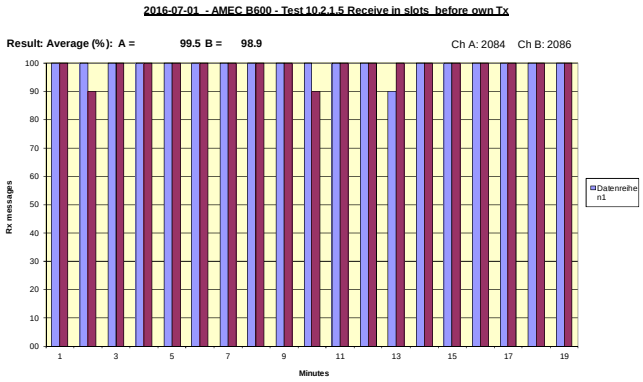
Messages (ABM, BBM)	
File name	Description
Sentences	
AIABM_bin.sst	Standard addressed binary message
!AIABM,1,1,2,211001028,1,6,07i@E=@,2	
AIABM_safety.sst	Standard addressed safety related message
!AIABM,1,1,2,211001028,1,12,D5CD,0	
AIABM_4_bin.sst	Set of 4 addressed binary messages
!AIABM,1,1,3,211001028,1,6,07i@E=B34,2 *!AIABM,1,1,0,211001028,2,6,07i@E=B38,2* *!AIABM,1,1,1,211001028,1,6,07i@E=B3<,2* *!AIABM,1,1,2,211001028,2,6,07i@E=B3@,2*	
AIBBM_bin.sst	Standard binary broadcast message
!AIBBM,1,1,6,1,8,07i@E=@,2	
AIBBM_safety.sst	Standard safety related broadcast message
!AIBBM,1,1,6,1,14,D5CD,0	

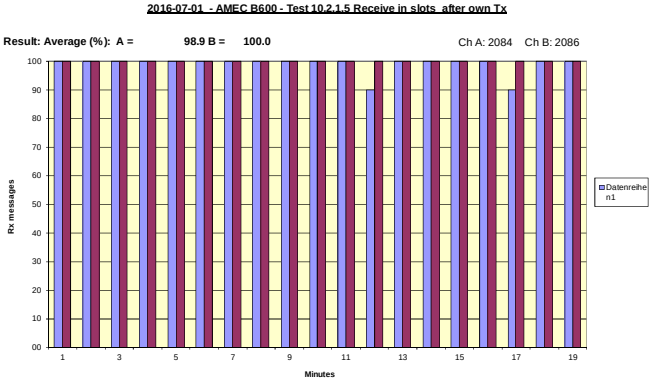
AIABM_BBM_msg25_26.sst	Collecton of addressed and broadcast message 25/26
<WAIT_EVENT> !AIABM,1,1,0,211001028,1,70,upGd45L22B2J2B2H,0 <WAIT,10000> !AIABM,1,1,1,211001028,2,25,upGd45L22B2J2B2H,0 <WAIT,10000> !AIABM,1,1,2,211001028,1,71,ur3d45L0h`S0,0 <WAIT,10000> !AIABM,1,1,3,211001028,2,26,ur3d45L0h`S0,0 <WAIT,10000> !AIBBM,1,1,4,1,70,up?d45L2N`UKPFl>o8?`00,4 <WAIT,5000> !AIBBM,1,1,5,2,25,up?d45L2N`UKPFl>o8?`00,4 <WAIT,5000> !AIBBM,1,1,6,1,71,upkd45L1E9PR200JGP,4 <WAIT,5000> !AIBBM,1,1,7,2,26,upkd45L1E9PR200JGP,4	
AIBBM_multi_bin_3_slot.sst	Long 3 slot binary broadcast message
!AIBBM,3,1,6,2,8,07i@4567890123456789012345678901234567890123456789,0 !AIBBM,3,2,6,2,8,0123456789012345678901234567890123456789,0 !AIBBM,3,3,6,2,8,01234567890,2	

Annex C Test Diagrams

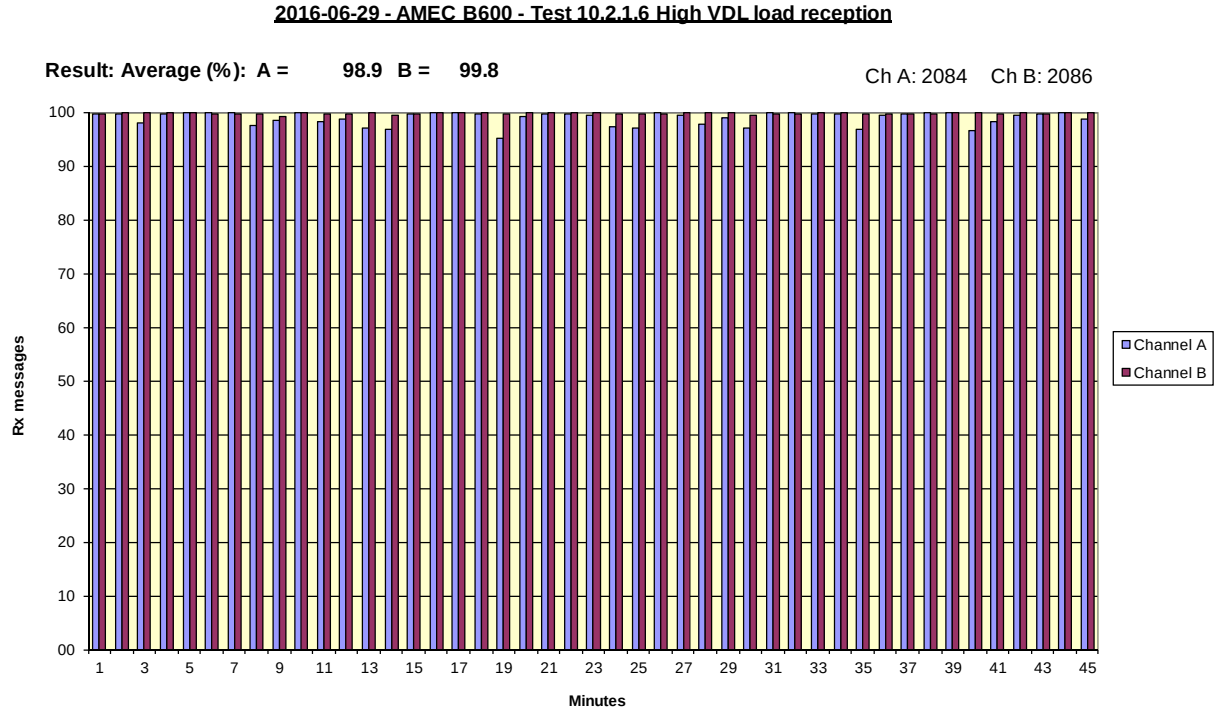
C.1 10.2.1.5 Receiving in adjacent slots

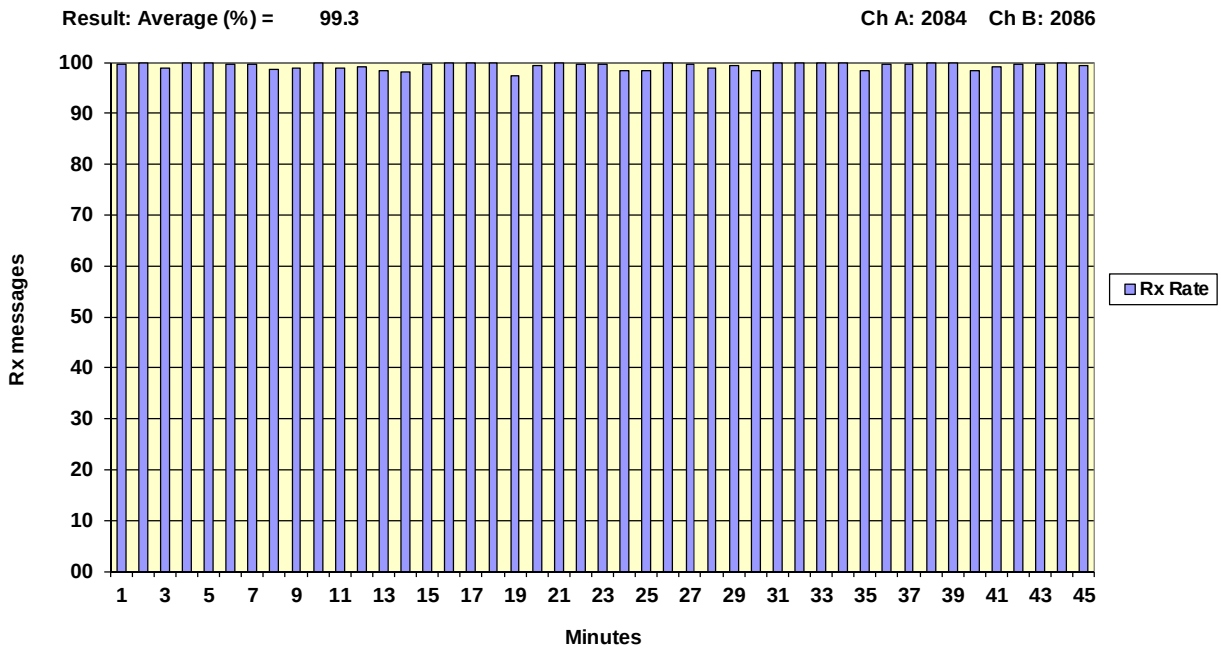




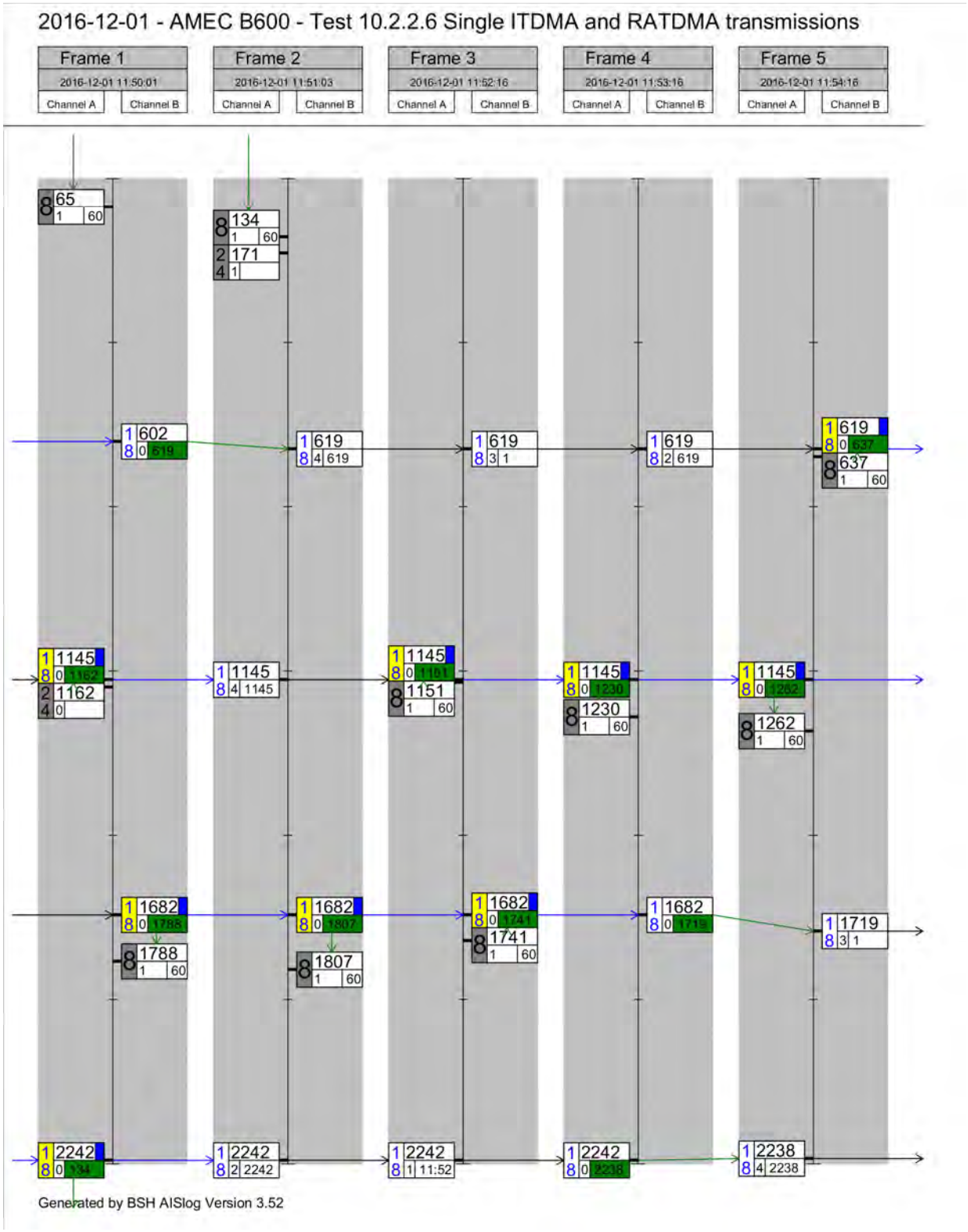


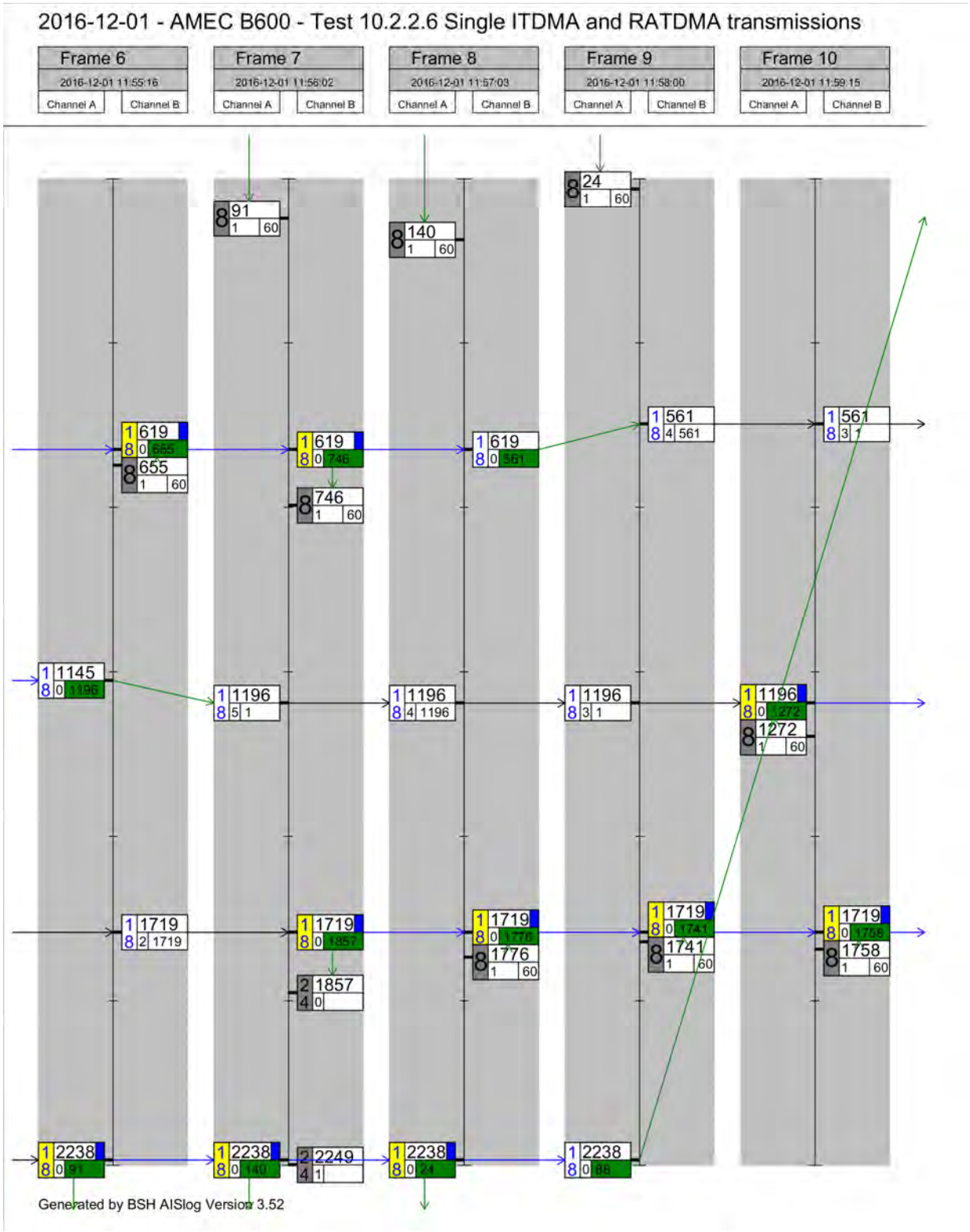
C.2 10.2.1.6 High VDL loading reception test





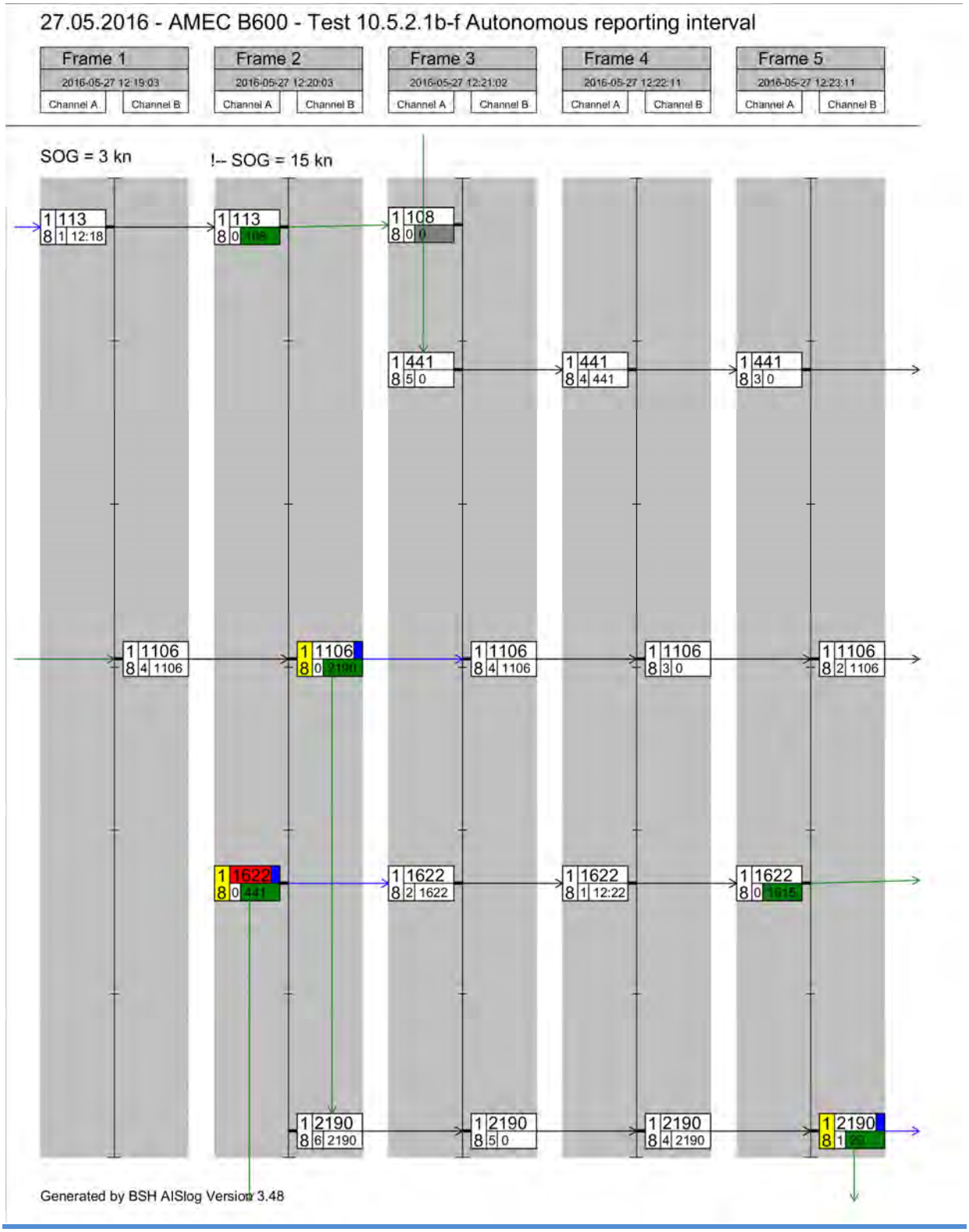
C.3 10.2.2.6 Single ITDMA and RATDMA transmissions

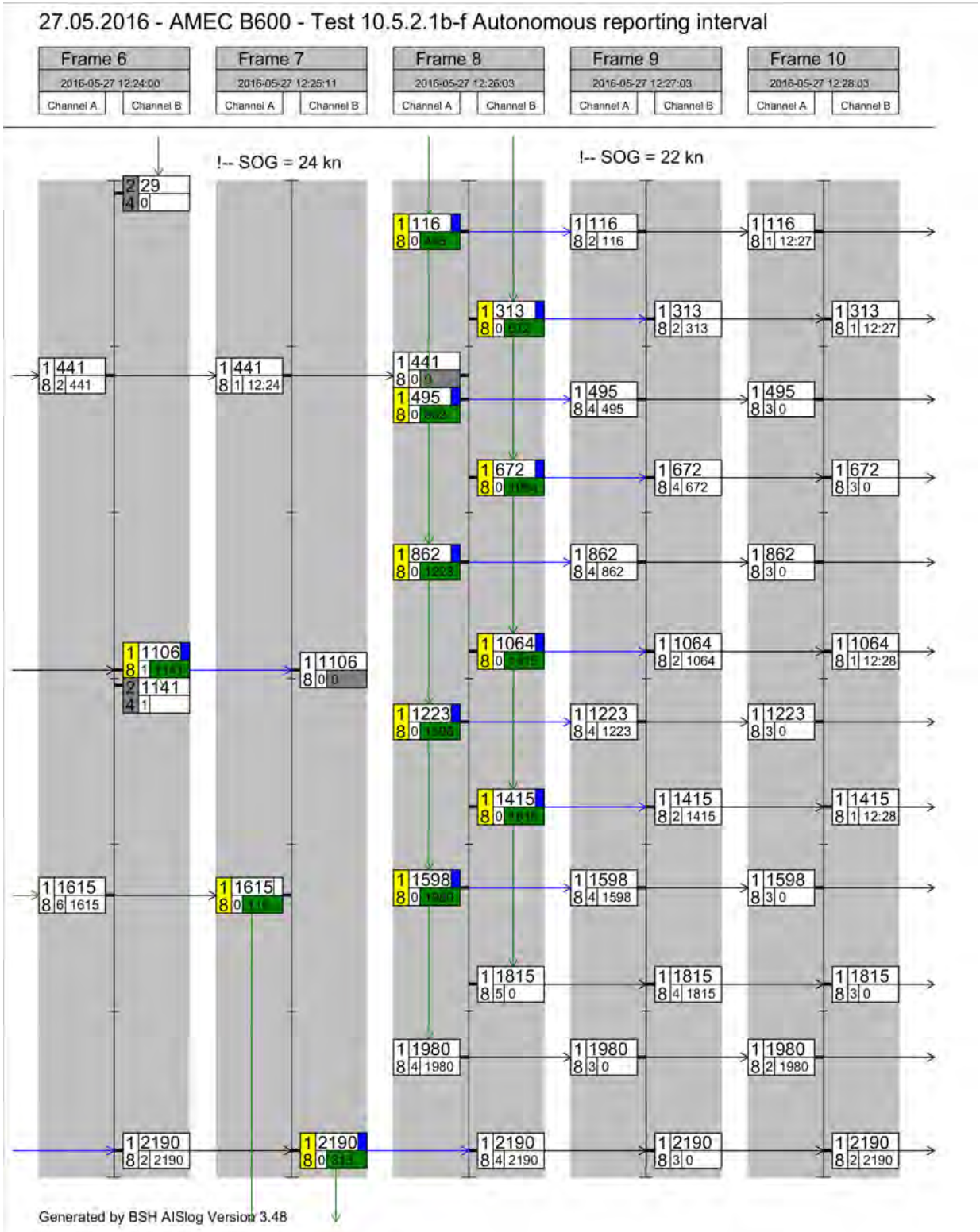


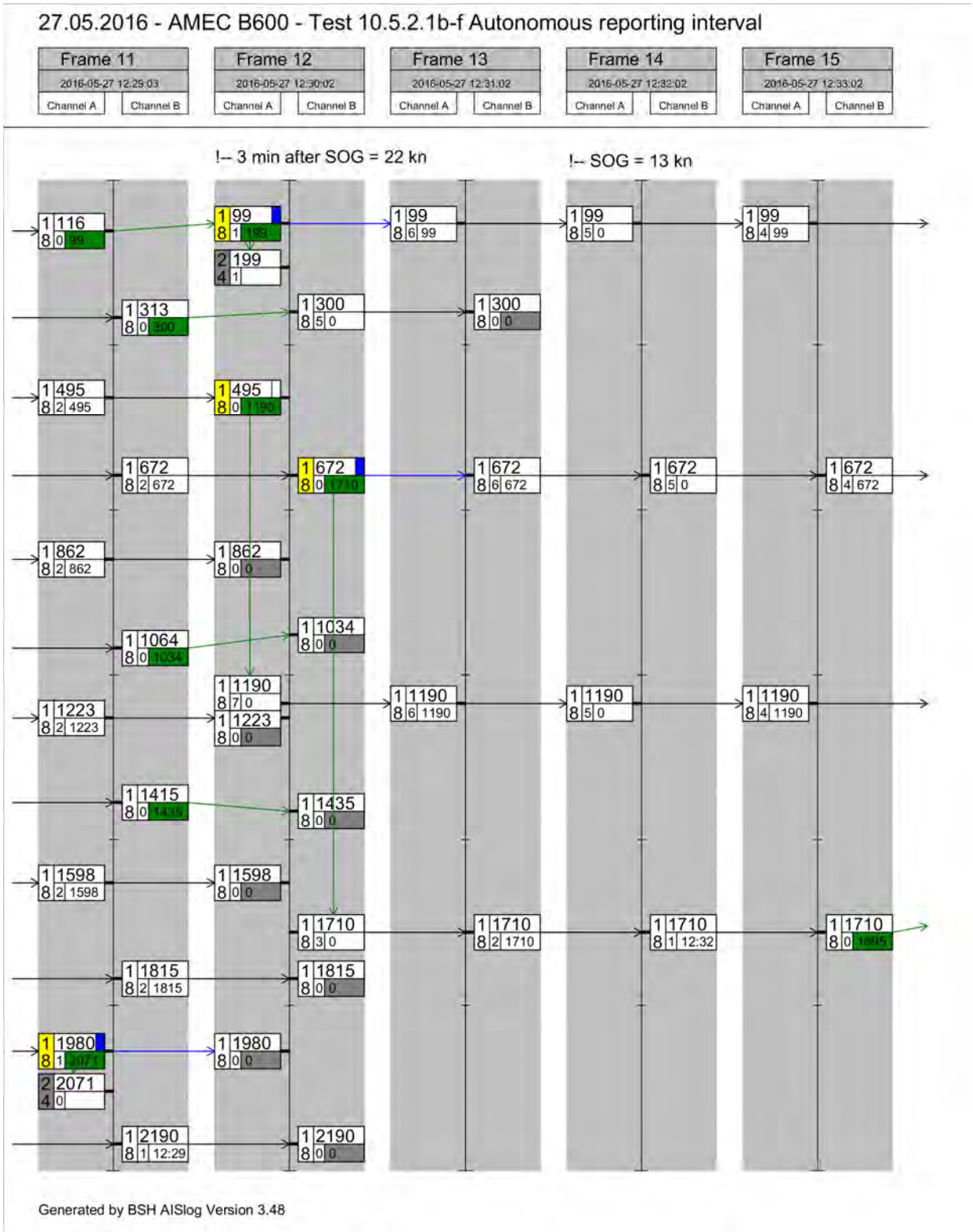

2016-12-01 - AMEC B600 - Test 10.2.2.6 Single ITDMA and RATDMA transmissions
Frame 6
2016-12-01 11:55:16
Frame 7
2016-12-01 11:56:02
Frame 8
2016-12-01 11:57:03
Frame 9
2016-12-01 11:58:00
Frame 10
2016-12-01 11:59:15
Channel A
Channel B
Generated by BSH AISlog Version 3.52

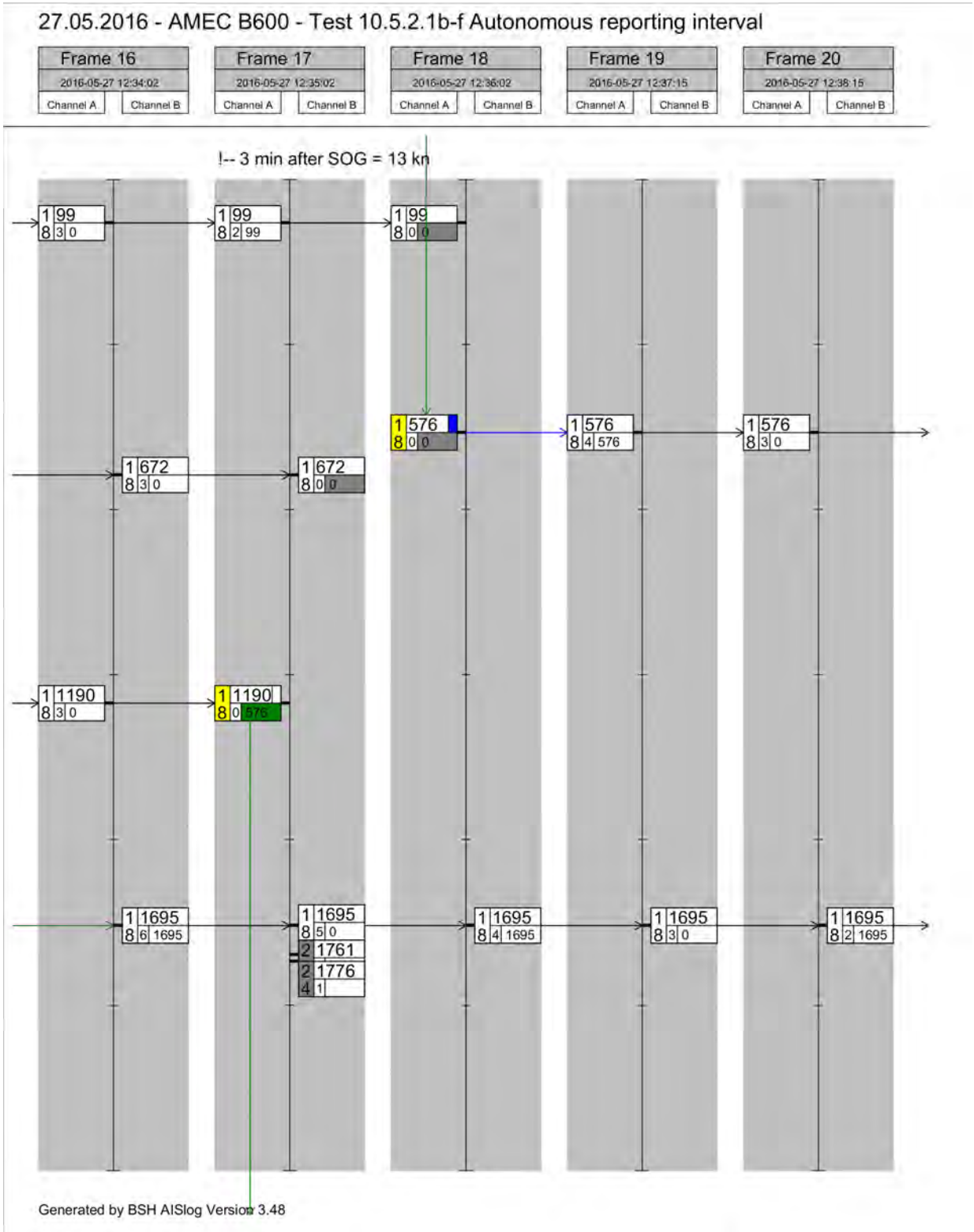
C.4 10.5.2.1 Autonomous reporting interval

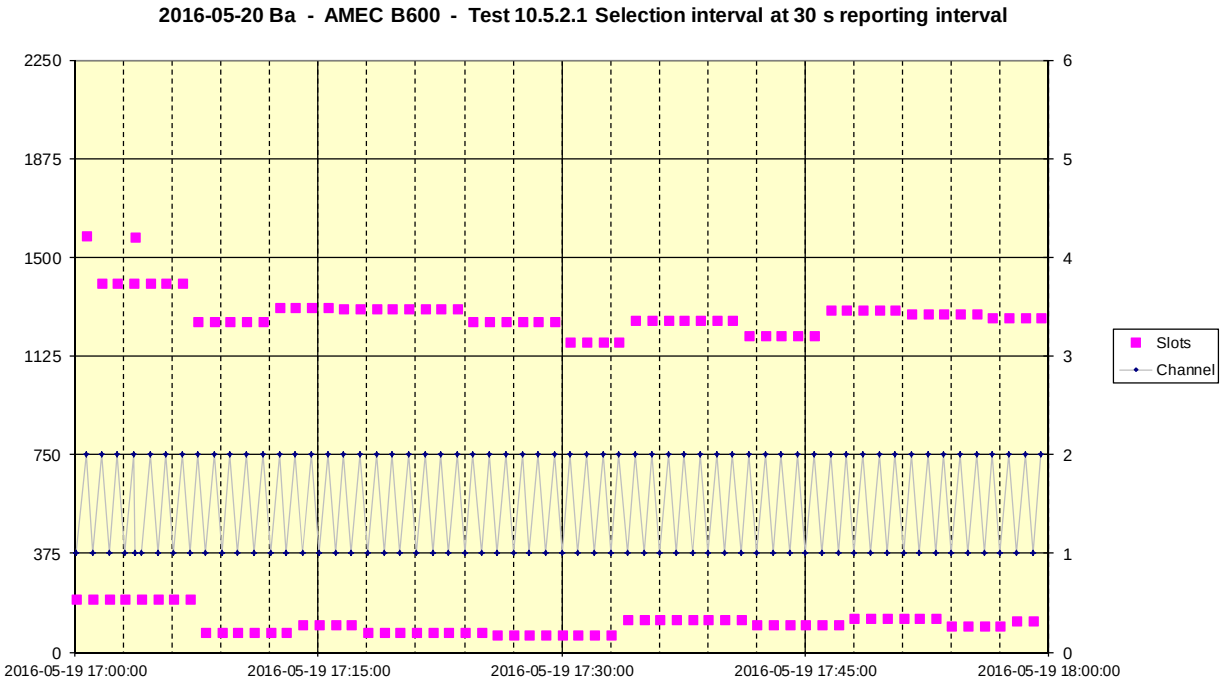
C.4.1 30s – 5 s interval

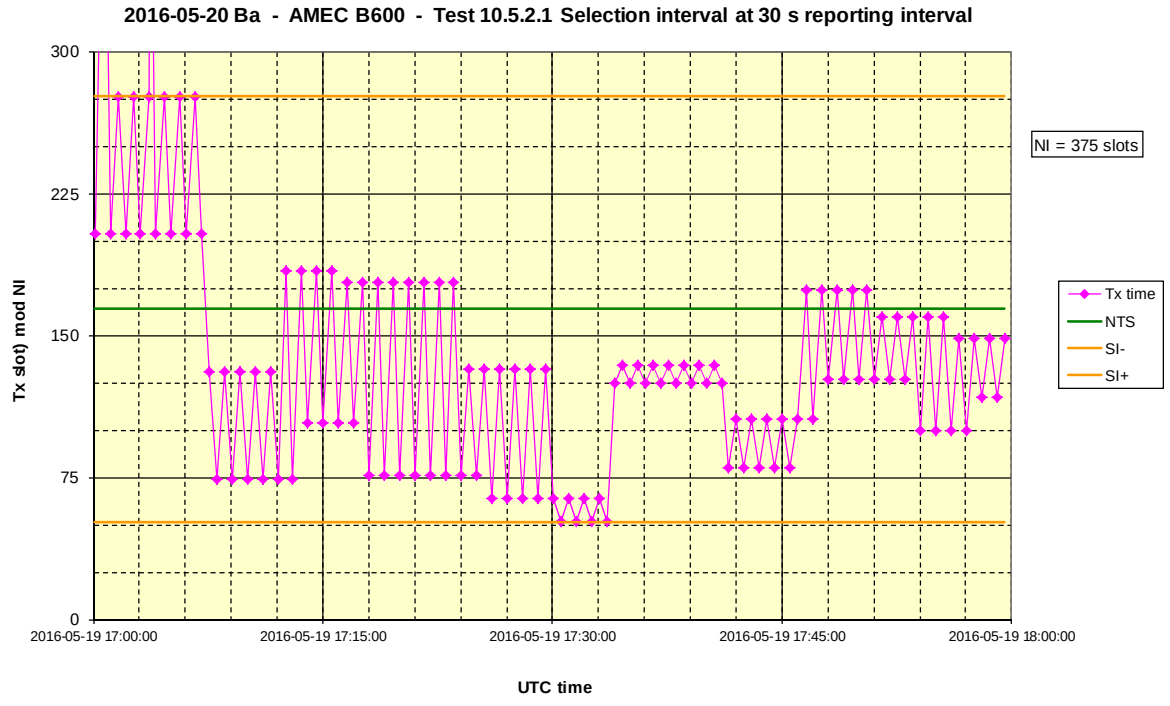


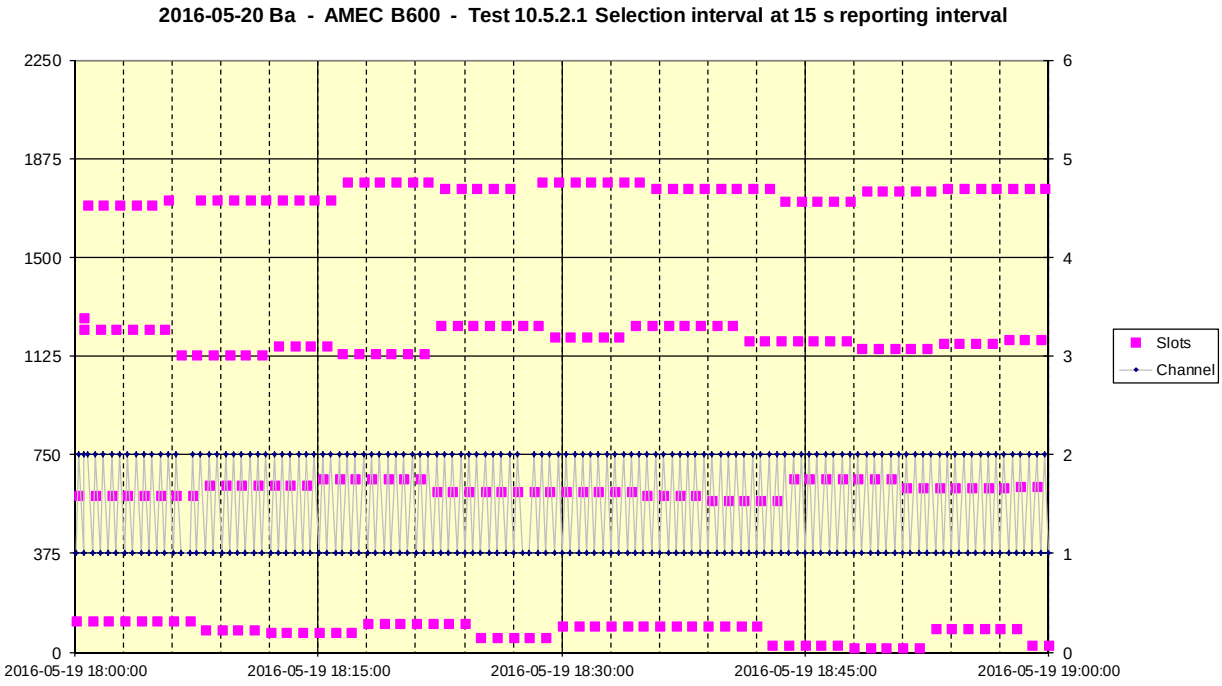

27.05.2016 - AMEC B600 - Test 10.5.2.1b-f Autonomous reporting interval
Frame 6
2016-05-27 12:24:00
Frame 7
2016-05-27 12:25:11
Frame 8
2016-05-27 12:26:03
Frame 9
2016-05-27 12:27:03
Frame 10
2016-05-27 12:28:03
Channel A
Channel B
!-- SOG = 24 kn
!-- SOG = 22 kn
Generated by BSH AISlog Version 3.48

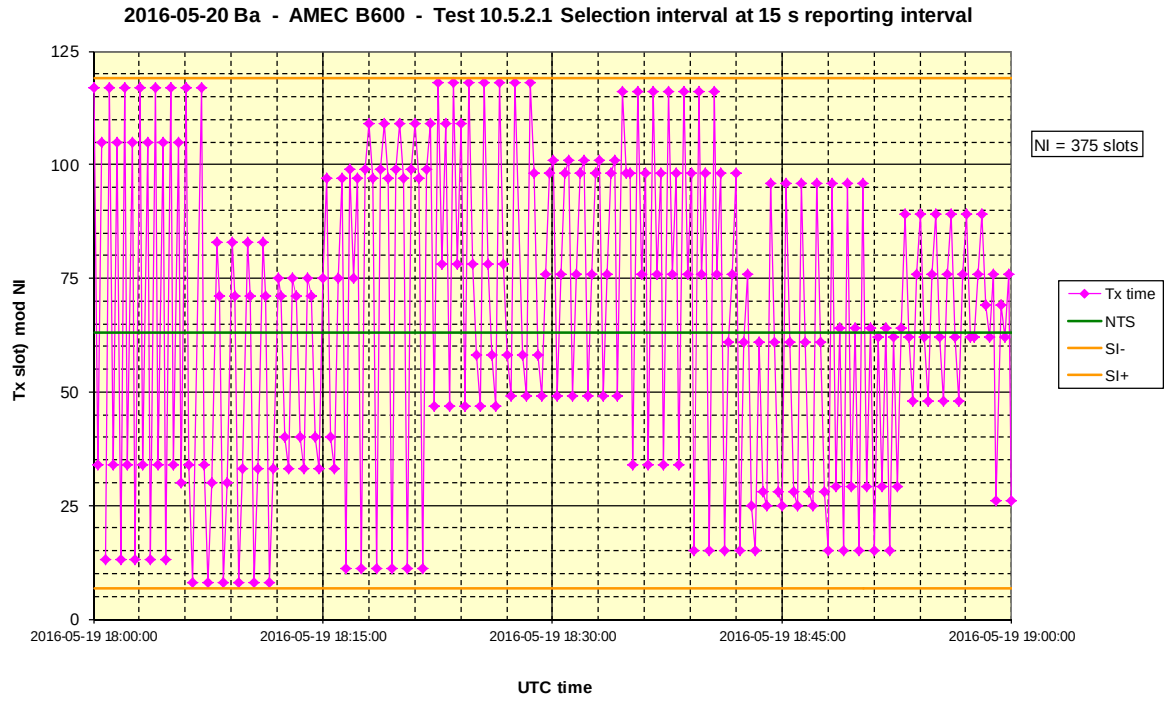

27.05.2016 - AMEC B600 - Test 10.5.2.1b-f Autonomous reporting interval
Frame 11
2016-05-27 12:29:03
Frame 12
2016-05-27 12:30:02
Frame 13
2016-05-27 12:31:02
Frame 14
2016-05-27 12:32:02
Frame 15
2016-05-27 12:33:02
Channel A
Channel B
!-- 3 min after SOG = 22 kn
!-- SOG = 13 kn
Generated by BSH AISlog Version 3.48

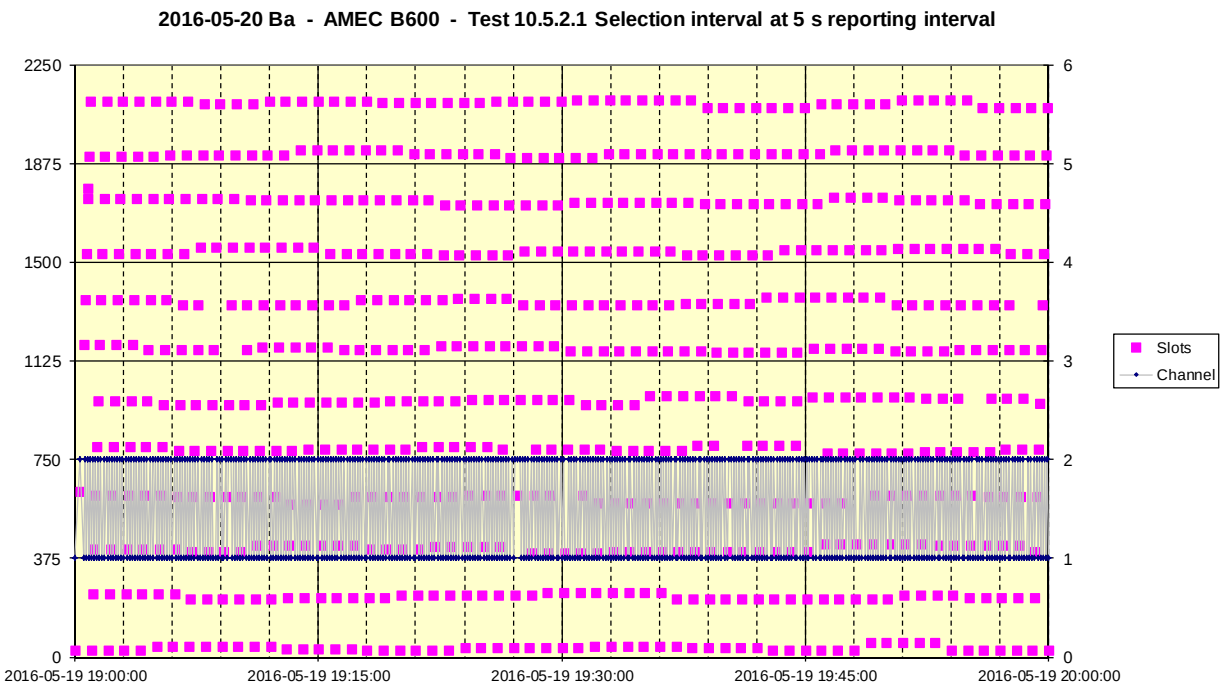

27.05.2016 - AMEC B600 - Test 10.5.2.1b-f Autonomous reporting interval
Frame 16
2016-05-27 12:34:02
Channel A
Channel B
Frame 17
2016-05-27 12:35:02
Channel A
Channel B
Frame 18
2016-05-27 12:36:02
Channel A
Channel B
Frame 19
2016-05-27 12:37:15
Channel A
Channel B
Frame 20
2016-05-27 12:38:15
Channel A
Channel B
!-- 3 min after SOG = 13 kn
1 99 8 3 0
1 99 8 2 99
1 99 8 0 0
1 576 8 0 0
1 576 8 4 576
1 576 8 3 0
1 672 8 3 0
1 672 8 0 0
1 1190 8 3 0
1 1190 8 0 576
1 1695 8 6 1695
1 1695 8 5 0
2 1761
2 1776
4 1
1 1695 8 4 1695
1 1695 8 3 0
1 1695 8 2 1695
Generated by BSH AISlog Version 3.48

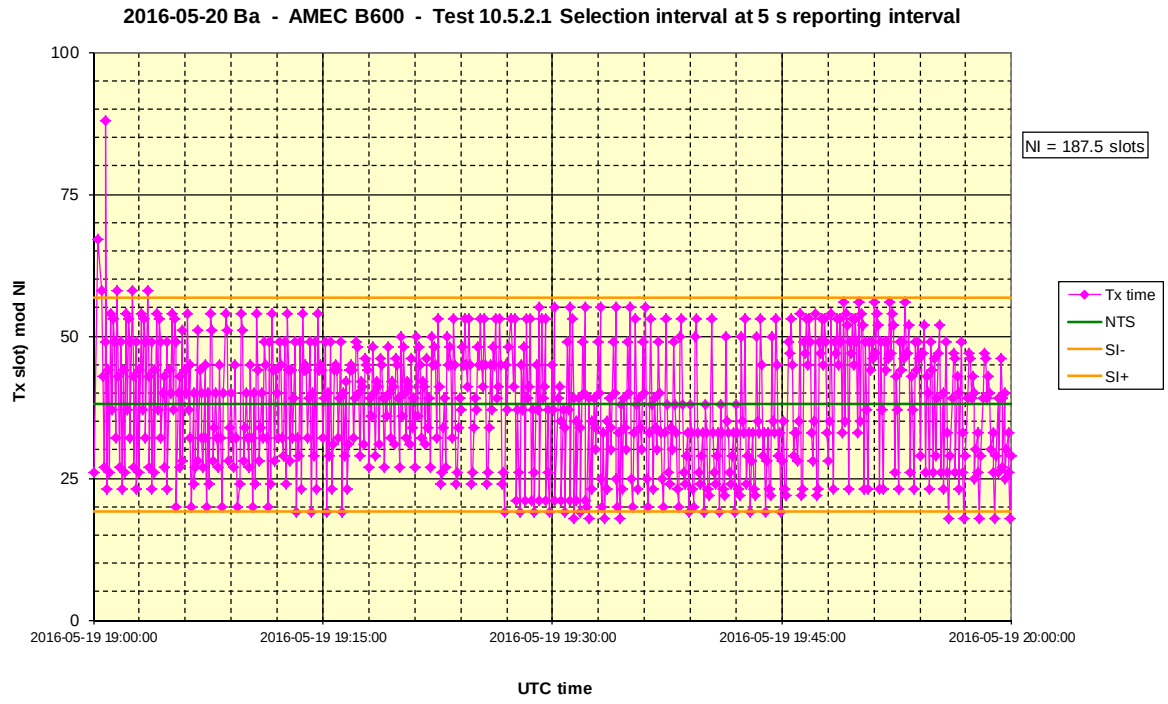

2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 30 s reporting interval
2250
1875
1500
1125
750
375
0
6
5
4
3
2
1
0
2016-05-19 17:00:00
2016-05-19 17:15:00
2016-05-19 17:30:00
2016-05-19 17:45:00
2016-05-19 18:00:00
Slots
Channel


2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 30 s reporting interval
300
225
150
75
0
Tx slot) mod NI
2016-05-19 17:00:00
2016-05-19 17:15:00
2016-05-19 17:30:00
2016-05-19 17:45:00
2016-05-19 18:00:00
UTC time
NI = 375 slots
Tx time
NTS
SI-
SI+

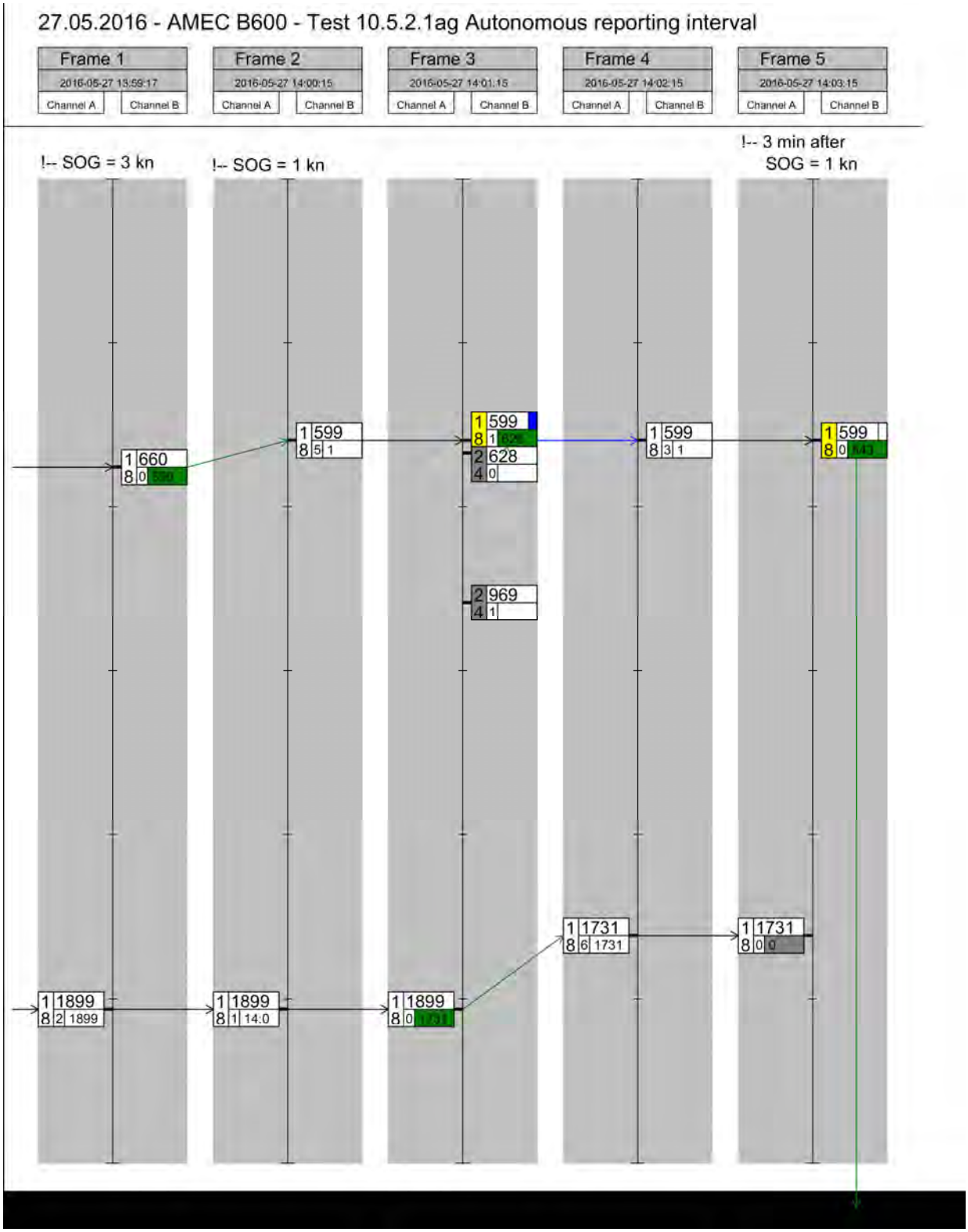

2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 15 s reporting interval
2250
1875
1500
1125
750
375
0
6
5
4
3
2
1
0
2016-05-19 18:00:00
2016-05-19 18:15:00
2016-05-19 18:30:00
2016-05-19 18:45:00
2016-05-19 19:00:00
Slots
Channel

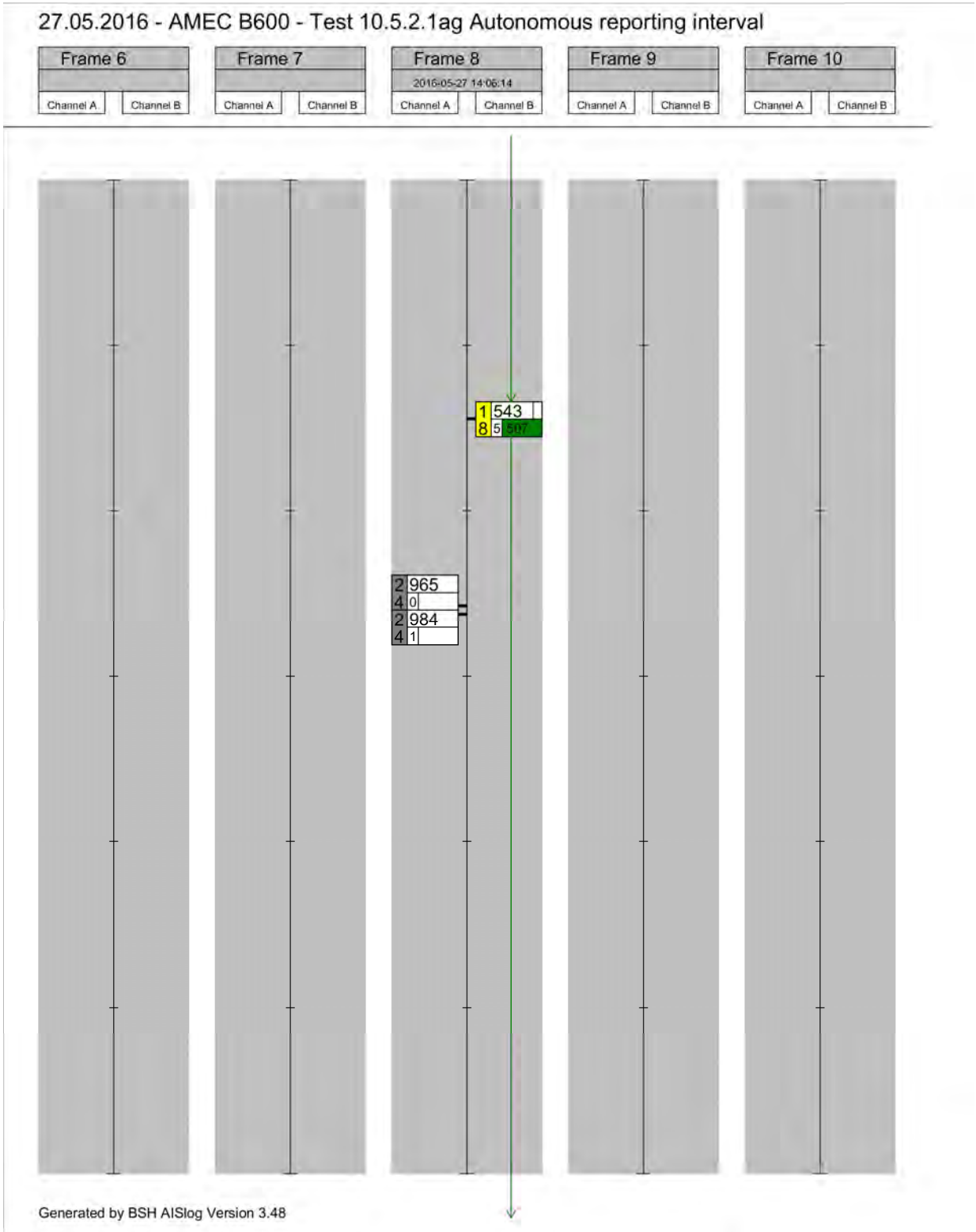

2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 15 s reporting interval
125
100
75
50
25
0
Tx slot) mod NI
2016-05-19 18:00:00
2016-05-19 18:15:00
2016-05-19 18:30:00
2016-05-19 18:45:00
2016-05-19 19:00:00
UTC time
NI = 375 slots
Tx time
NTS
SI-
SI+

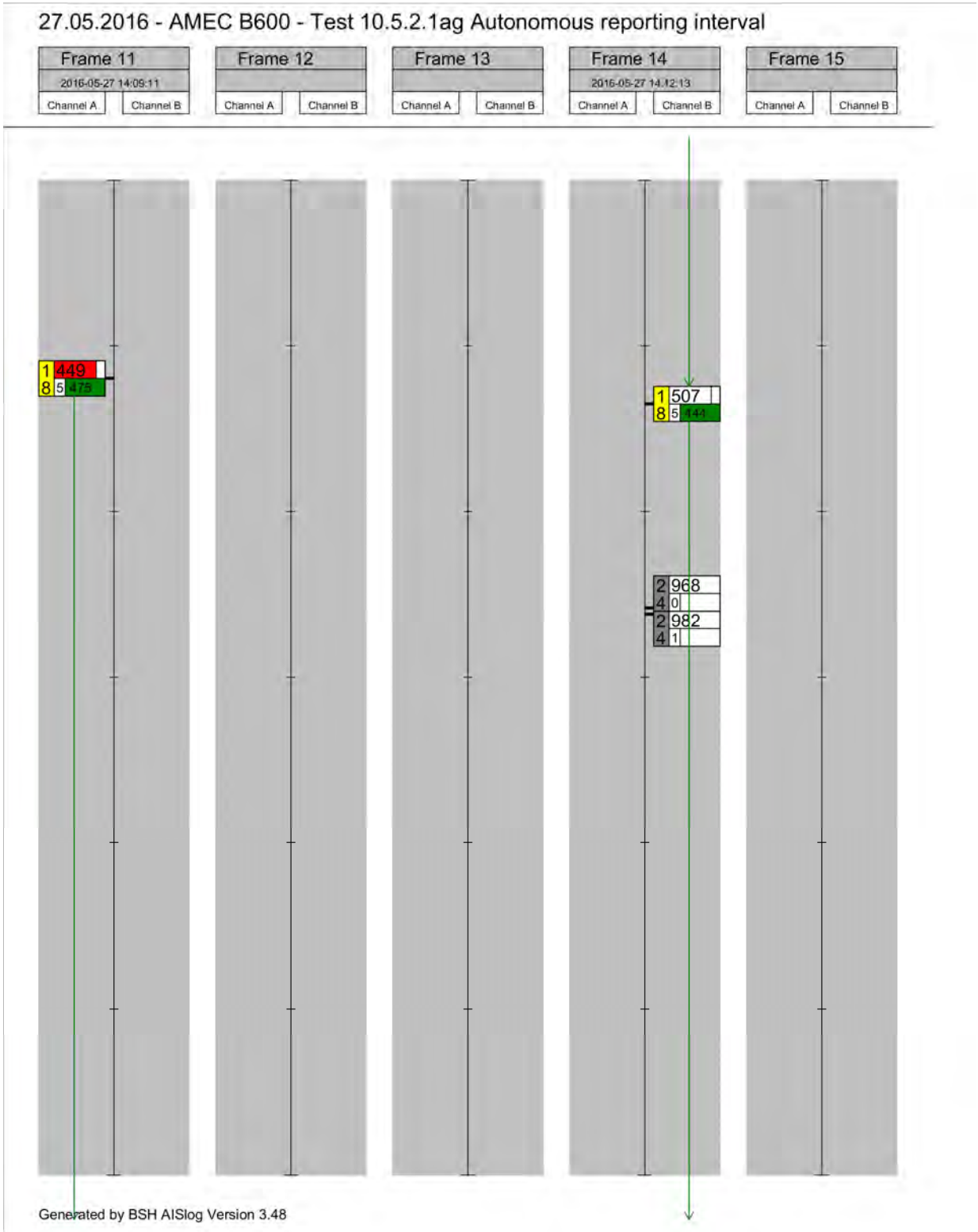

2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 5 s reporting interval
2250
1875
1500
1125
750
375
0
6
5
4
3
2
1
0
2016-05-19 19:00:00
2016-05-19 19:15:00
2016-05-19 19:30:00
2016-05-19 19:45:00
2016-05-19 20:00:00
Slots
Channel

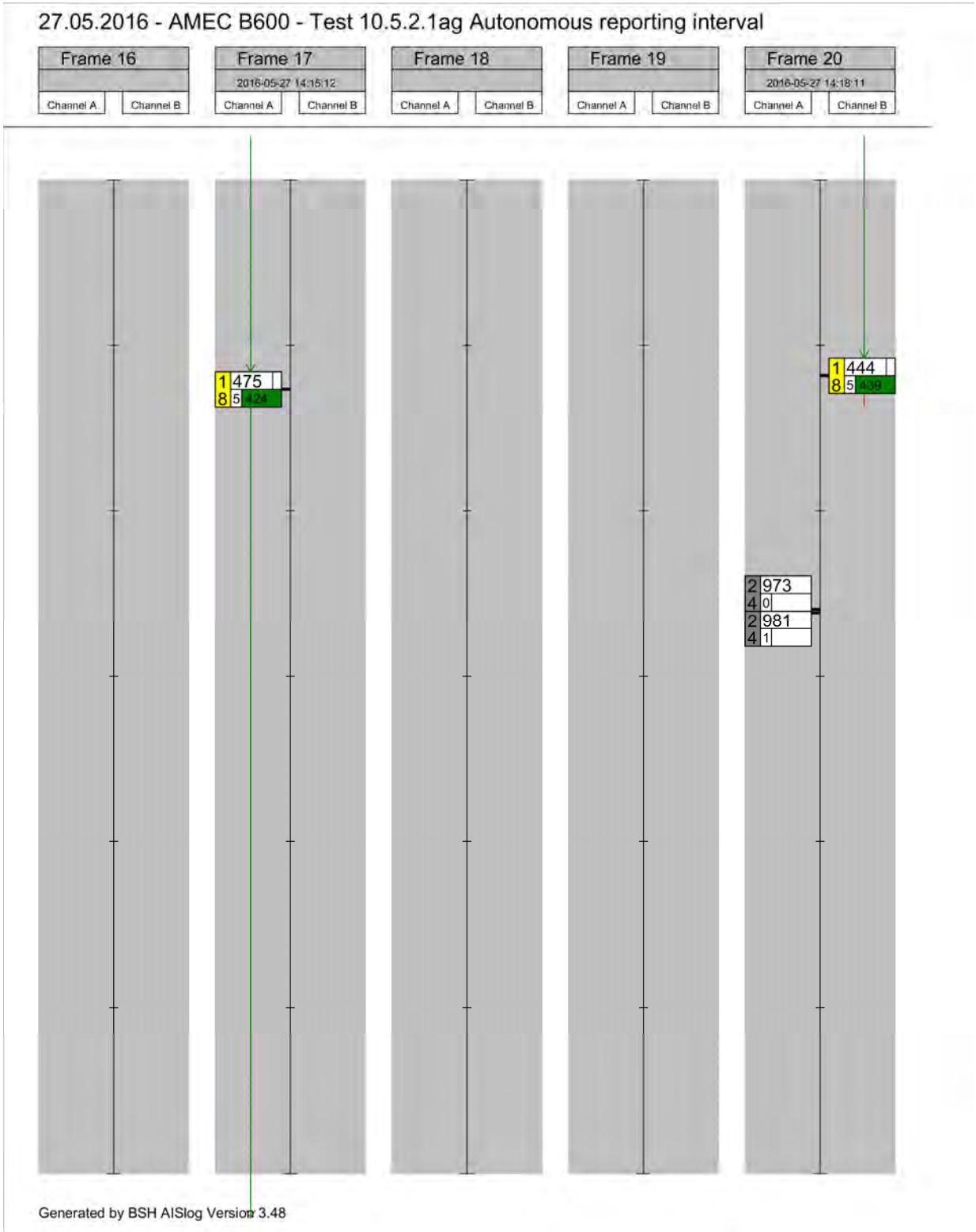

2016-05-20 Ba - AMEC B600 - Test 10.5.2.1 Selection interval at 5 s reporting interval
100
75
50
25
0
Tx slot) mod NI
NI = 187.5 slots
Tx time
NTS
SI-
SI+
2016-05-19 19:00:00
2016-05-19 19:15:00
2016-05-19 19:30:00
2016-05-19 19:45:00
2016-05-19 20:00:00
UTC time

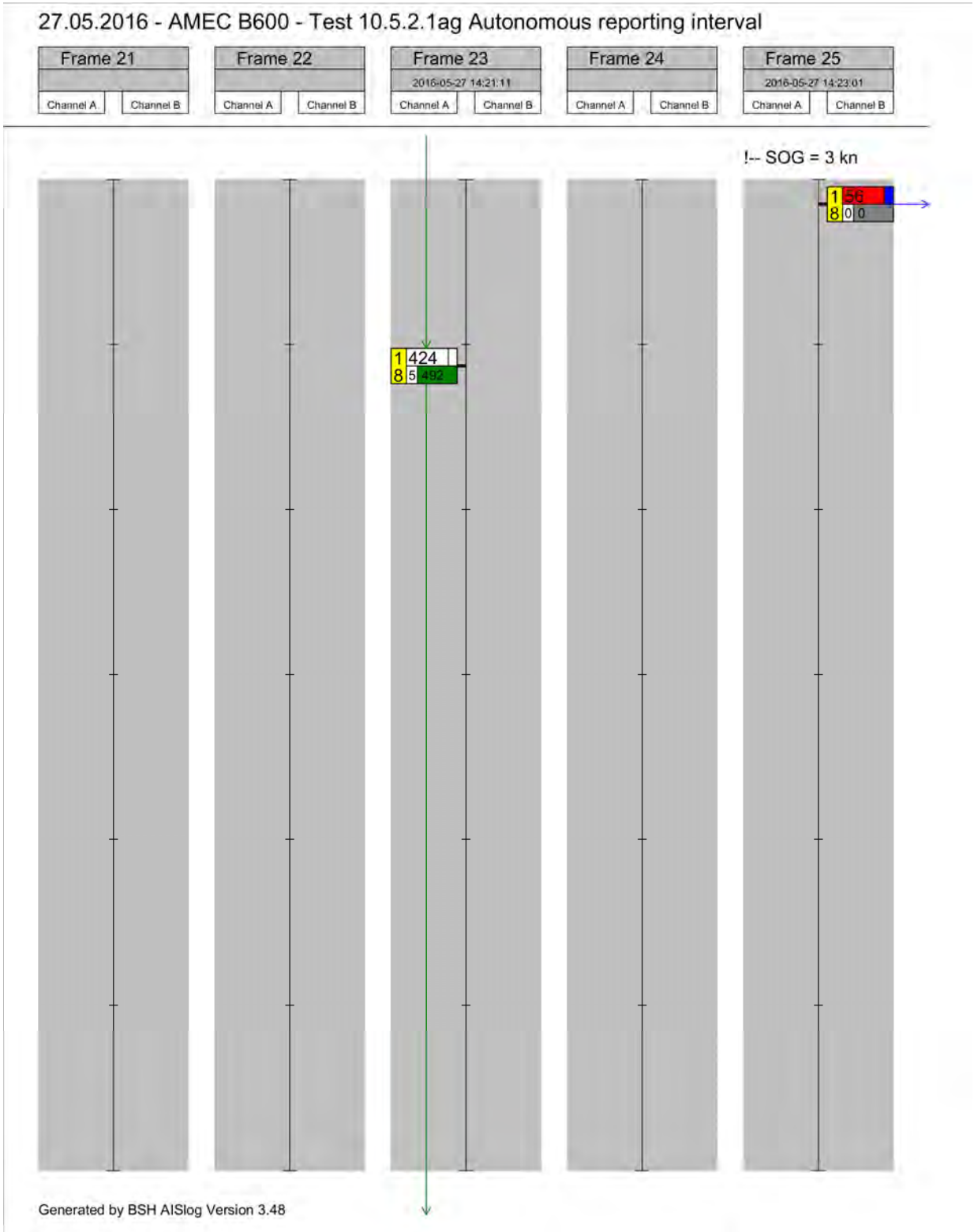
C.4.2 3 min – 30 s interval

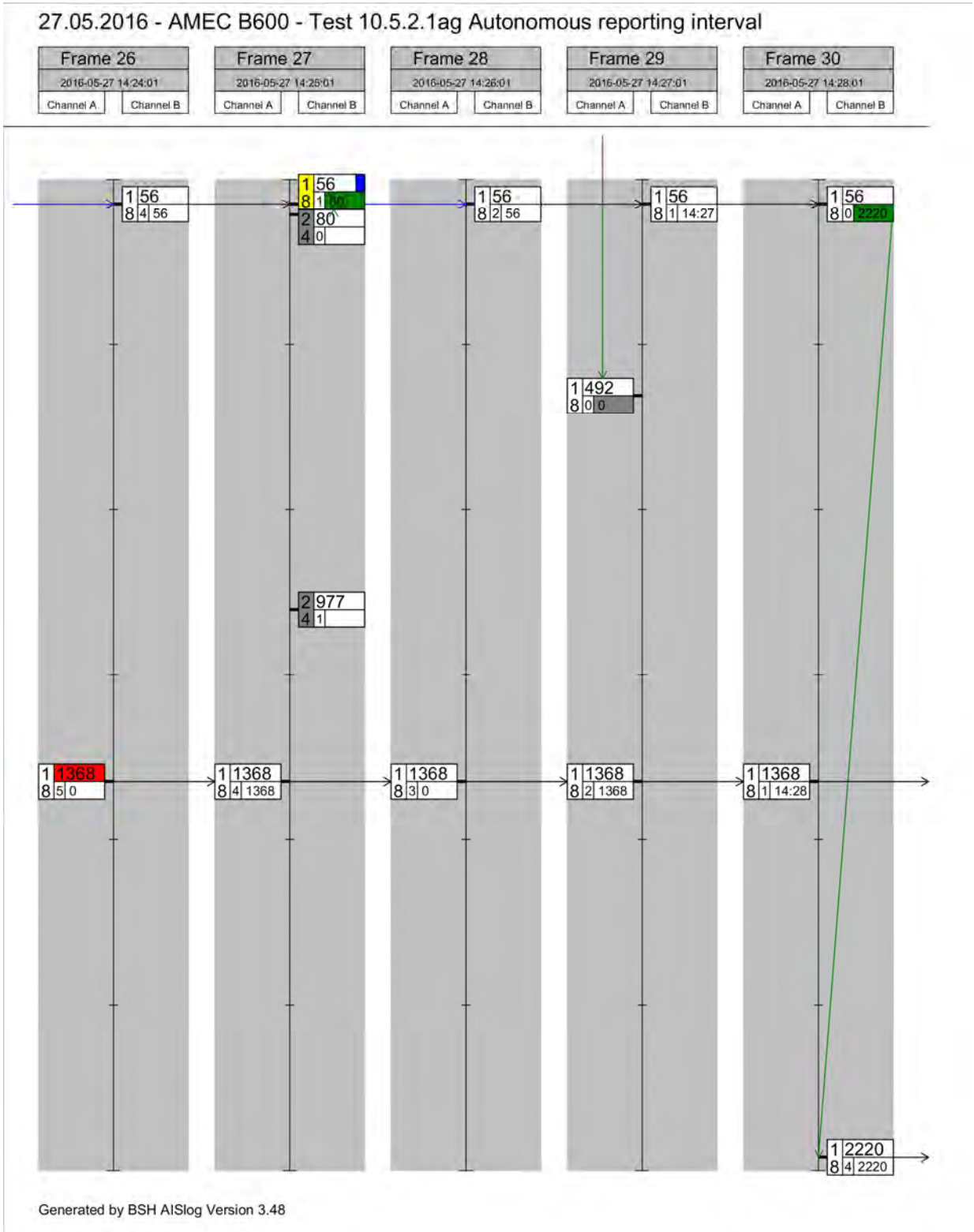


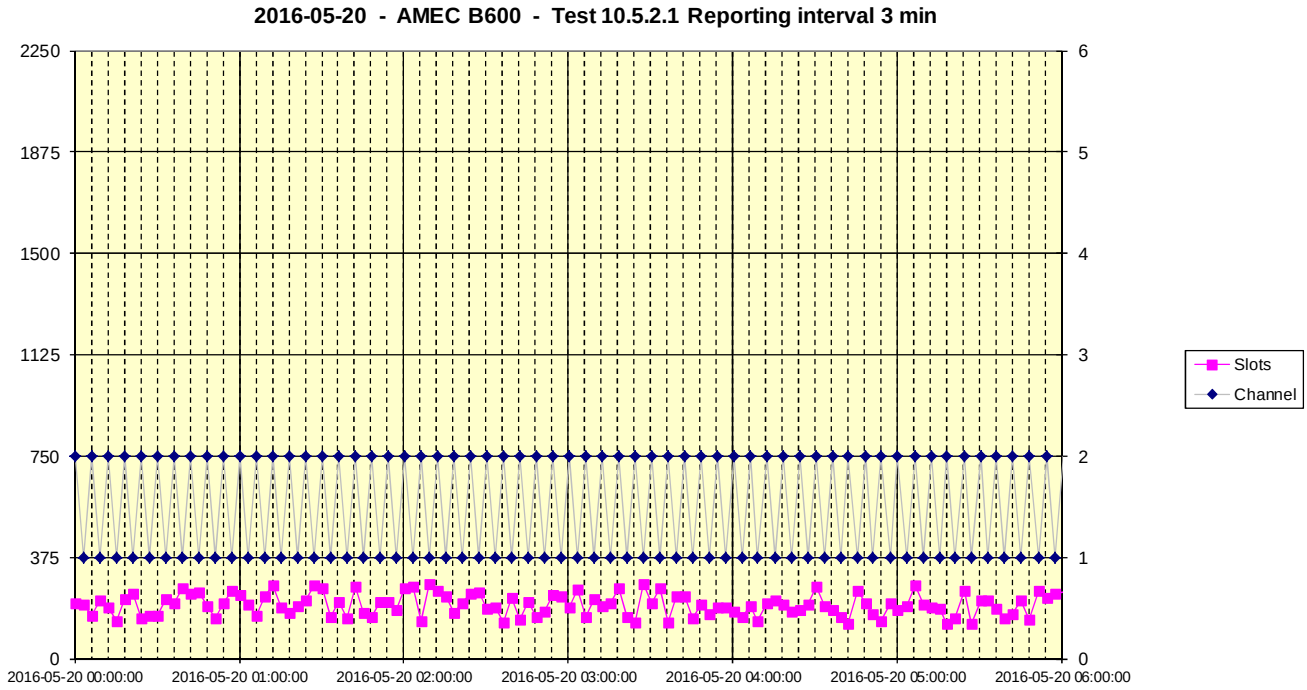

27.05.2016 - AMEC B600 - Test 10.5.2.1ag Autonomous reporting interval
Frame 6
Frame 7
Frame 8
2016-05-27 14:06:14
Frame 9
Frame 10
Channel A
Channel B
1 543
8 5 507
2 965
4 0
2 984
4 1
Generated by BSH AISlog Version 3.48

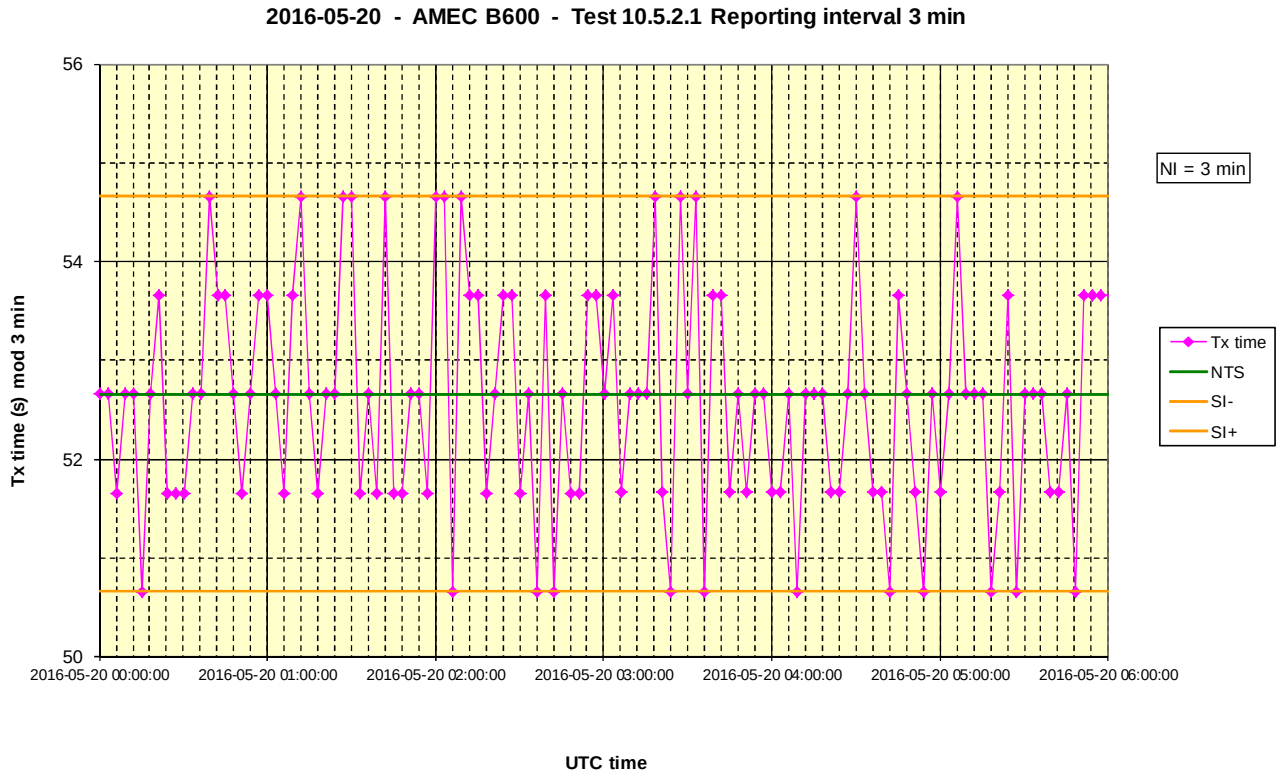

27.05.2016 - AMEC B600 - Test 10.5.2.1ag Autonomous reporting interval
Frame 11
2016-05-27 14:05:11
Channel A
Channel B
Frame 12
Channel A
Channel B
Frame 13
Channel A
Channel B
Frame 14
2016-05-27 14:12:13
Channel A
Channel B
Frame 15
Channel A
Channel B
1 449
8 5 475
1 507
8 5 444
2 968
4 0
2 982
4 1
Generated by BSH AISlog Version 3.48


27.05.2016 - AMEC B600 - Test 10.5.2.1ag Autonomous reporting interval
Frame 16
Channel A
Channel B
Frame 17
2016-05-27 14:15:12
Channel A
Channel B
Frame 18
Channel A
Channel B
Frame 19
Channel A
Channel B
Frame 20
2016-05-27 14:18:11
Channel A
Channel B
1 475
8 5 424
1 444
8 5 439
2 973
4 0
2 981
4 1
Generated by BSH AISlog Version 3.48


27.05.2016 - AMEC B600 - Test 10.5.2.1ag Autonomous reporting interval
Frame 21
Channel A
Channel B
Frame 22
Channel A
Channel B
Frame 23
2016-05-27 14:21:11
Channel A
Channel B
Frame 24
Channel A
Channel B
Frame 25
2016-05-27 14:23:01
Channel A
Channel B
!-- SOG = 3 kn
1 424
8 5 492
1 56
8 0 0
Generated by BSH AISlog Version 3.48

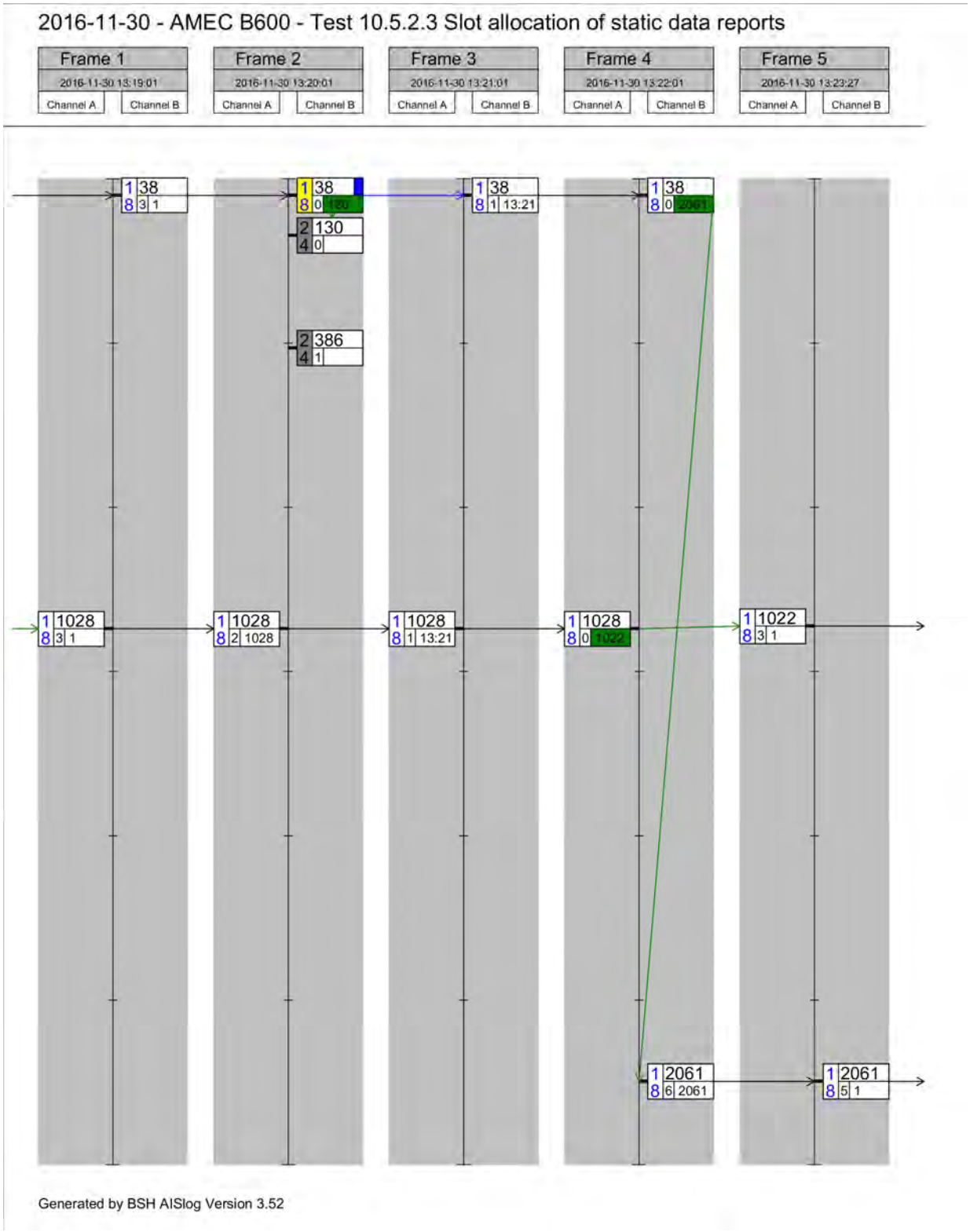

27.05.2016 - AMEC B600 - Test 10.5.2.1ag Autonomous reporting interval
Frame 26
2016-05-27 14:24:01
Channel A
Channel B
Frame 27
2016-05-27 14:25:01
Channel A
Channel B
Frame 28
2016-05-27 14:26:01
Channel A
Channel B
Frame 29
2016-05-27 14:27:01
Channel A
Channel B
Frame 30
2016-05-27 14:28:01
Channel A
Channel B
1 56
8 4 56
1 56
8 1
2 80
4 0
1 56
8 2 56
1 56
8 1 14:27
1 56
8 0 2220
1 492
8 0 0
2 977
4 1
1 1368
8 5 0
1 1368
8 4 1368
1 1368
8 3 0
1 1368
8 2 1368
1 1368
8 1 14:28
1 2220
8 4 2220
Generated by BSH AISlog Version 3.48

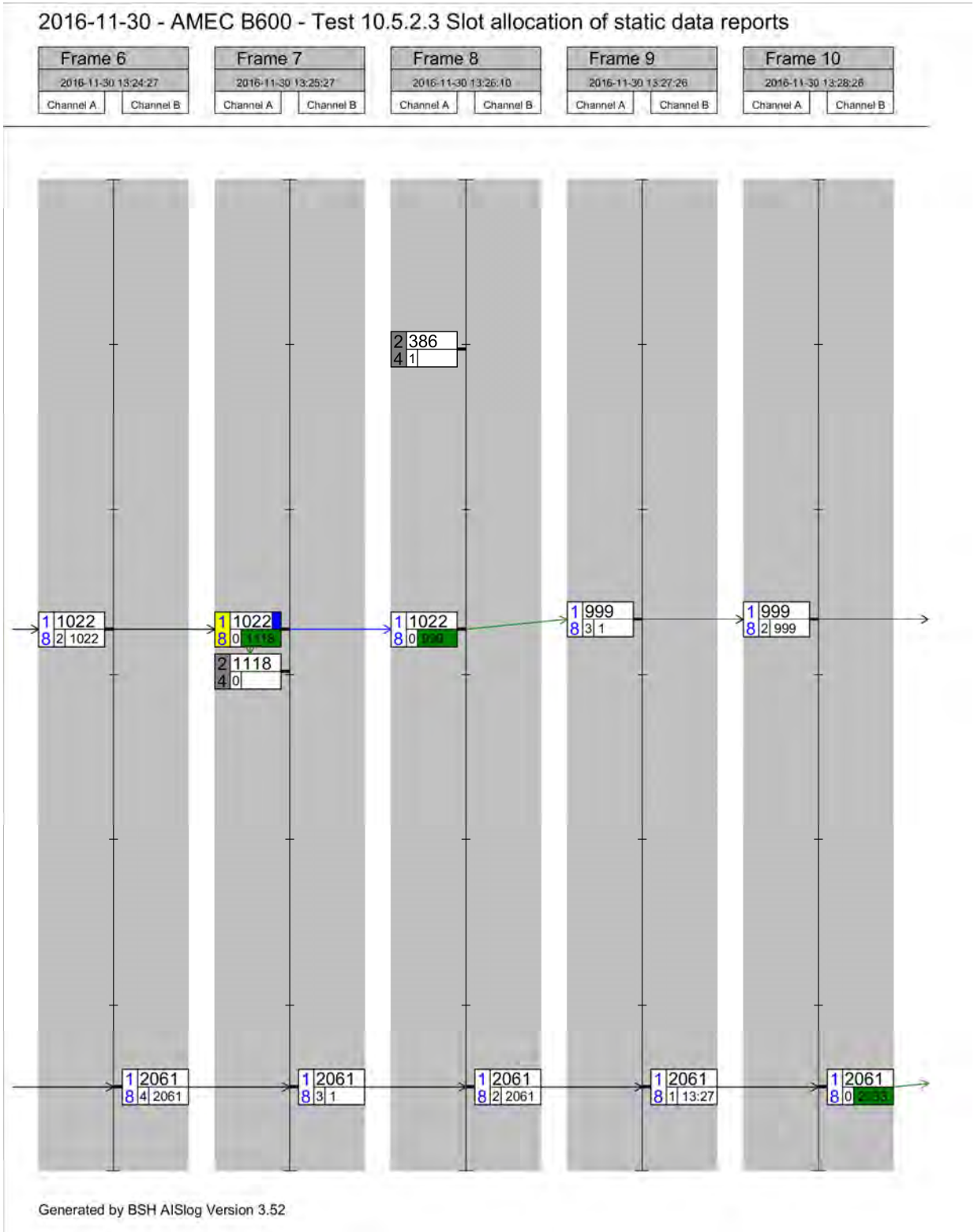

2016-05-20 - AMEC B600 - Test 10.5.2.1 Reporting interval 3 min
2250
1875
1500
1125
750
375
0
6
5
4
3
2
1
0
2016-05-20 00:00:00
2016-05-20 01:00:00
2016-05-20 02:00:00
2016-05-20 03:00:00
2016-05-20 04:00:00
2016-05-20 05:00:00
2016-05-20 06:00:00
Slots
Channel


2016-05-20 - AMEC B600 - Test 10.5.2.1 Reporting interval 3 min
Tx time (s) mod 3 min
56
54
52
50
2016-05-20 00:00:00
2016-05-20 01:00:00
2016-05-20 02:00:00
2016-05-20 03:00:00
2016-05-20 04:00:00
2016-05-20 05:00:00
2016-05-20 06:00:00
UTC time
NI = 3 min
Tx time
NTS
SI-
SI+

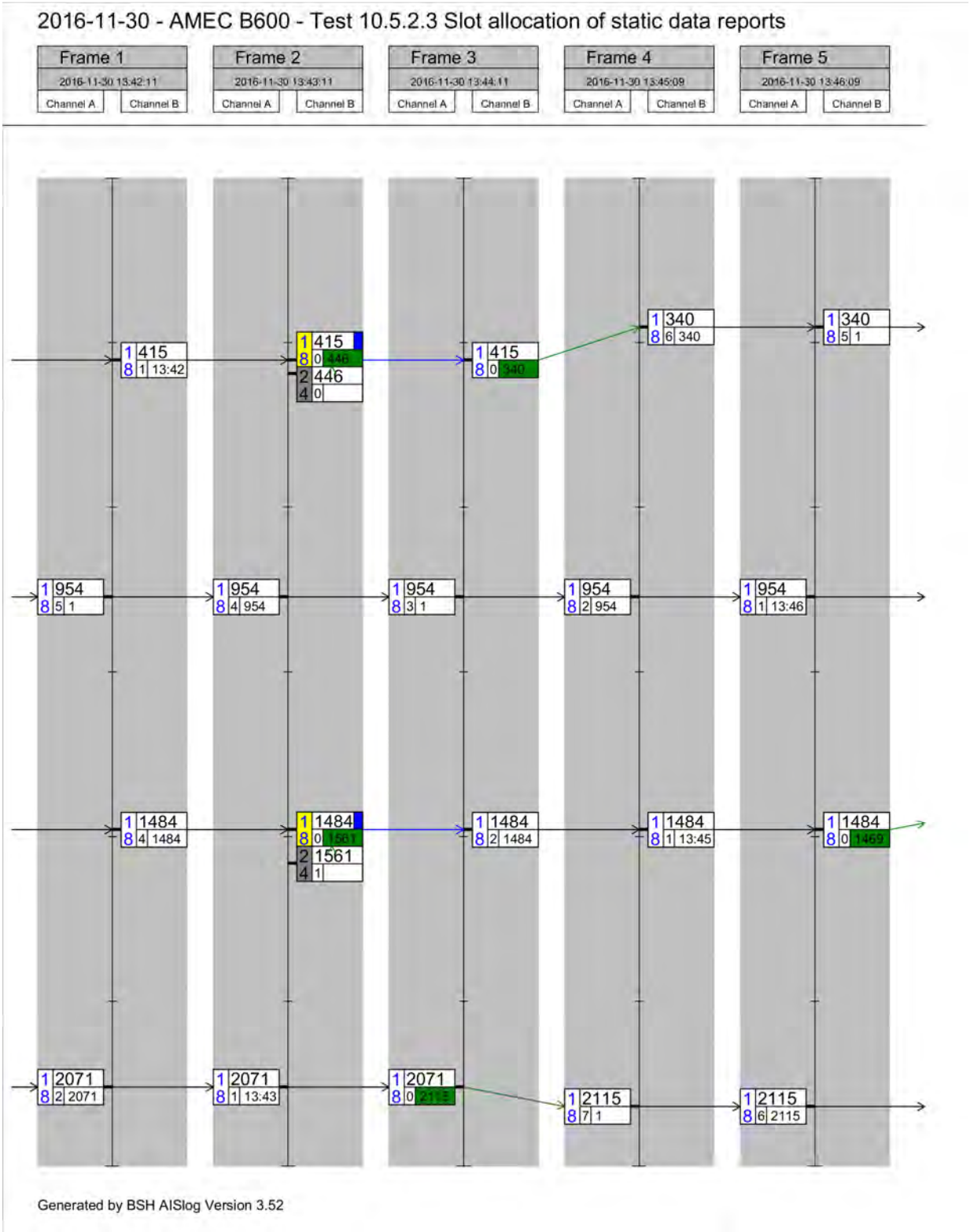
C.5 10.5.2.3 Static data reporting interval

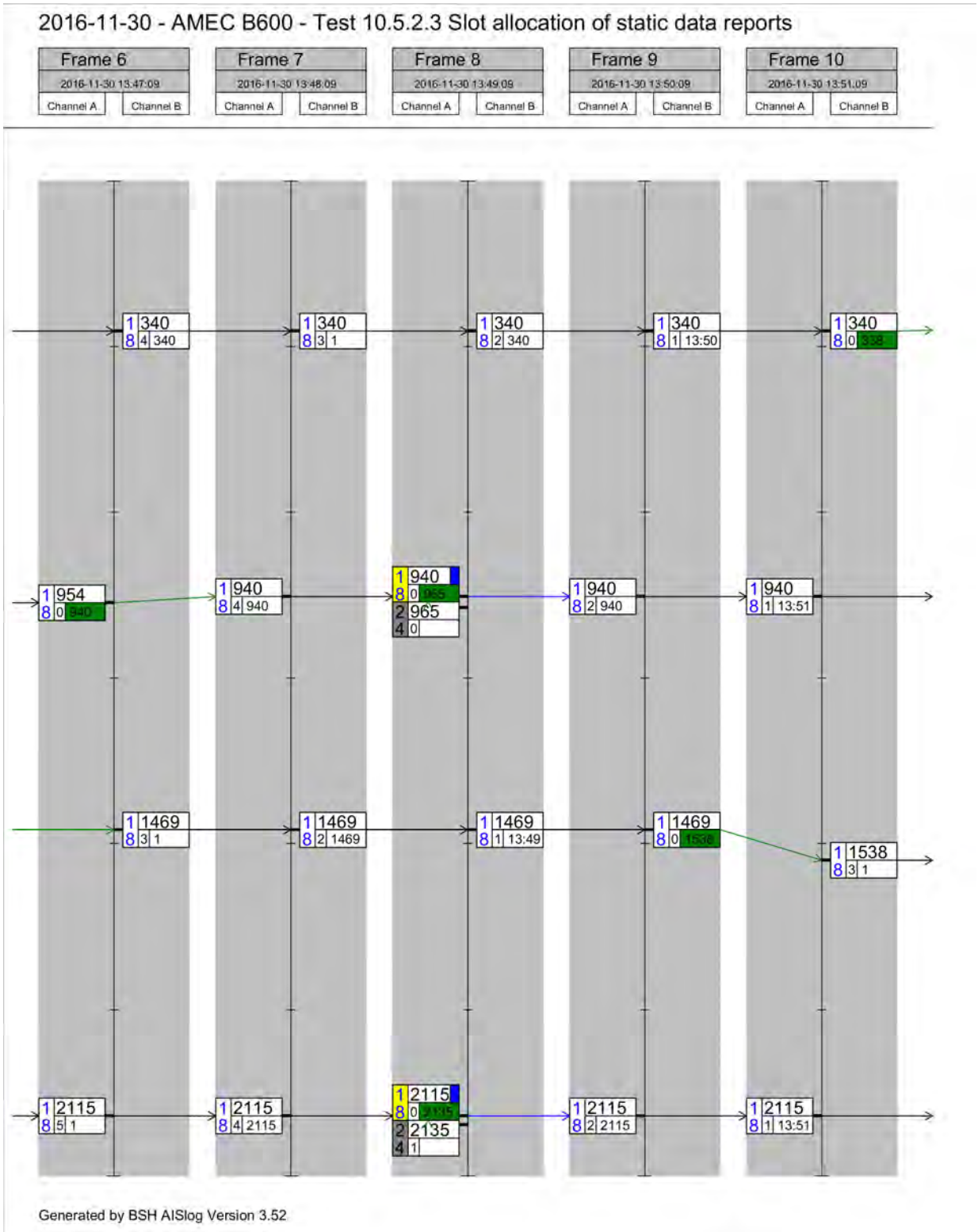
C.5.1 Slot allocation at 30 s interval



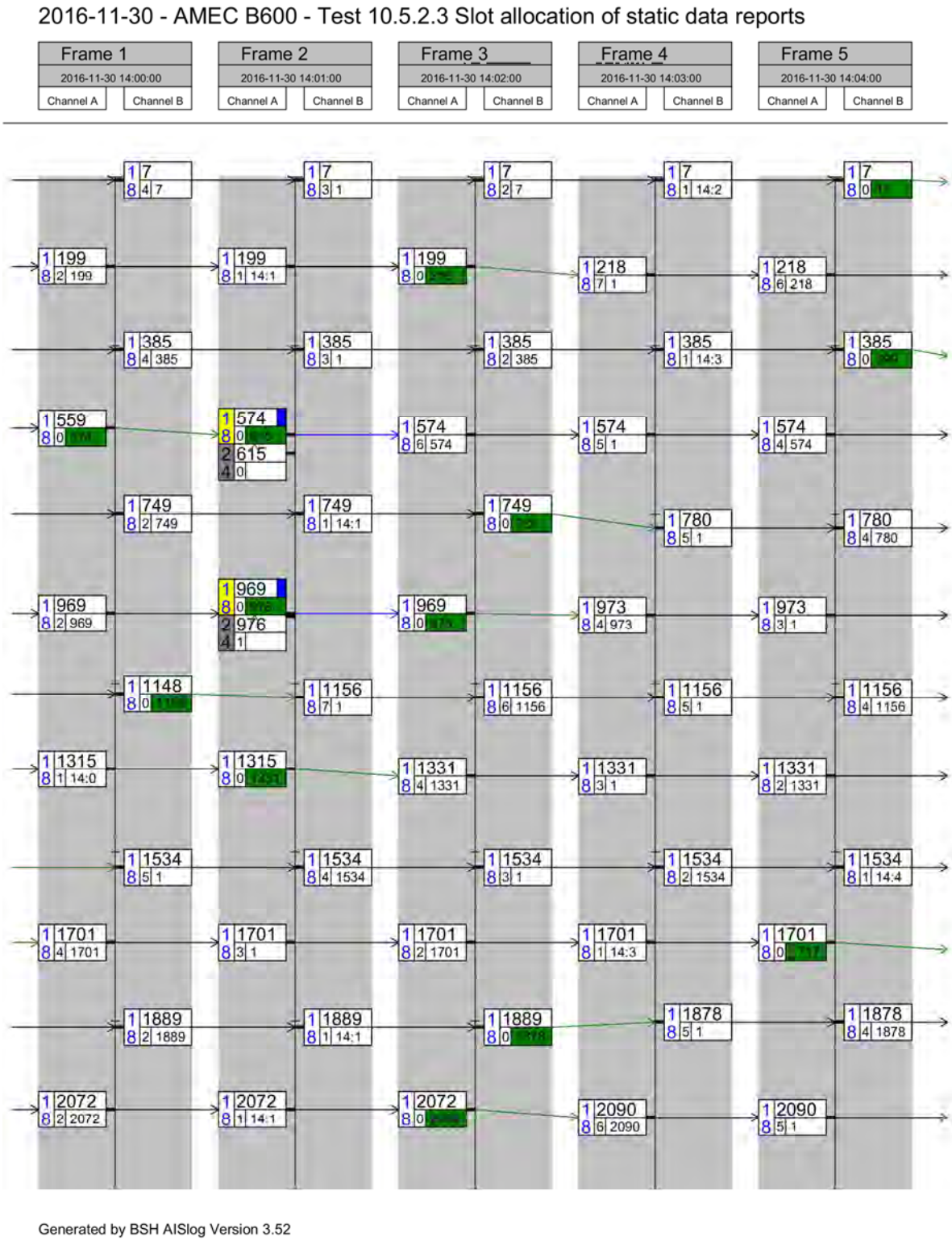

2016-11-30 - AMEC B600 - Test 10.5.2.3 Slot allocation of static data reports
Frame 6
2016-11-30 13:24:27
Channel A
Channel B
Frame 7
2016-11-30 13:25:27
Channel A
Channel B
Frame 8
2016-11-30 13:26:10
Channel A
Channel B
Frame 9
2016-11-30 13:27:26
Channel A
Channel B
Frame 10
2016-11-30 13:28:26
Channel A
Channel B
2 386 4 1
1 1022 8 2 1022
1 1022 8 0
2 1118 4 0
1 1022 8 0
1 999 8 3 1
1 999 8 2 999
1 2061 8 4 2061
1 2061 8 3 1
1 2061 8 2 2061
1 2061 8 1 13:27
1 2061 8 0
Generated by BSH AISlog Version 3.52

C.5.2 Slot allocation at 15 s interval

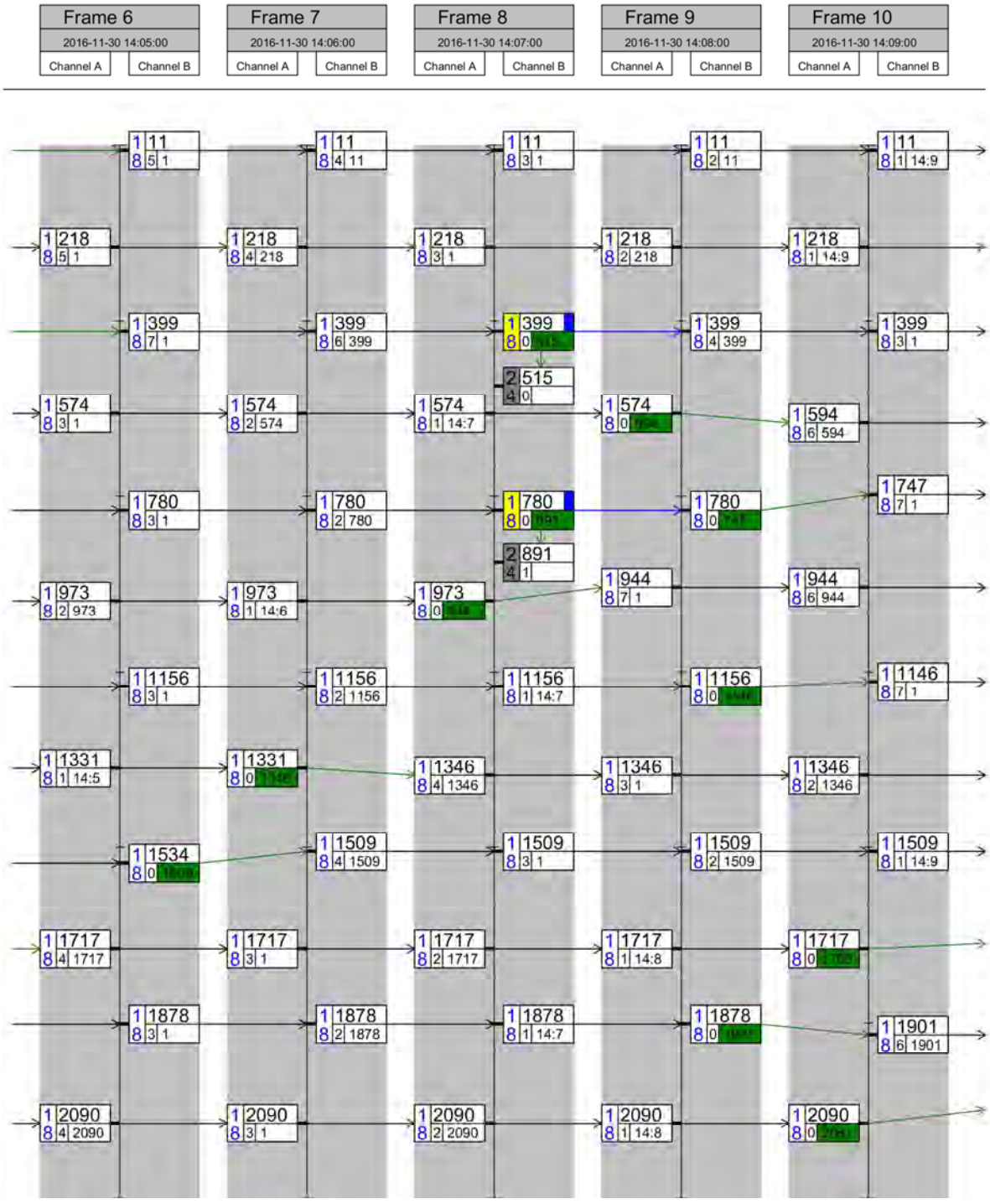



2016-11-30 - AMEC B600 - Test 10.5.2.3 Slot allocation of static data reports
Frame 6
2016-11-30 13:47:09
Channel A
Channel B
Frame 7
2016-11-30 13:48:09
Channel A
Channel B
Frame 8
2016-11-30 13:49:09
Channel A
Channel B
Frame 9
2016-11-30 13:50:09
Channel A
Channel B
Frame 10
2016-11-30 13:51:09
Channel A
Channel B
1 340 8 4 340
1 340 8 3 1
1 340 8 2 340
1 340 8 1 13:50
1 340 8 0 338
1 954 8 0 940
1 940 8 4 940
1 940 8 0 965
2 965 4 0
1 940 8 2 940
1 940 8 1 13:51
1 1469 8 3 1
1 1469 8 2 1469
1 1469 8 1 13:49
1 1469 8 0 1538
1 1538 8 3 1
1 2115 8 5 1
1 2115 8 4 2115
1 2115 8 0 2115
2 2135 4 1
1 2115 8 2 2115
1 2115 8 1 13:51
Generated by BSH AISlog Version 3.52

C.5.3 Slot allocation at 5 s interval

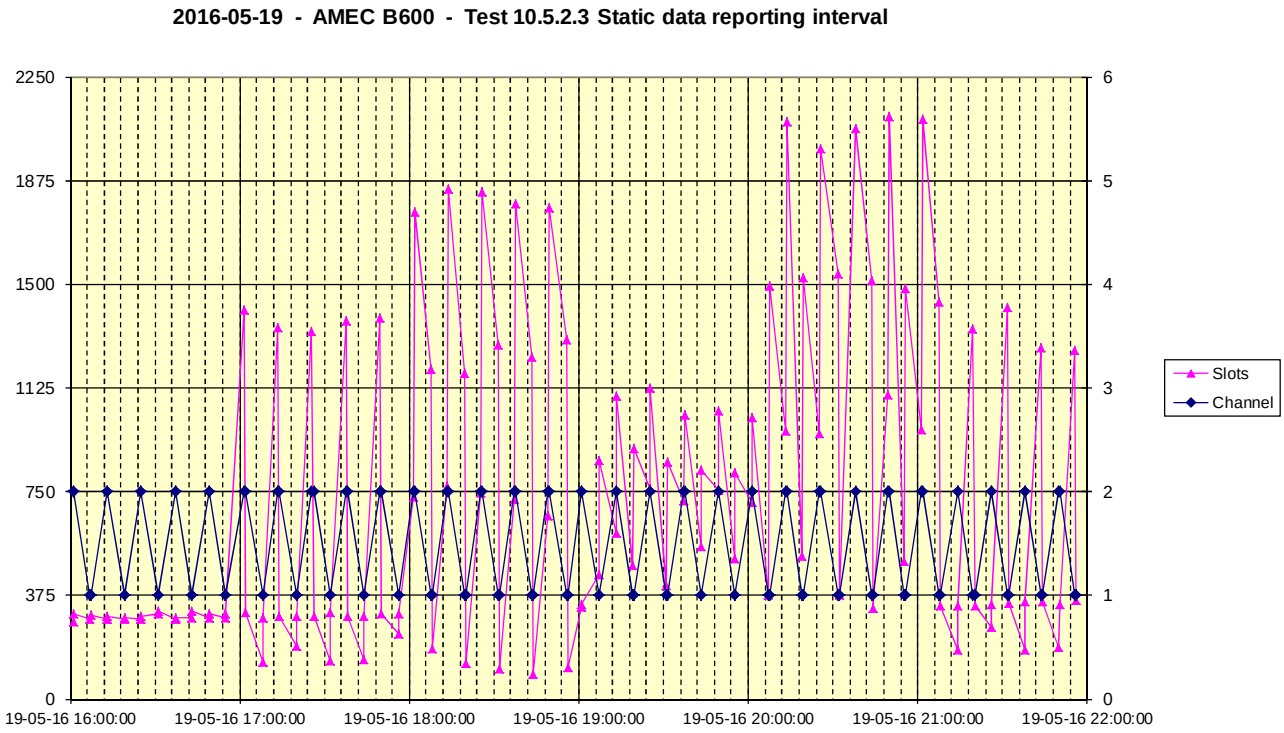


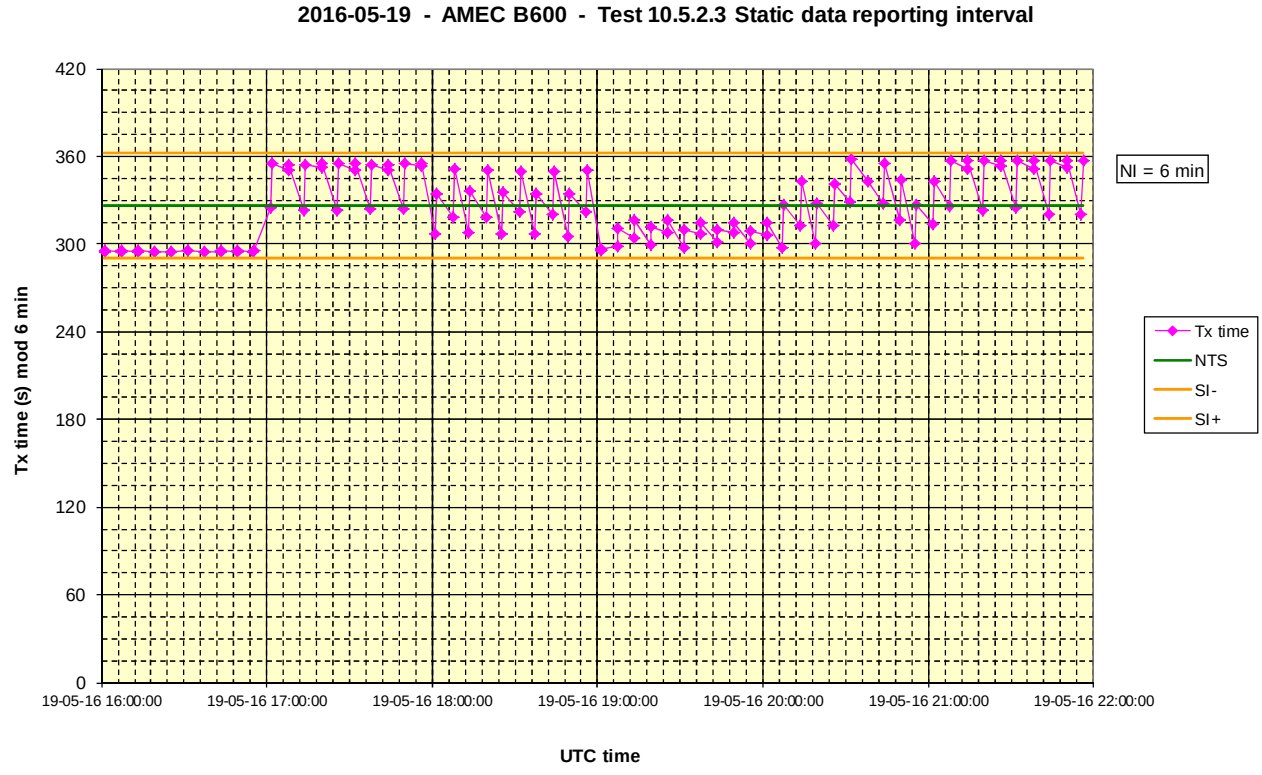
2016-11-30 - AMEC B600 - Test 10.5.2.3 Slot allocation of static data reports



Generated by BSH AISlog Version 3.52

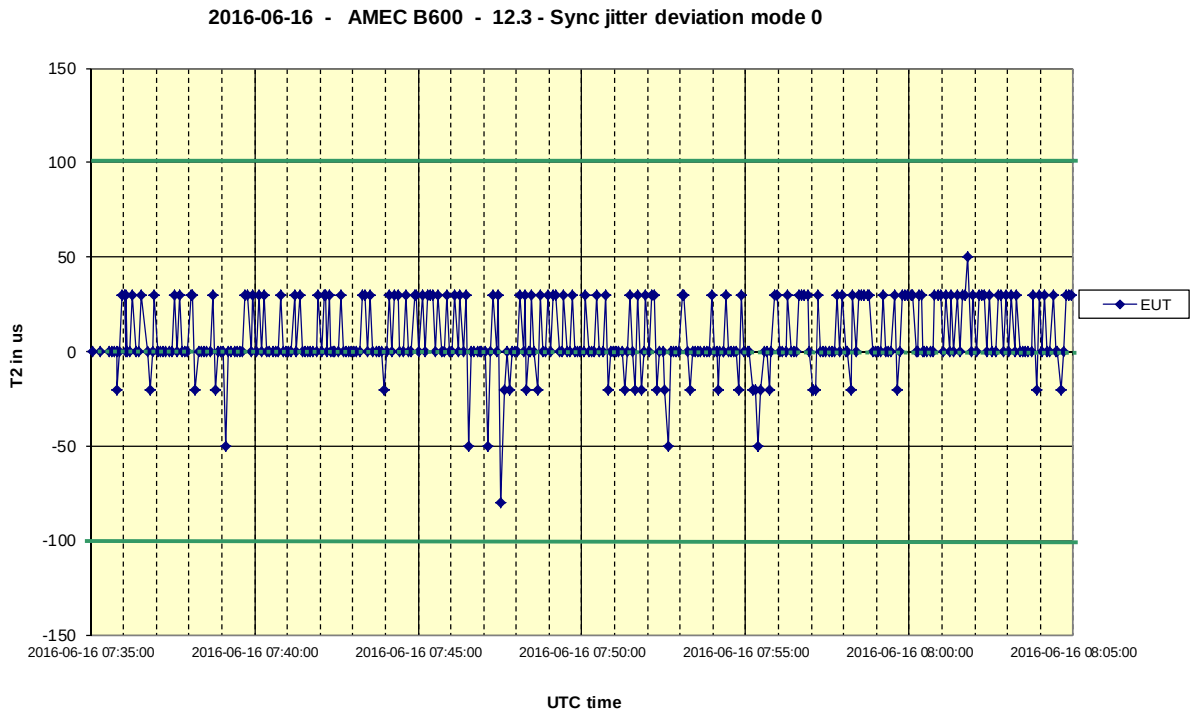
C.5.4 Transmission schedule of Message 24



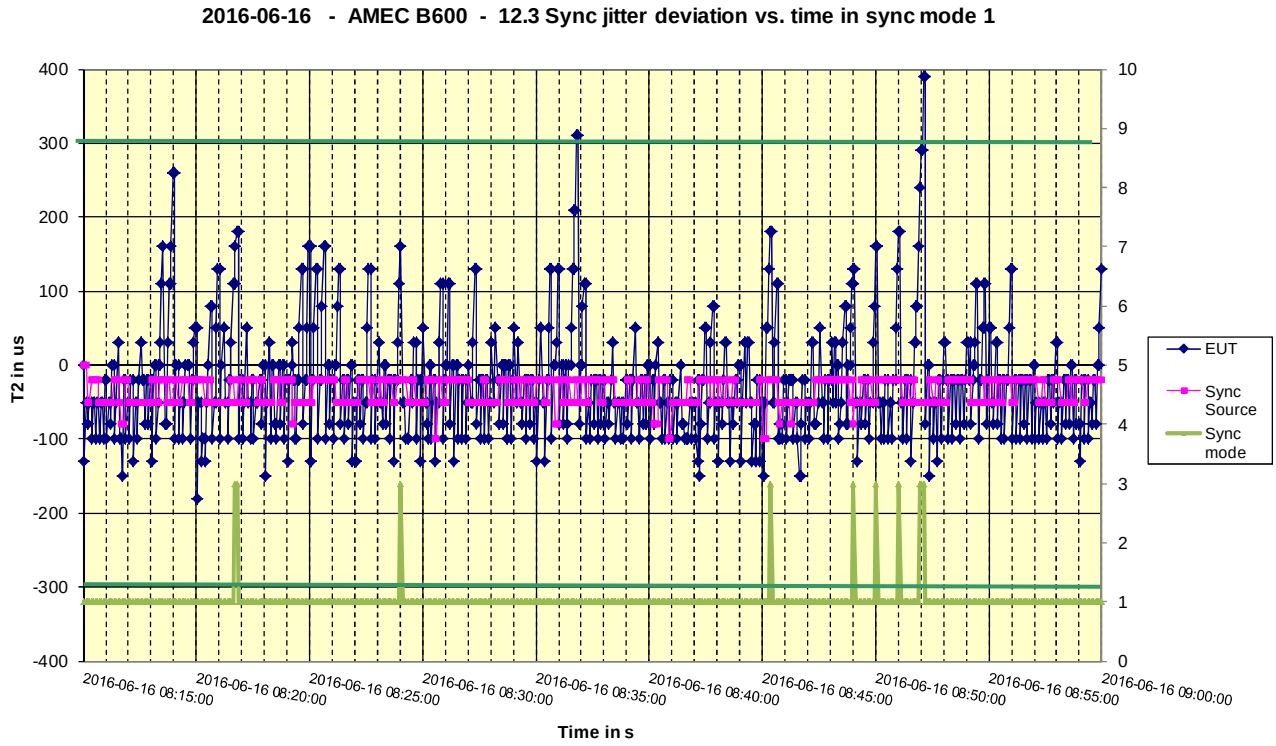


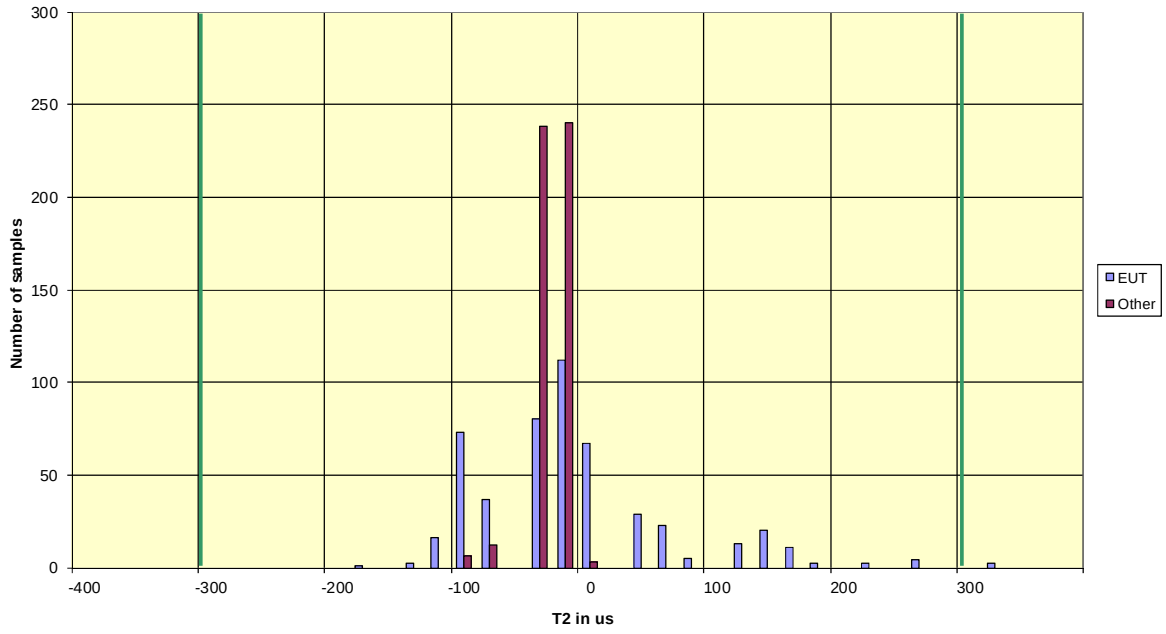
C.6 12.3 Synchronisation jitter

C.6.1 UTC direct synchronisation



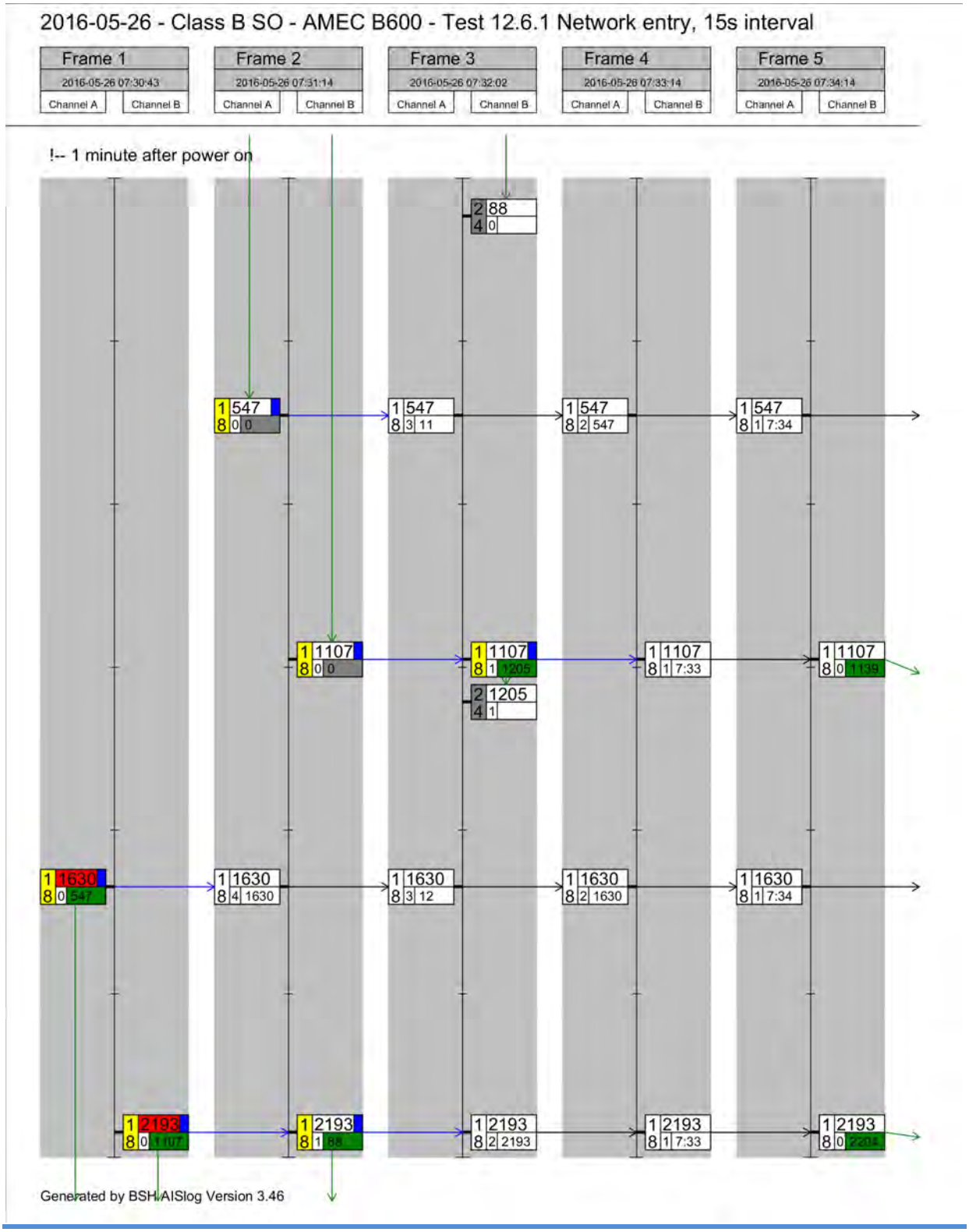
C.6.2 UTC indirect synchronisation

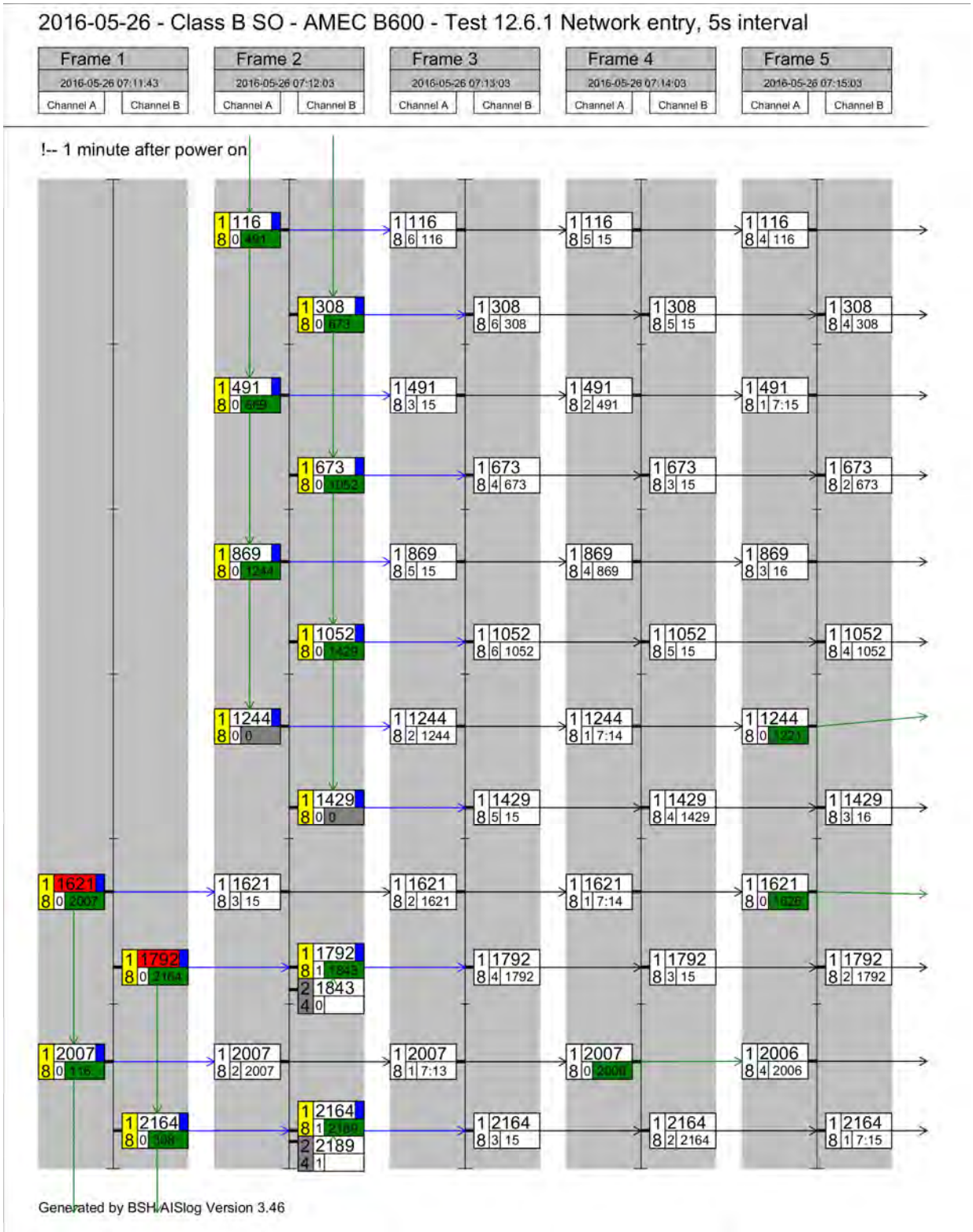




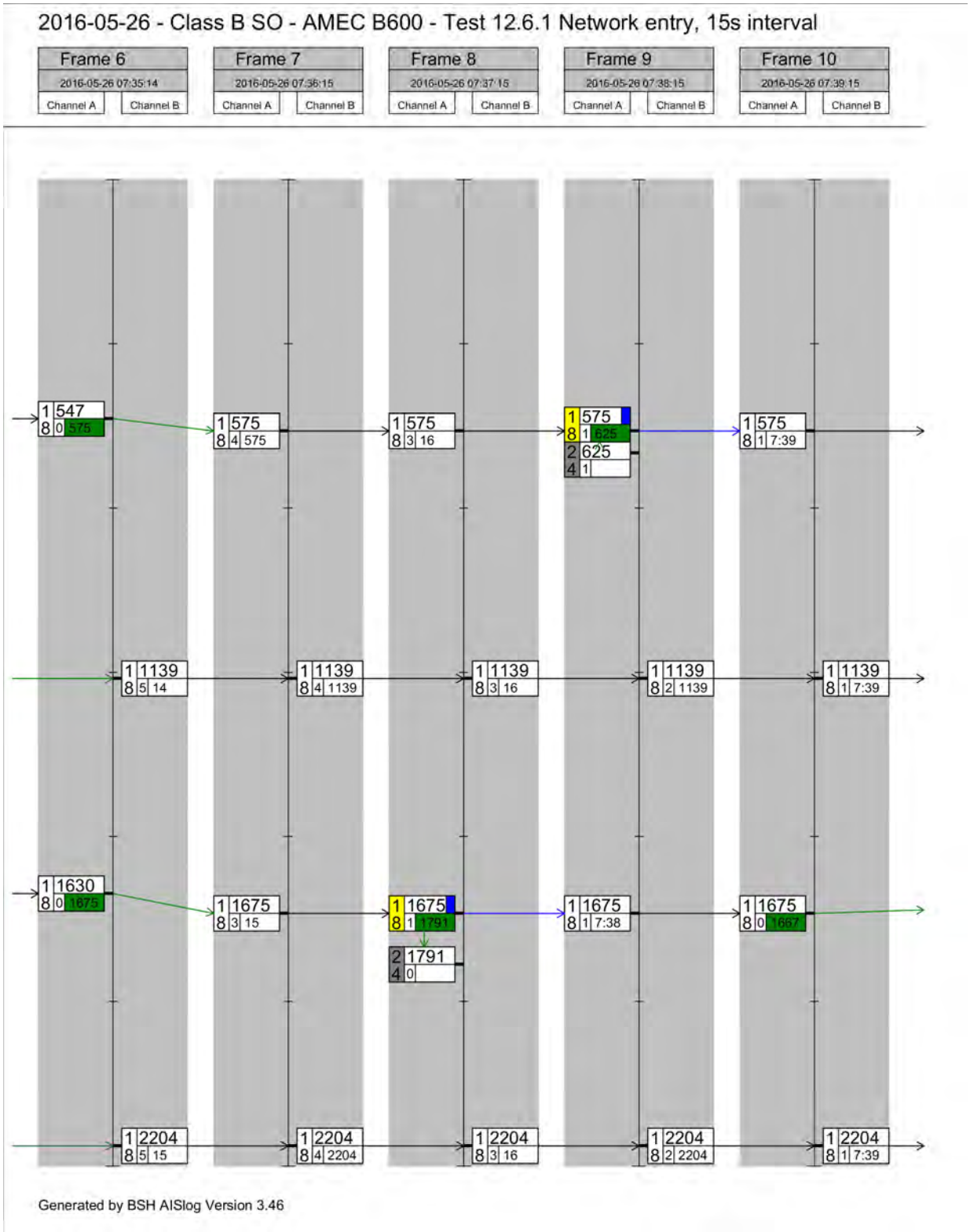
C.7 12.6 Slot allocation

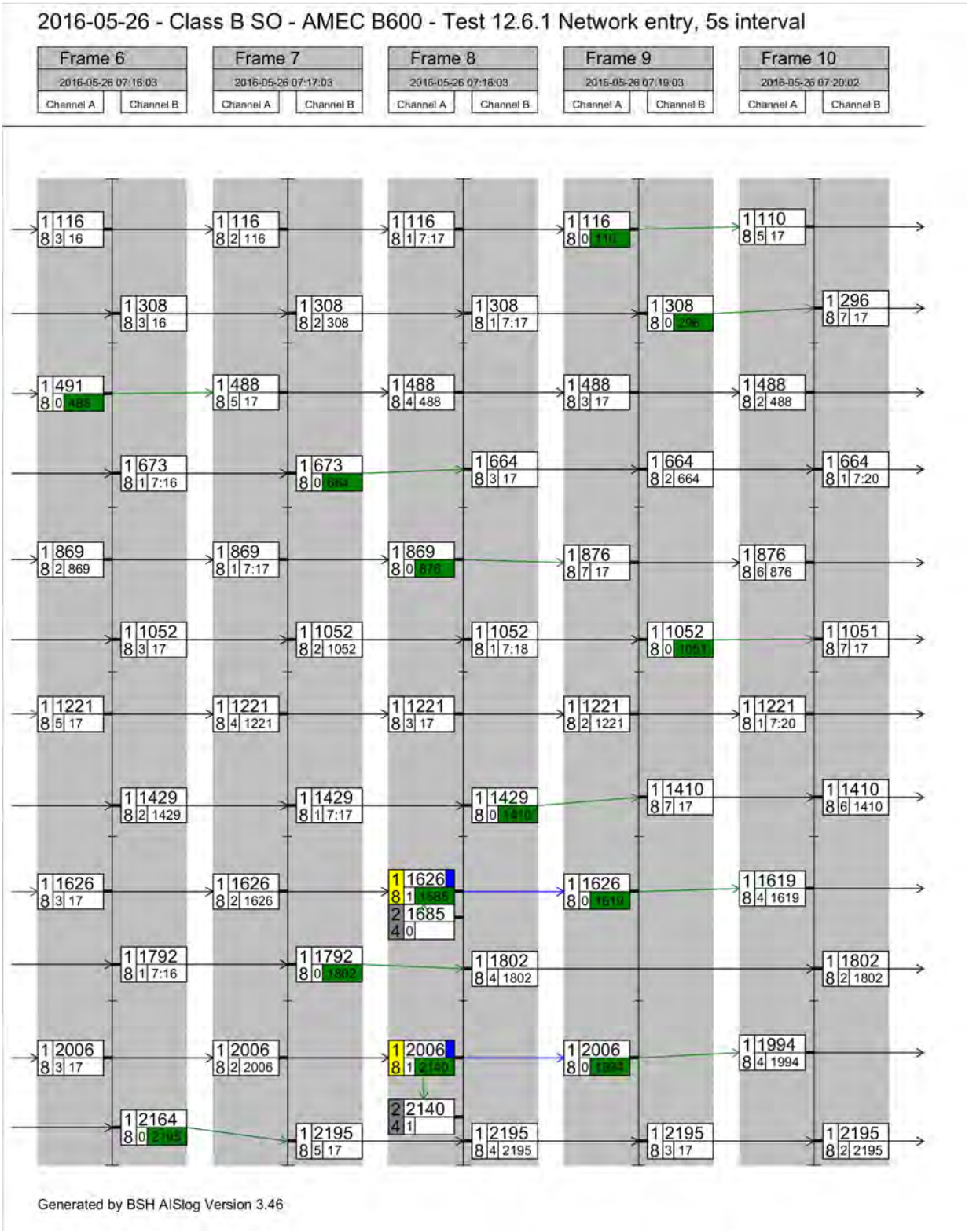
C.7.1 12.6.1 Network entry



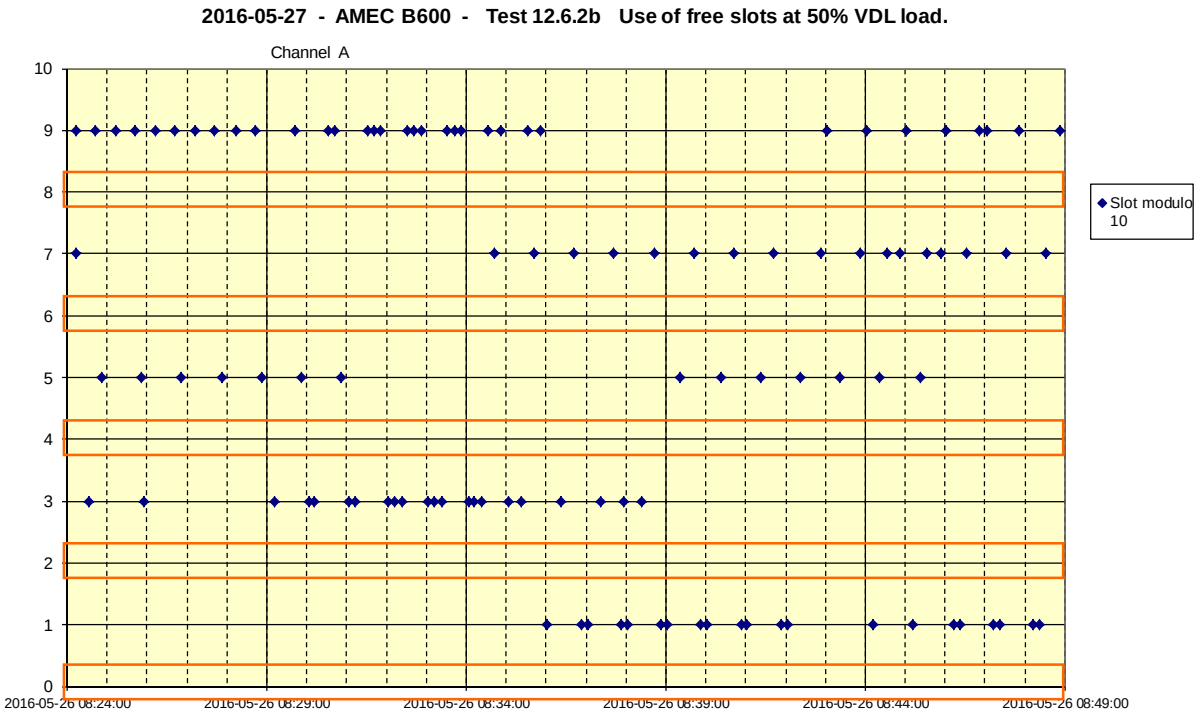

2016-05-26 - Class B SO - AMEC B600 - Test 12.6.1 Network entry, 5s interval
Frame 1
2016-05-26 07:11:43
Channel A
Channel B
Frame 2
2016-05-26 07:12:03
Frame 3
2016-05-26 07:13:03
Frame 4
2016-05-26 07:14:03
Frame 5
2016-05-26 07:15:03
!-- 1 minute after power on
Generated by BSH/AISlog Version 3.46

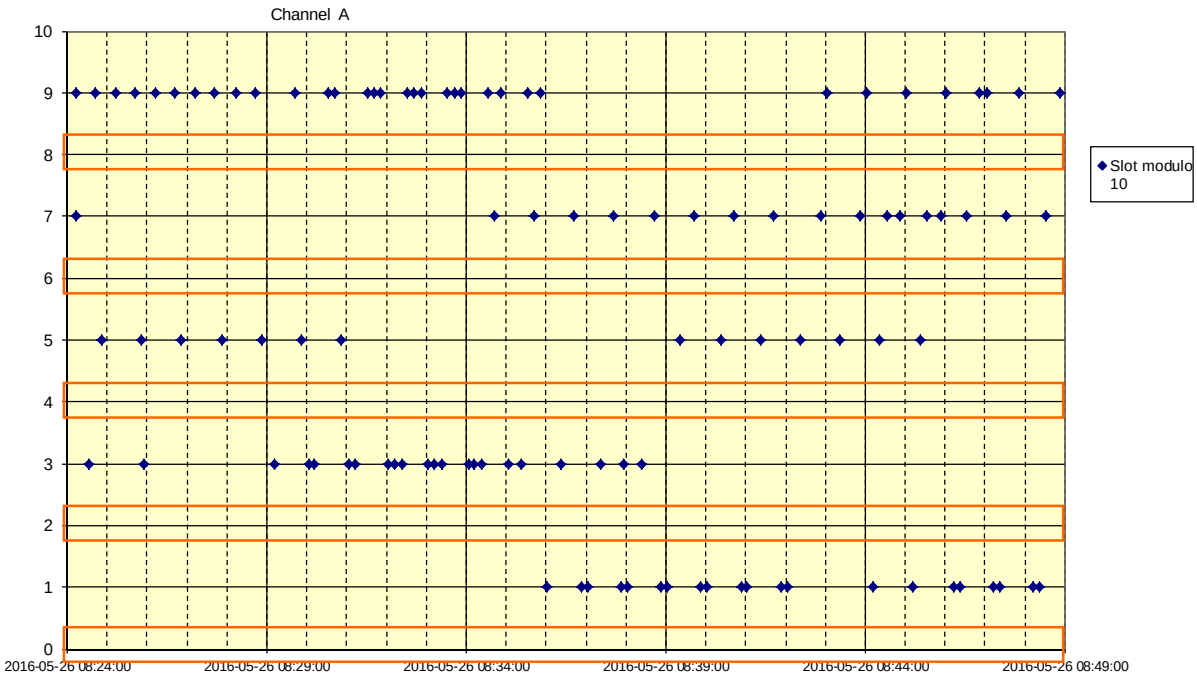
C.7.2 12.6.2 Autonomous scheduled tx (SOTDMA)




2016-05-26 - Class B SO - AMEC B600 - Test 12.6.1 Network entry, 5s interval
Frame 6
2016-05-26 07:16:03
Channel A
Channel B
Frame 7
2016-05-26 07:17:03
Channel A
Channel B
Frame 8
2016-05-26 07:18:03
Channel A
Channel B
Frame 9
2016-05-26 07:19:03
Channel A
Channel B
Frame 10
2016-05-26 07:20:02
Channel A
Channel B
Generated by BSH AISlog Version 3.46

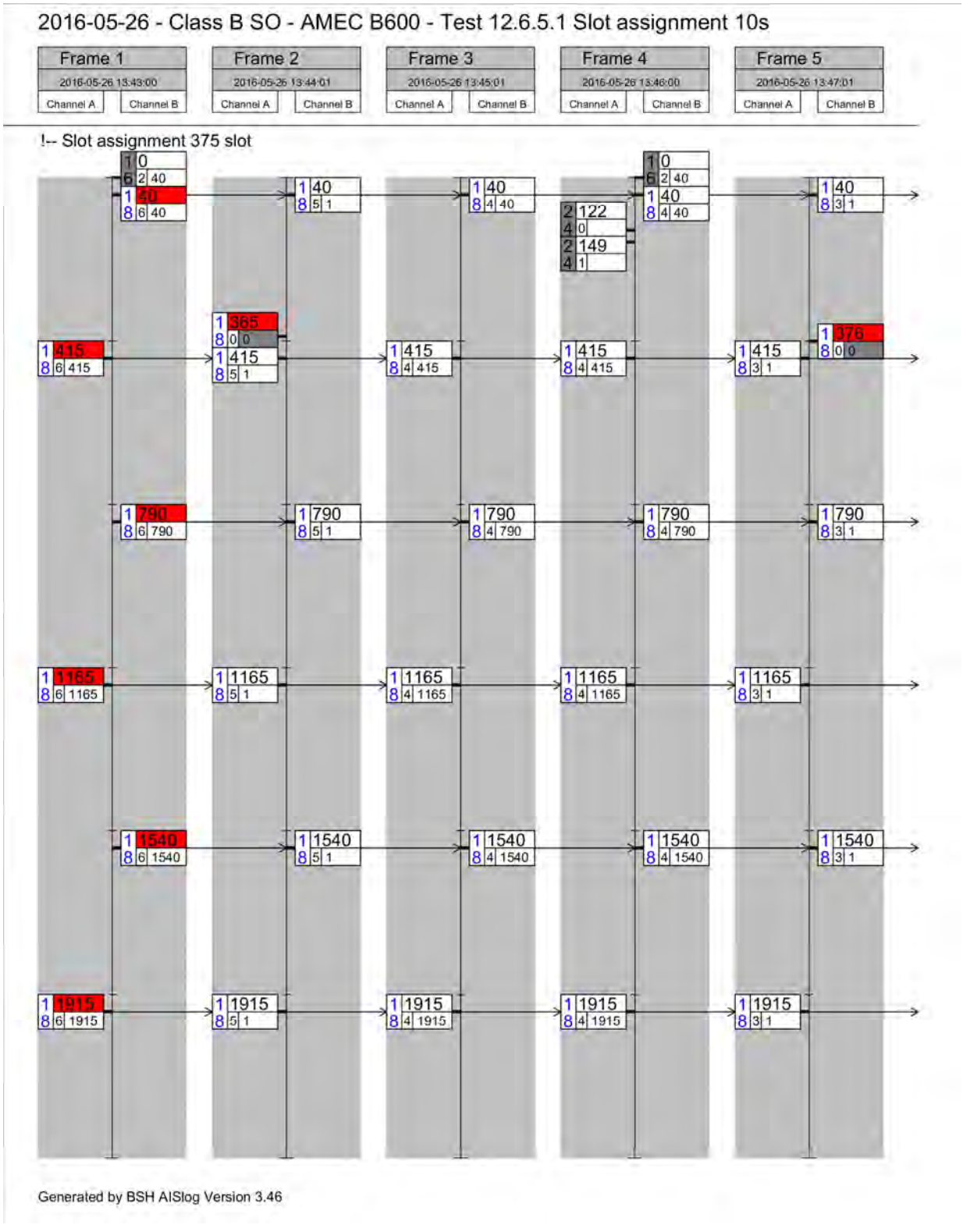
C.7.3 12.6.2b Use of free slots at 50% VDL load

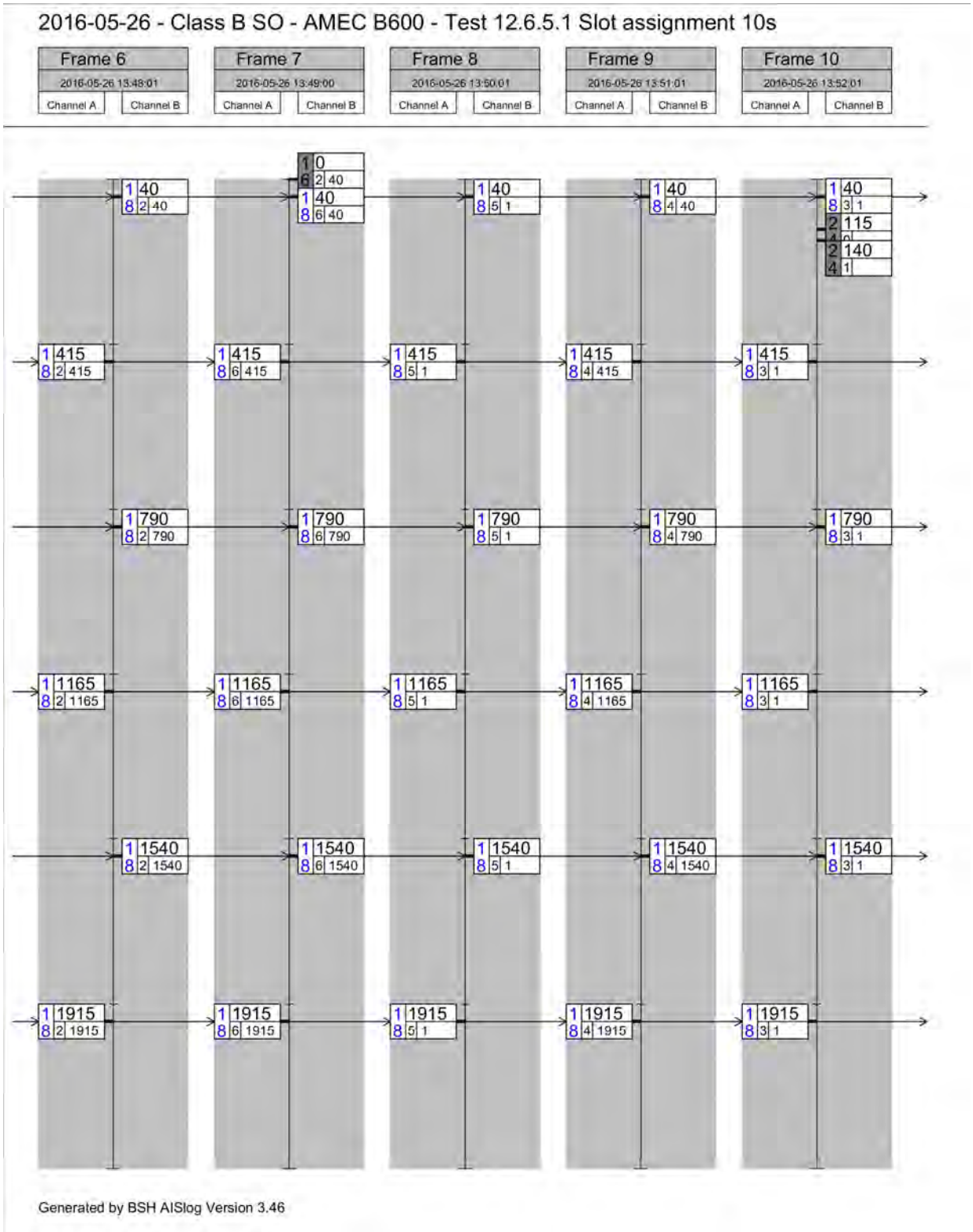


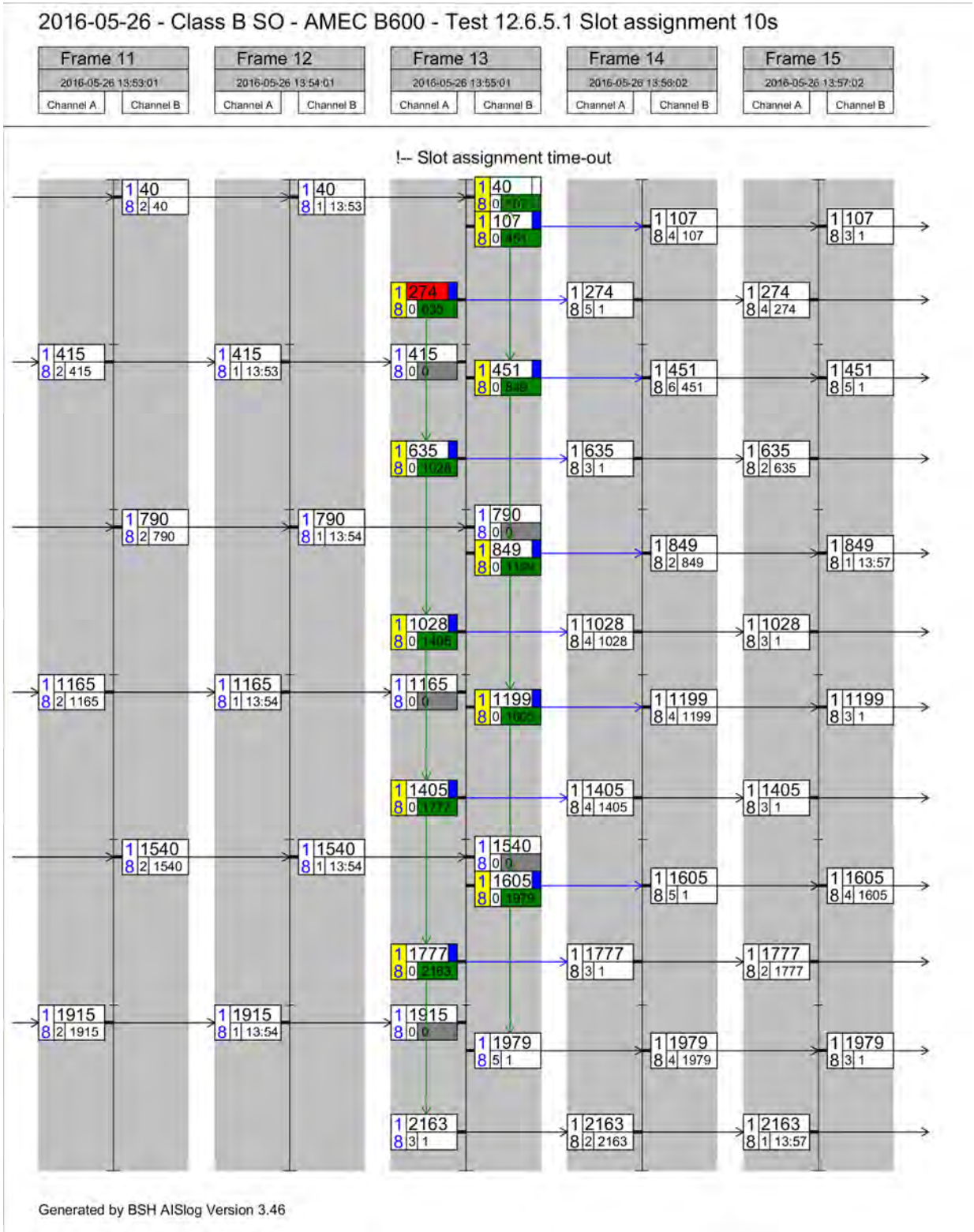


C.7.4 12.6.5 Assigned operation

C.7.4.1 12.6.5.1 Message 16 with slot assignment

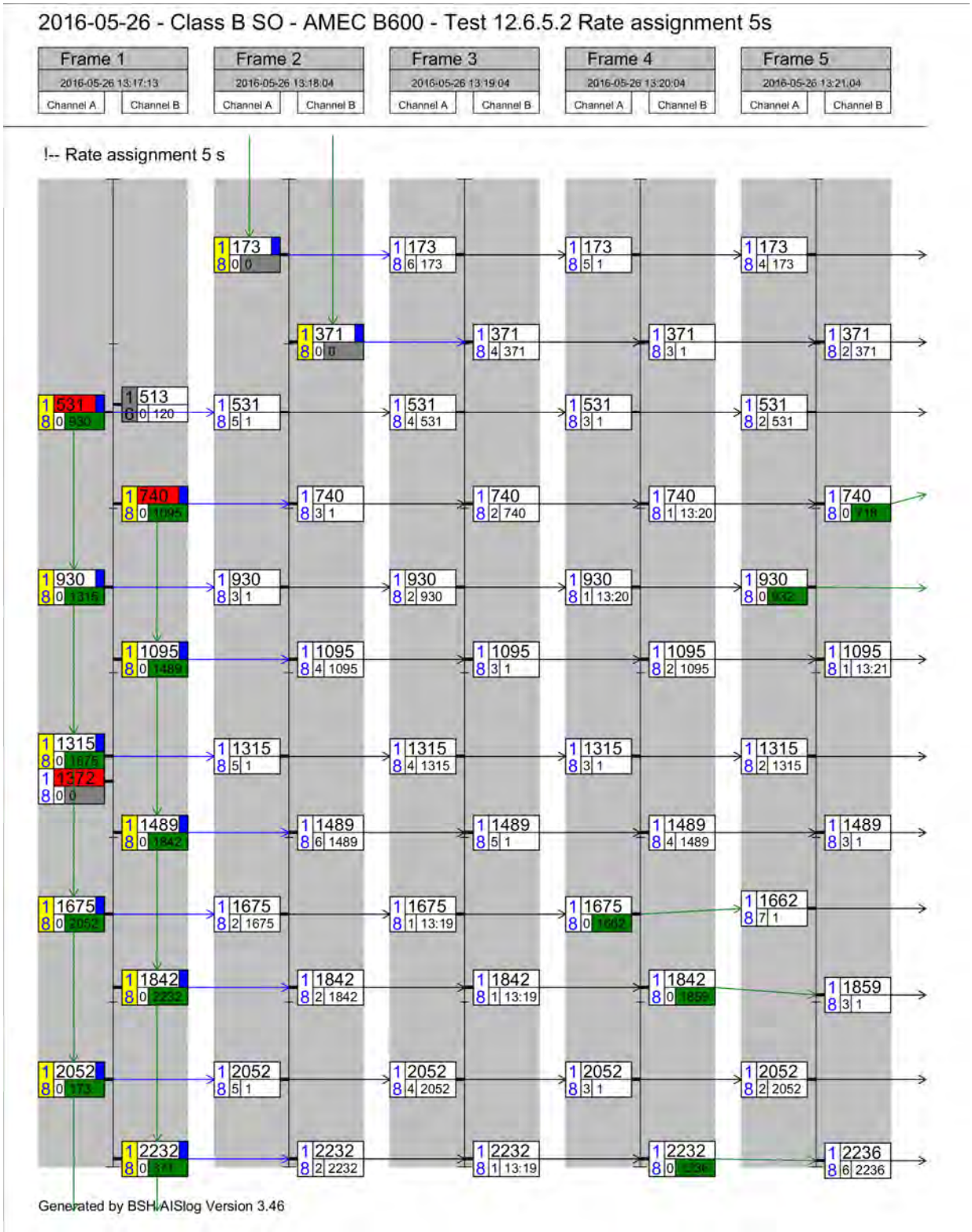


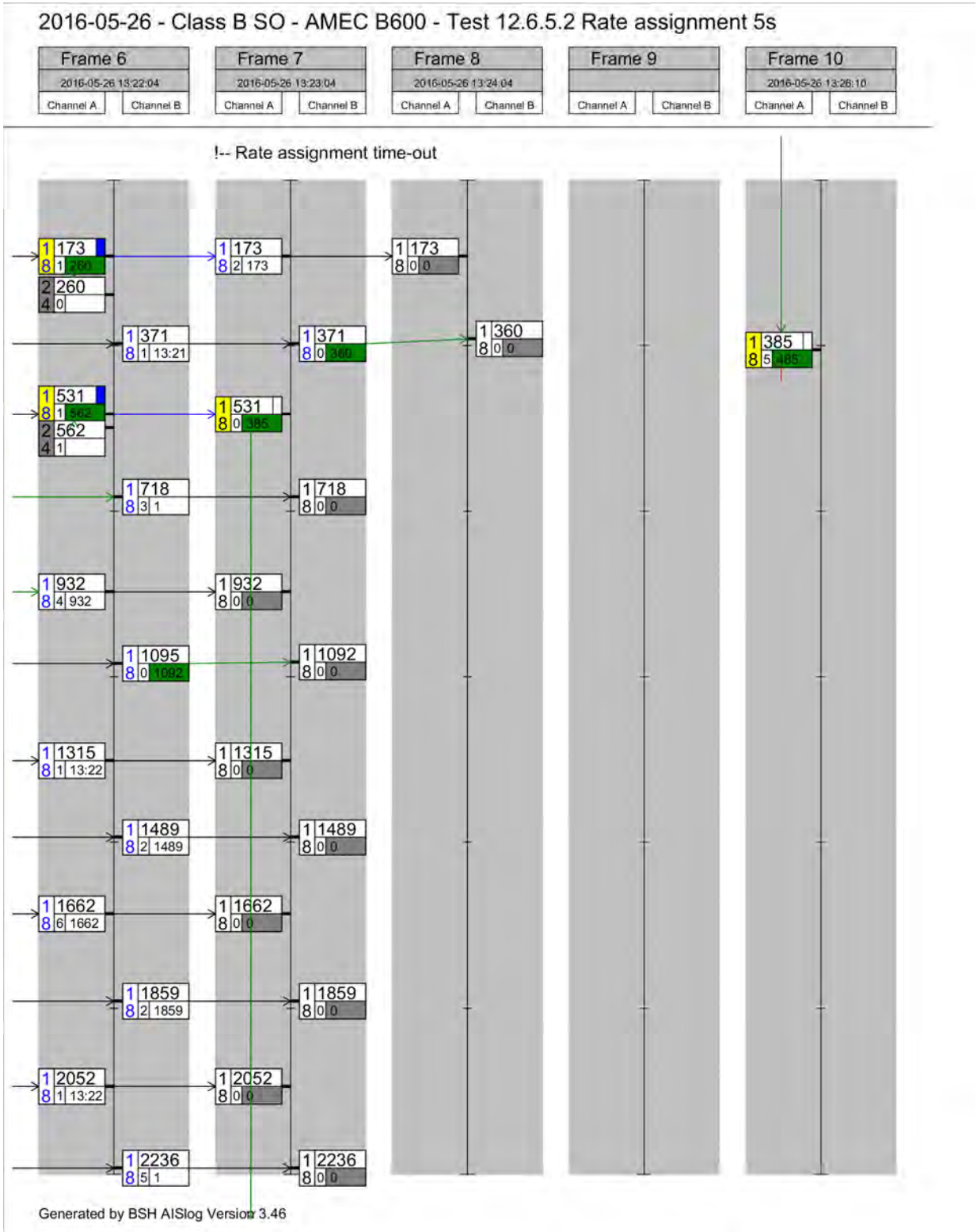

2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.1 Slot assignment 10s
Frame 6
2016-05-26 13:48:01
Channel A
Channel B
Frame 7
2016-05-26 13:49:00
Channel A
Channel B
Frame 8
2016-05-26 13:50:01
Channel A
Channel B
Frame 9
2016-05-26 13:51:01
Channel A
Channel B
Frame 10
2016-05-26 13:52:01
Channel A
Channel B
Generated by BSH AISlog Version 3.46


2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.1 Slot assignment 10s
Frame 11
2016-05-26 13:53:01
Frame 12
2016-05-26 13:54:01
Frame 13
2016-05-26 13:55:01
Frame 14
2016-05-26 13:56:02
Frame 15
2016-05-26 13:57:02
Channel A
Channel B
!-- Slot assignment time-out
Generated by BSH AISlog Version 3.46

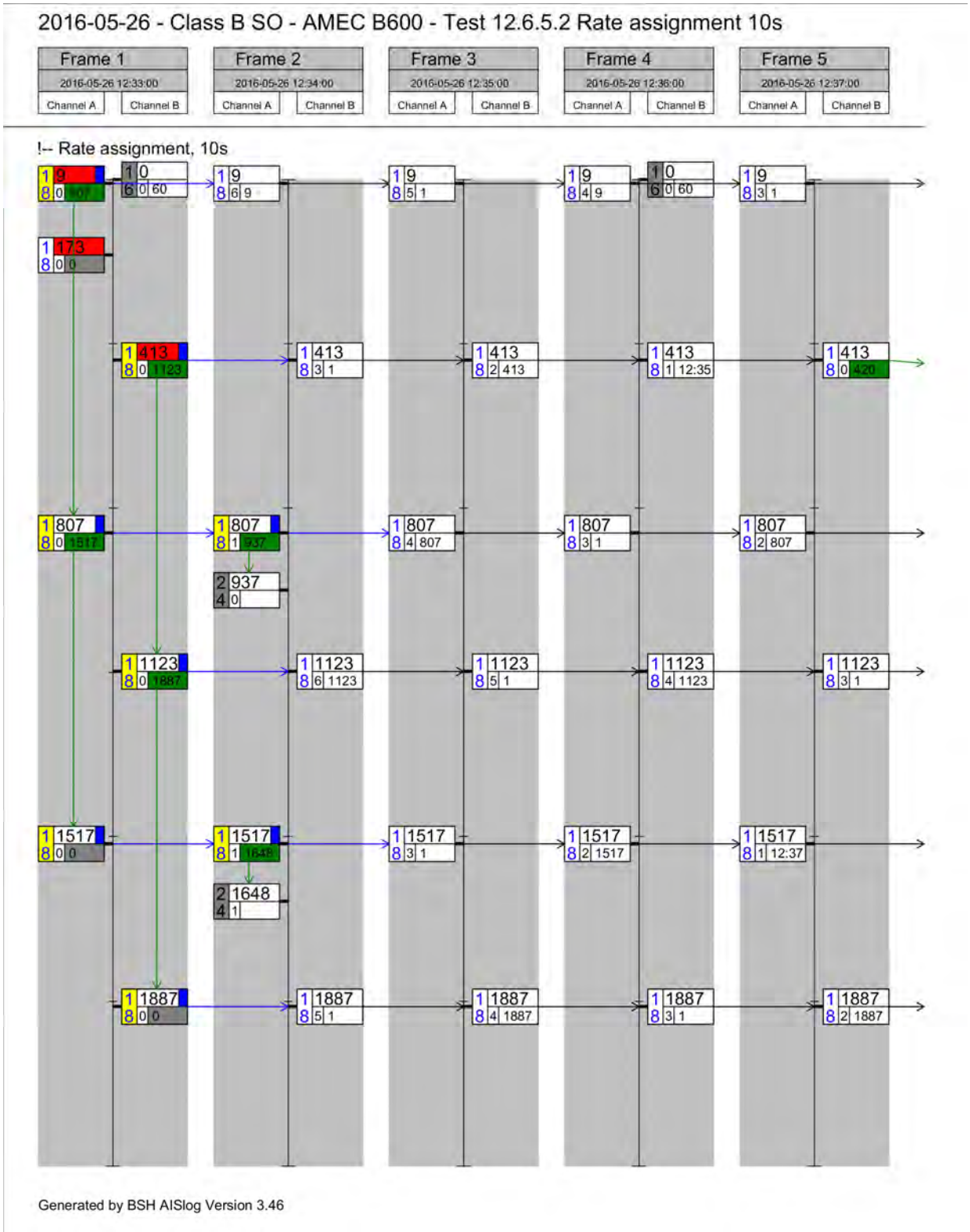
C.7.4.2 12.6.5.2 Message 16 with rate assignment

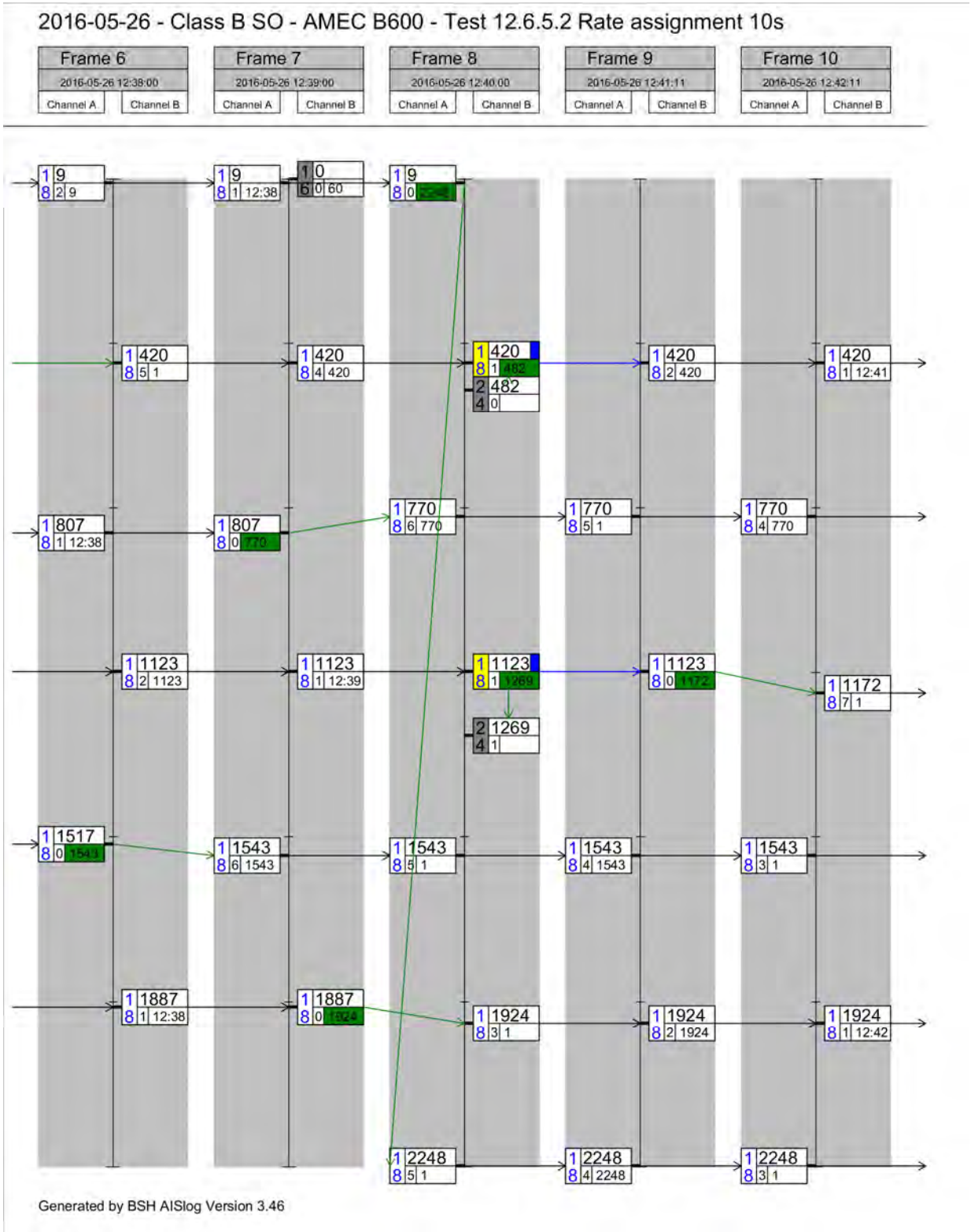
C.7.5 Rate assignment 5 s

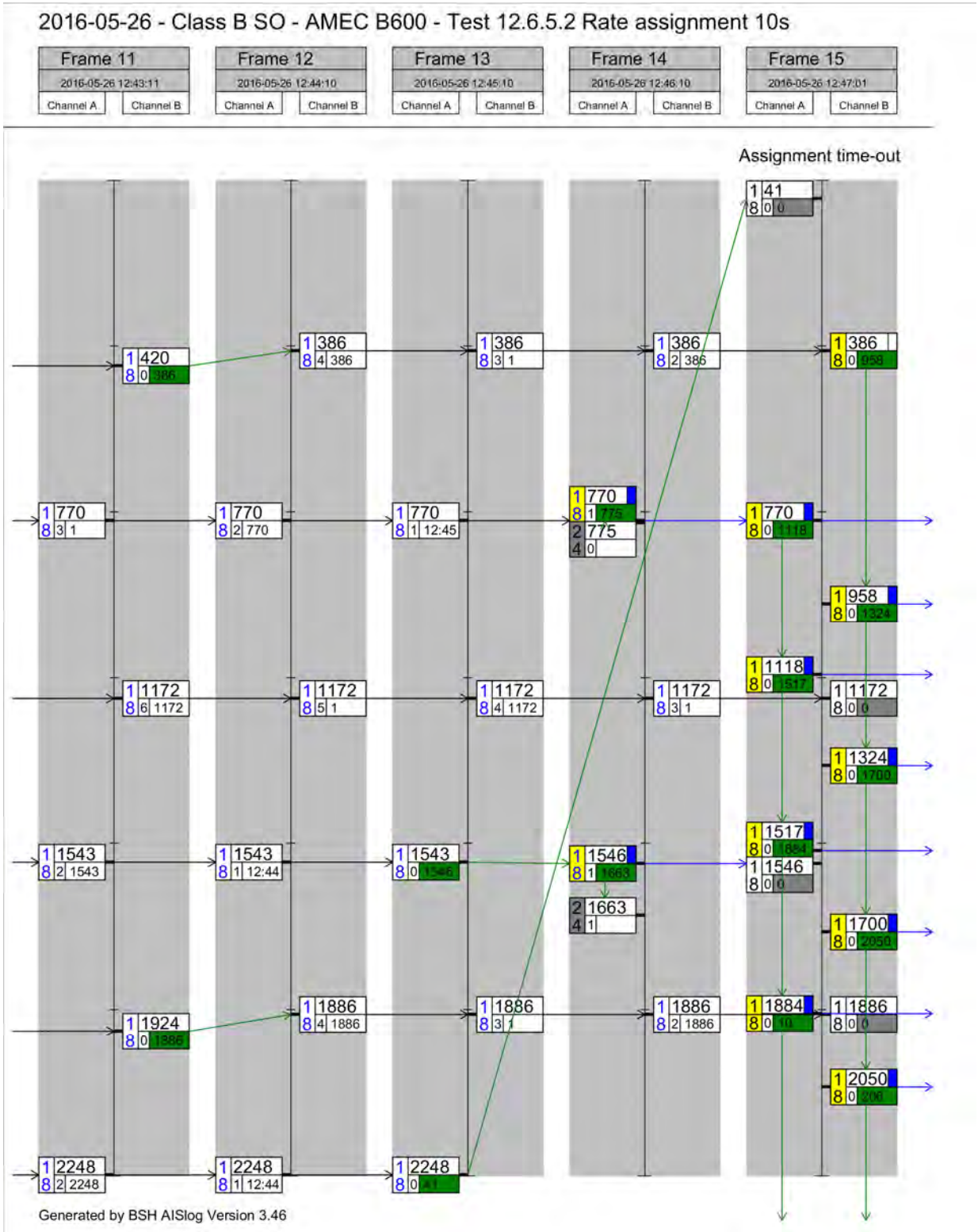


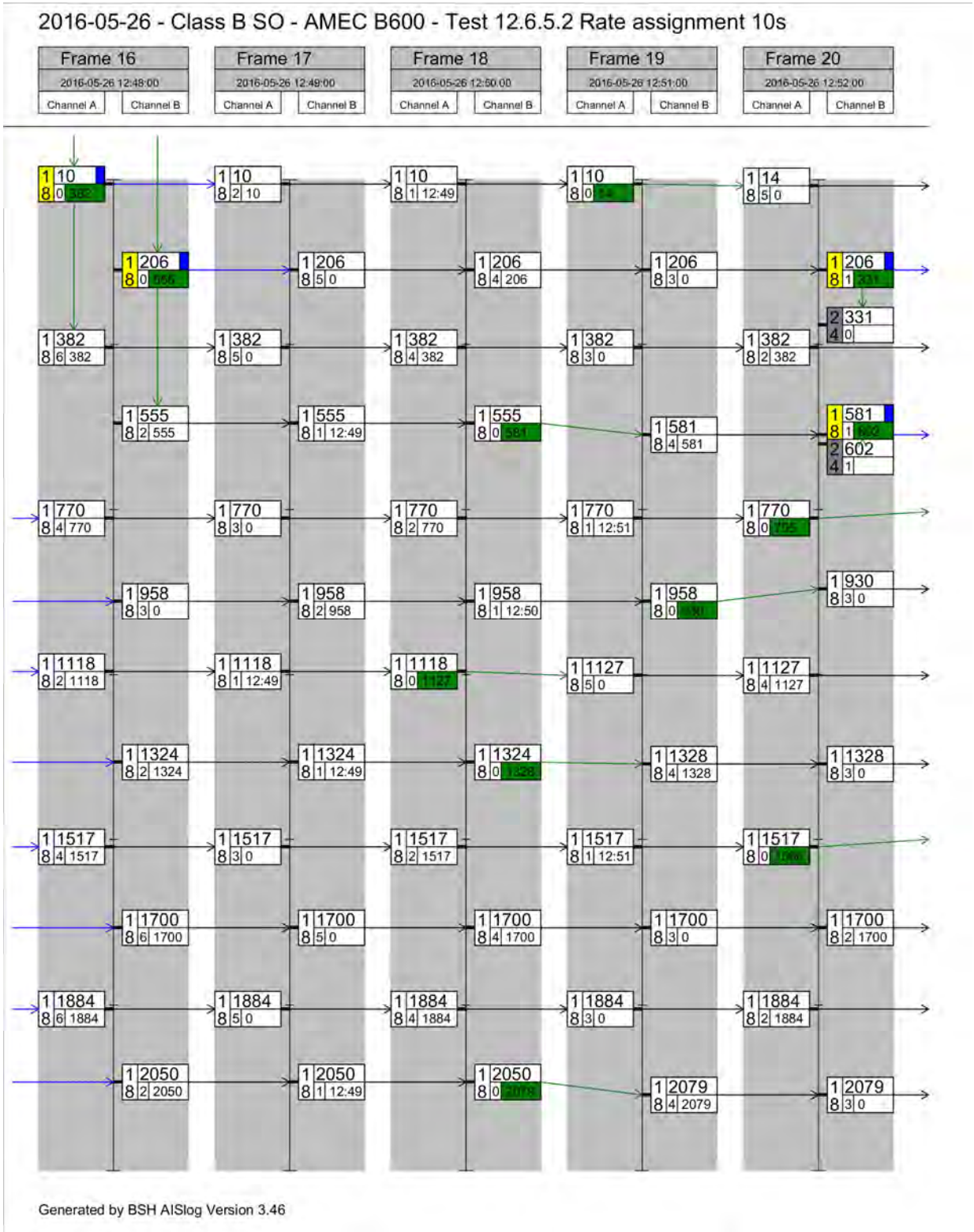

2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.2 Rate assignment 5s
Frame 6
2016-05-26 13:22:04
Channel A
Channel B
Frame 7
2016-05-26 13:23:04
Frame 8
2016-05-26 13:24:04
Frame 9
Frame 10
2016-05-26 13:26:10
!-- Rate assignment time-out
Generated by BSH AISlog Version 3.46

C.7.6 Rate assignment 10 s



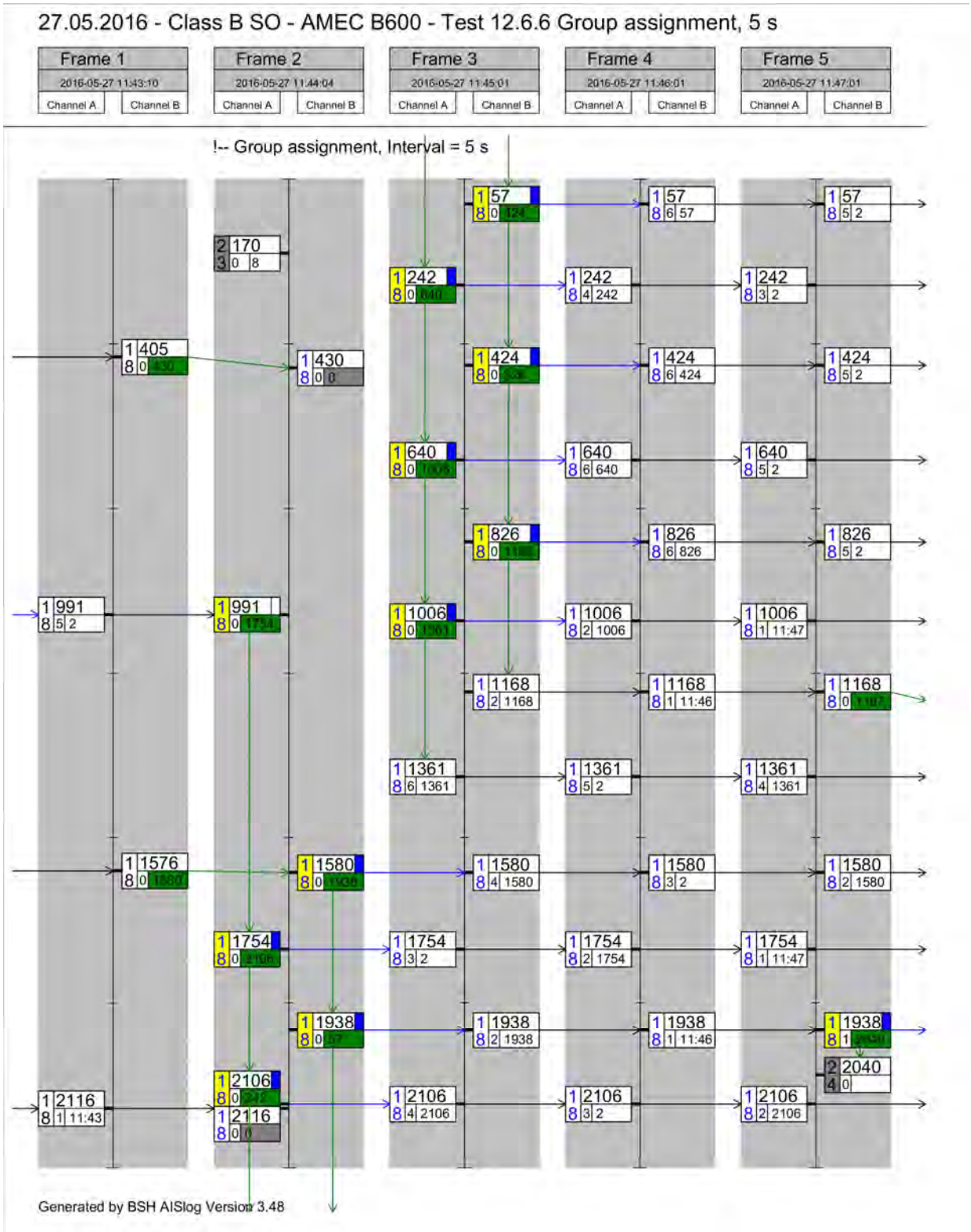

2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.2 Rate assignment 10s
Frame 6
2016-05-26 12:38:00
Channel A
Channel B
Frame 7
2016-05-26 12:39:00
Channel A
Channel B
Frame 8
2016-05-26 12:40:00
Channel A
Channel B
Frame 9
2016-05-26 12:41:11
Channel A
Channel B
Frame 10
2016-05-26 12:42:11
Channel A
Channel B
Generated by BSH AISlog Version 3.46


2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.2 Rate assignment 10s
Frame 11
2016-05-26 12:43:11
Frame 12
2016-05-26 12:44:10
Frame 13
2016-05-26 12:45:10
Frame 14
2016-05-26 12:46:10
Frame 15
2016-05-26 12:47:01
Channel A
Channel B
Assignment time-out
Generated by BSH AISlog Version 3.46

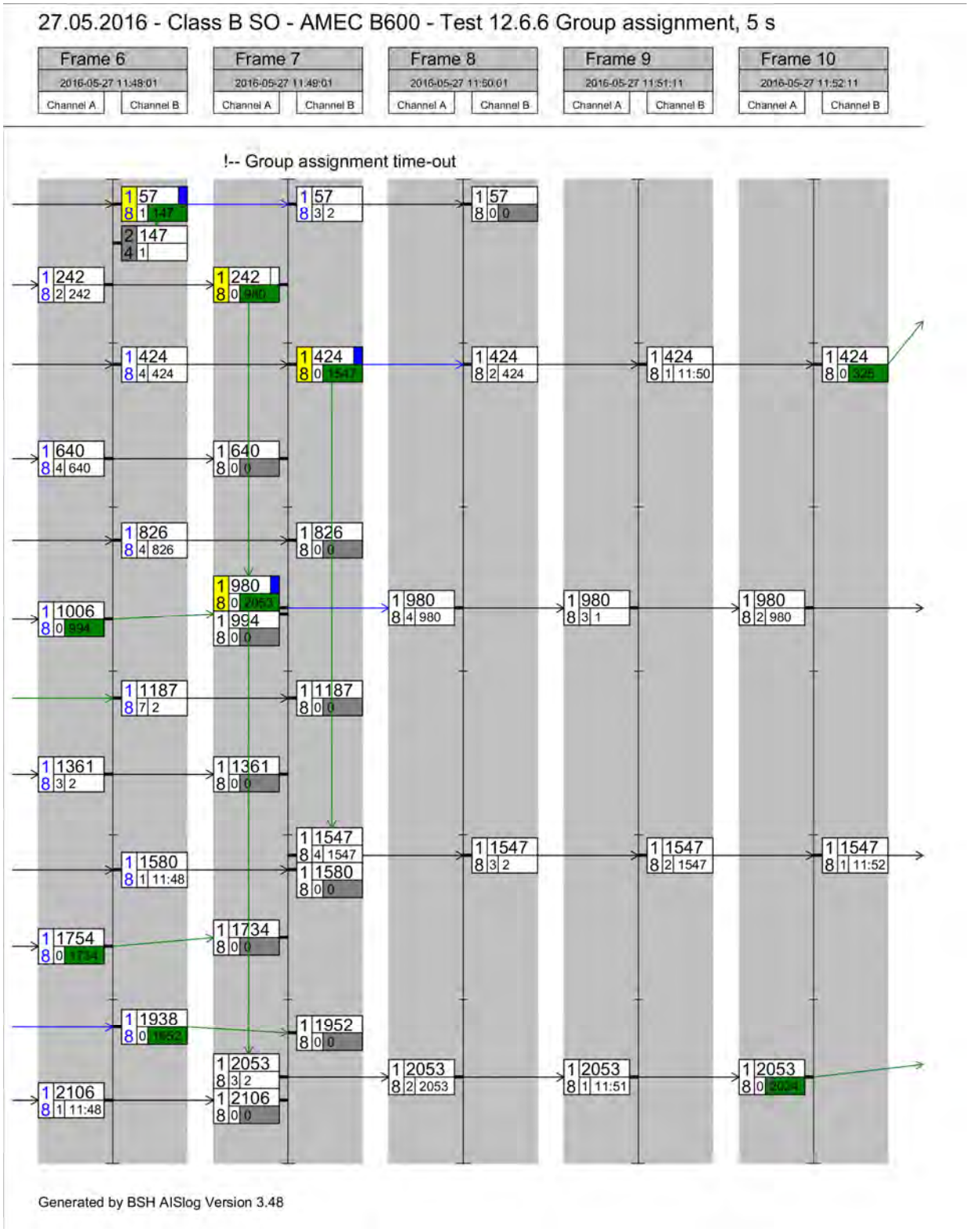

2016-05-26 - Class B SO - AMEC B600 - Test 12.6.5.2 Rate assignment 10s
Frame 16
2016-05-26 12:48:00
Channel A
Channel B
Frame 17
2016-05-26 12:49:00
Frame 18
2016-05-26 12:50:00
Frame 19
2016-05-26 12:51:00
Frame 20
2016-05-26 12:52:00
Generated by BSH AISlog Version 3.46

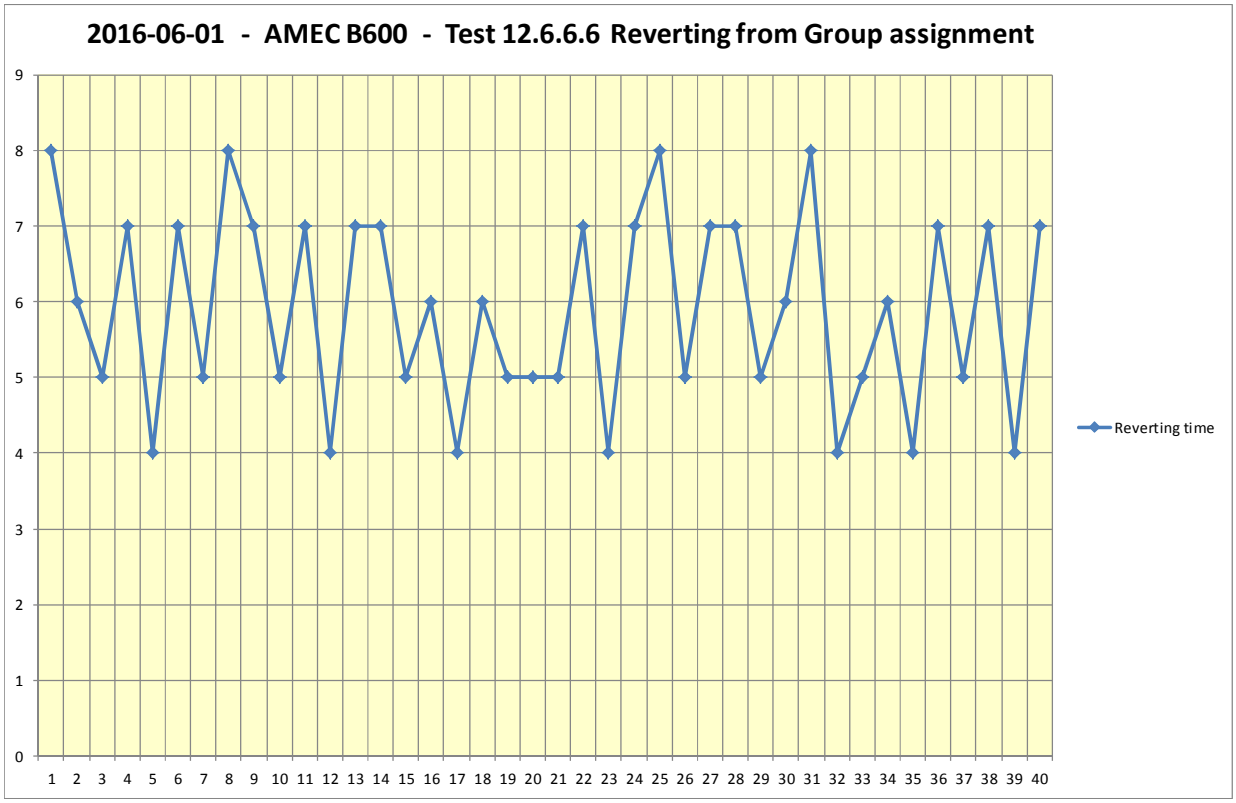
C.7.7 12.6.6 Group assignment

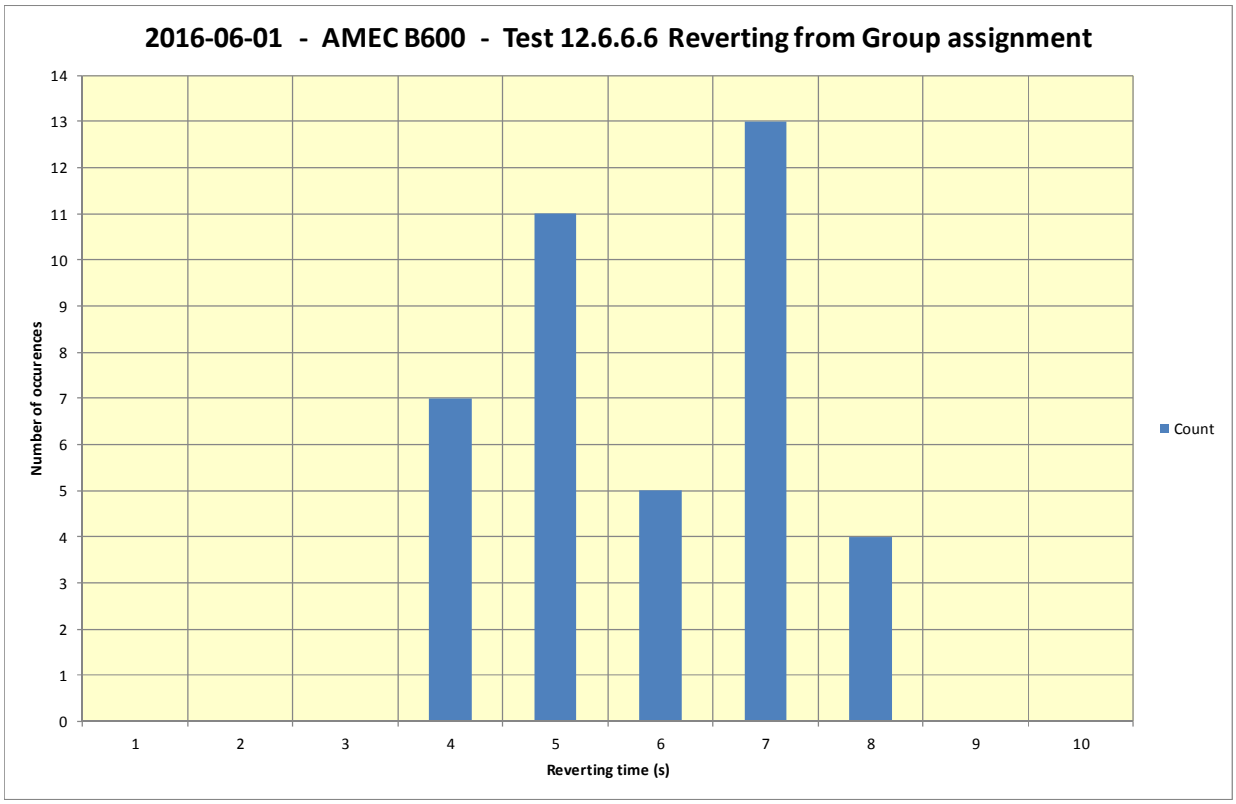
C.7.7.1 12.6.6.1 Entering group assignment



C.7.7.2 12.6.6.6 Reverting from group assignment

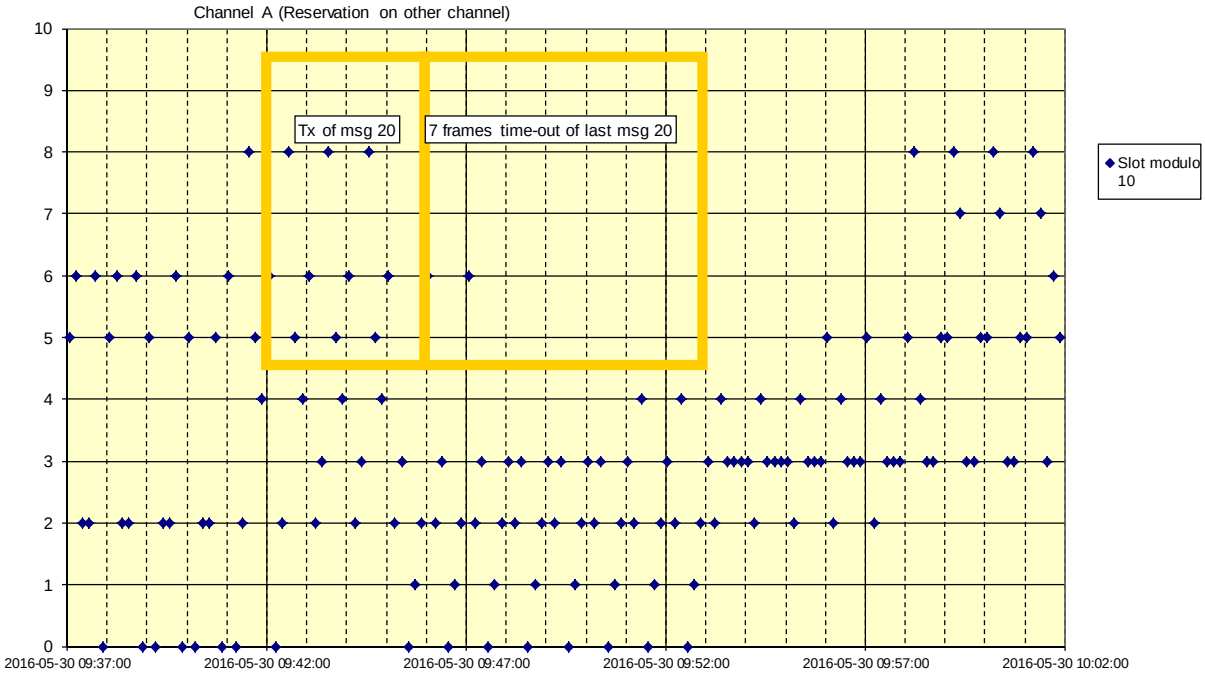



2016-06-01 - AMEC B600 - Test 12.6.6.6 Reverting from Group assignment
Reverting time

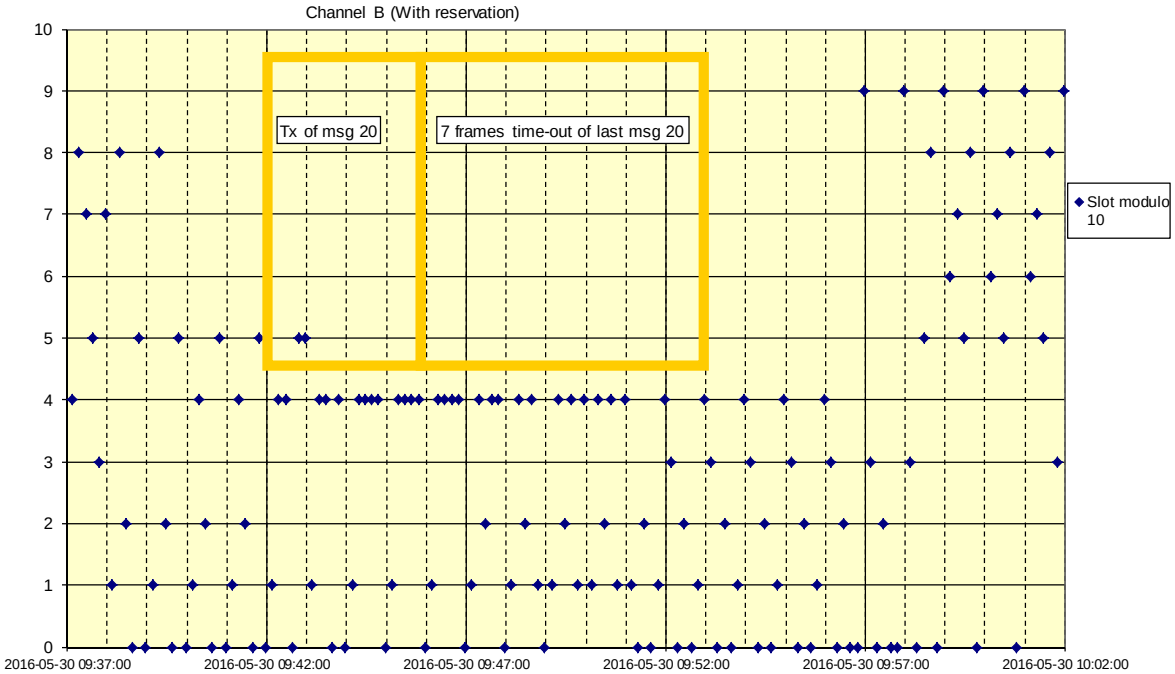

2016-06-01 - AMEC B600 - Test 12.6.6.6 Reverting from Group assignment
Number of occurences
Reverting time (s)
Count

C.7.8 12.6.7 Base station reservations

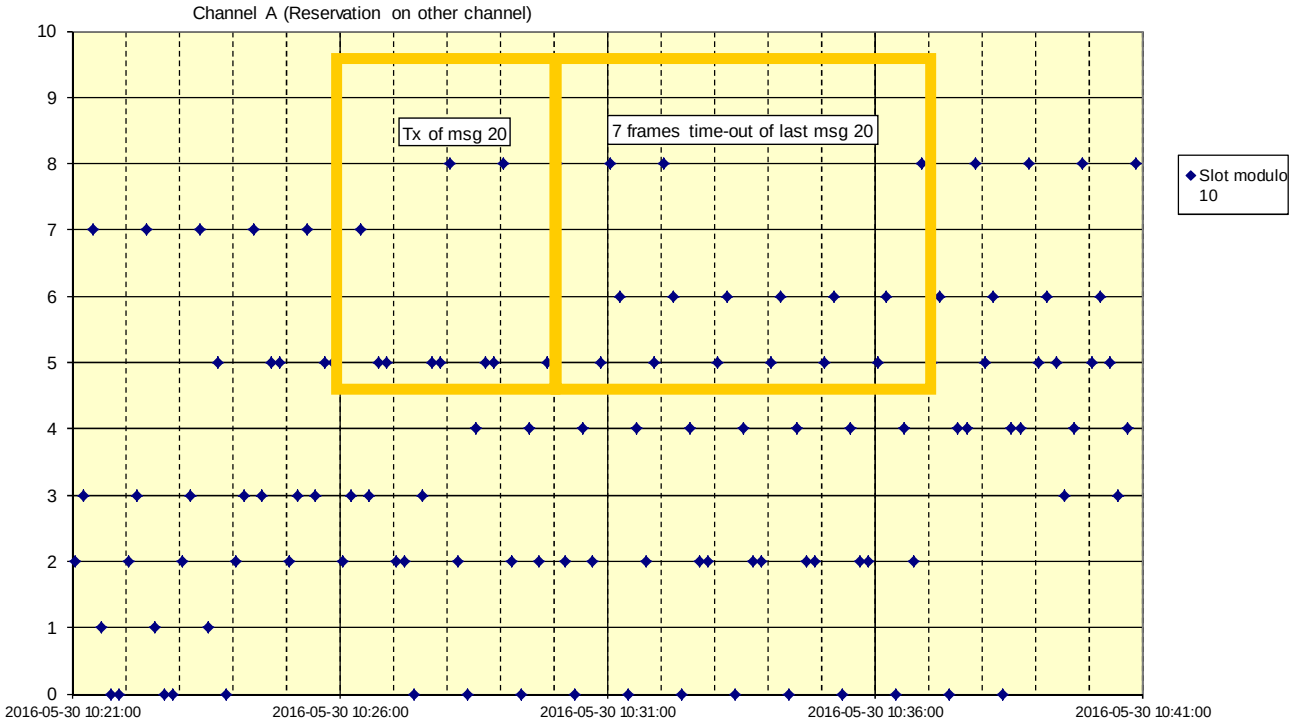
2016-05-30 - AMEC B600 - 12.6.7 Base station reservation, distance < 120 NM



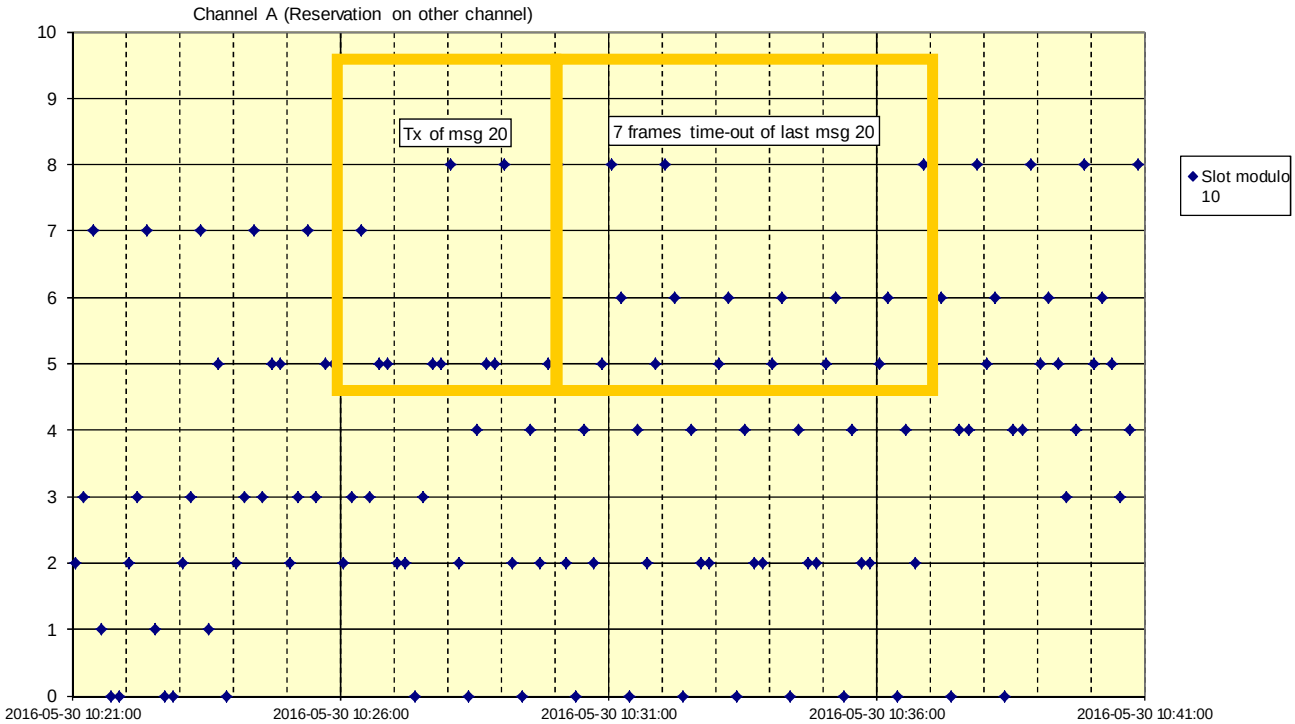
2016-05-30 - AMEC B600 - 12.6.7 Base station reservation, distance < 120 NM



2016-05-30 - AMEC B600 - 12.6.7 Base station reservation, distance > 120 NM

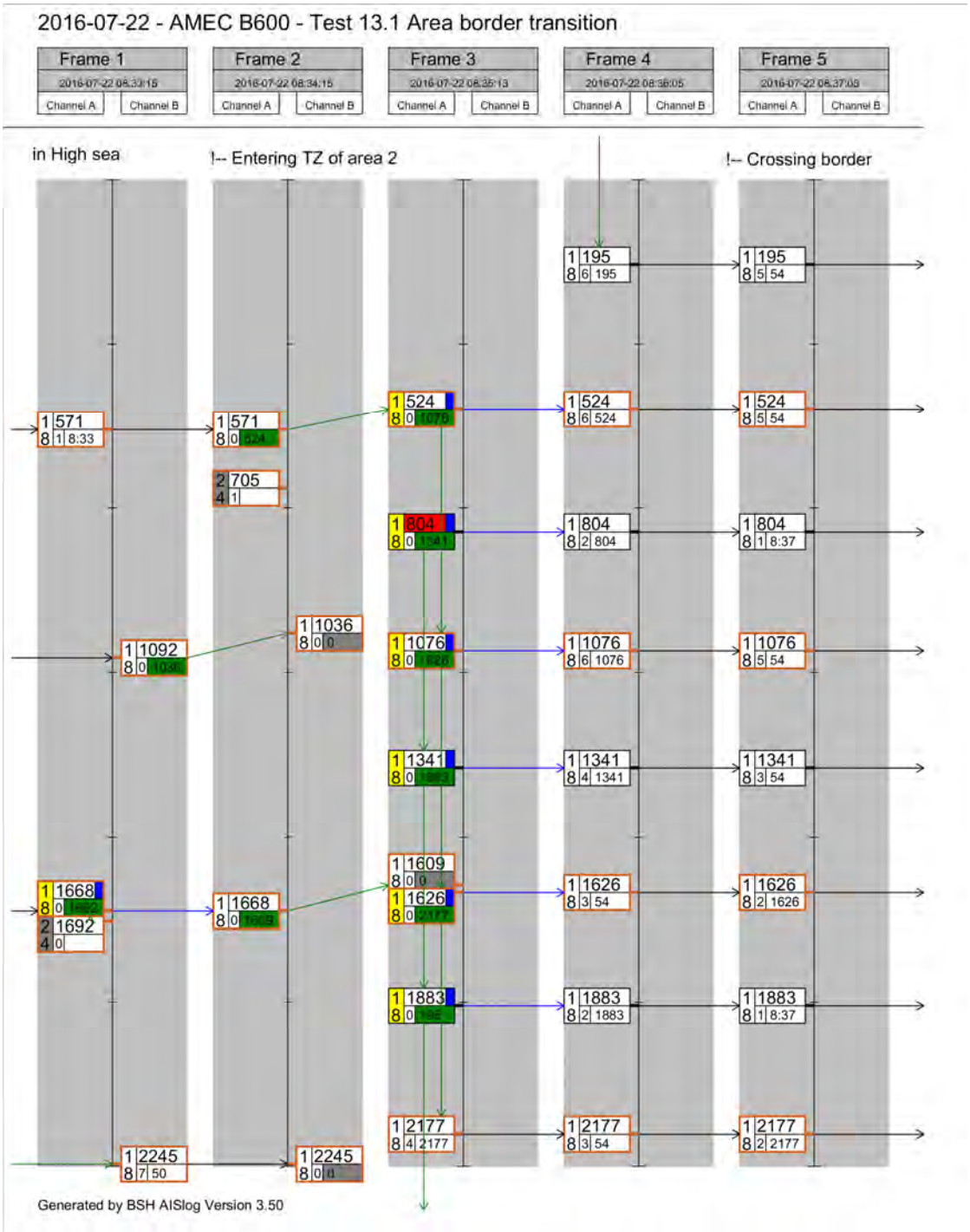


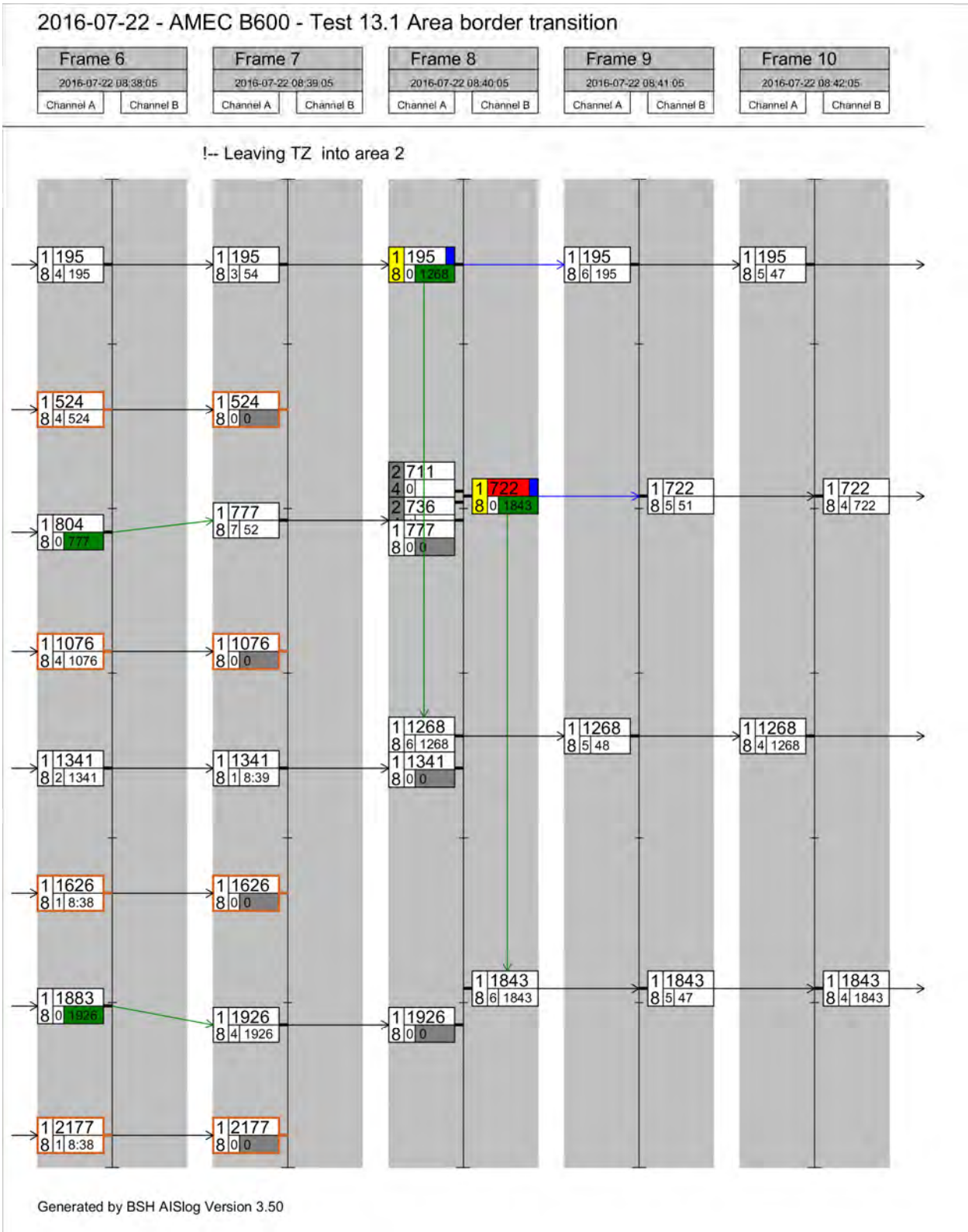
2016-05-30 - AMEC B600 - 12.6.7 Base station reservation, distance > 120 NM



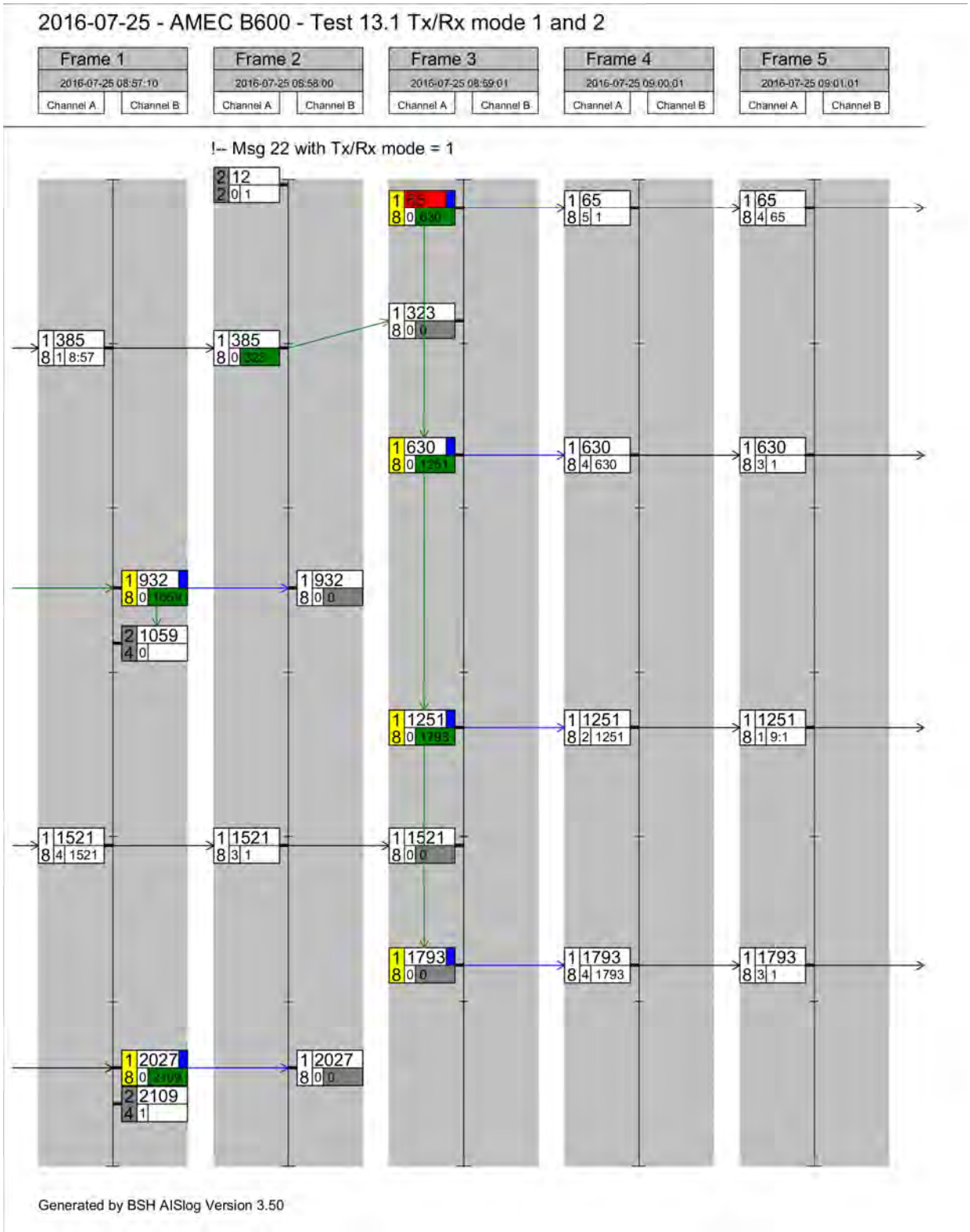
C.8 13.1 Regional area designation by VDL Message

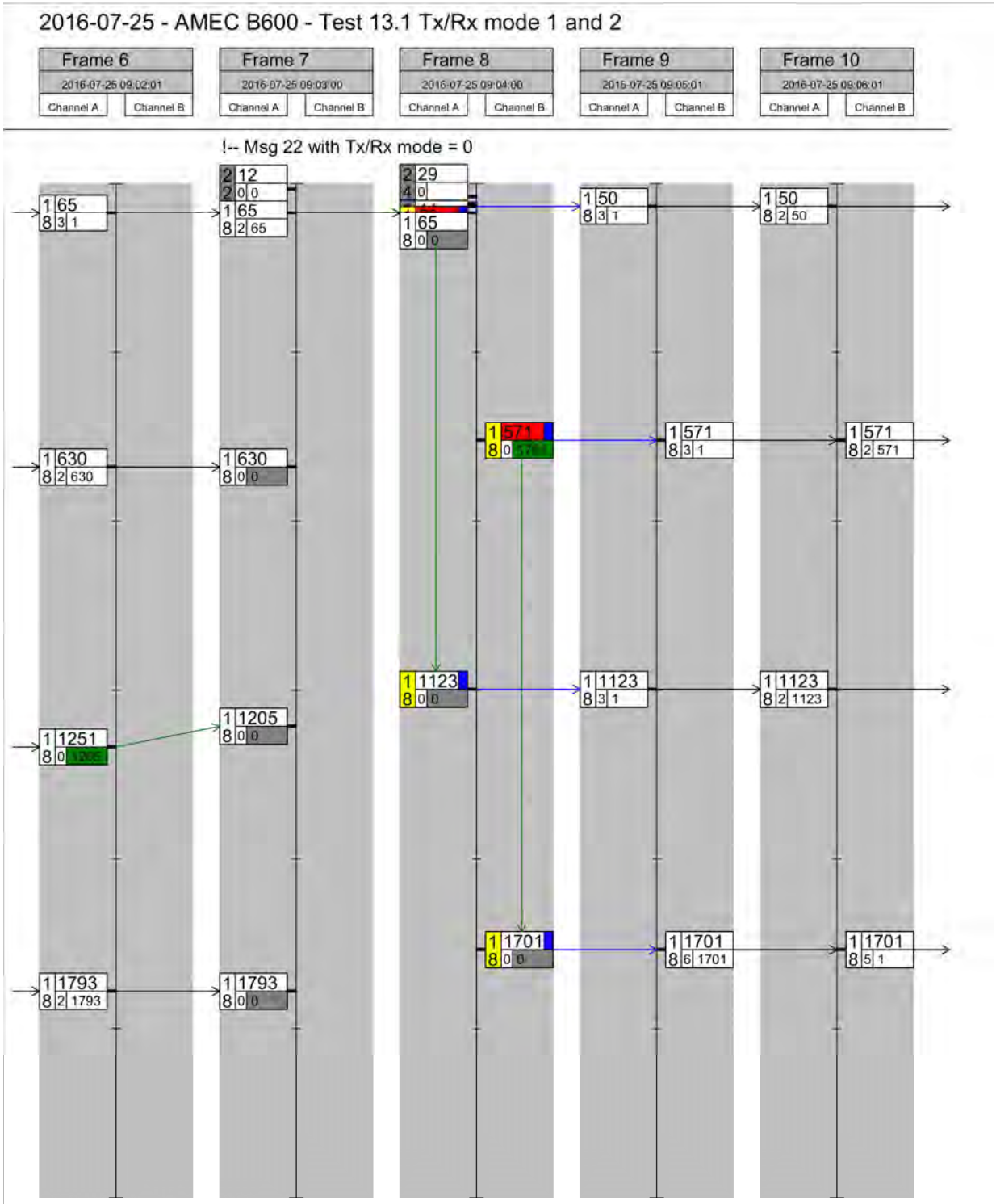
C.8.1 a) Area border transition



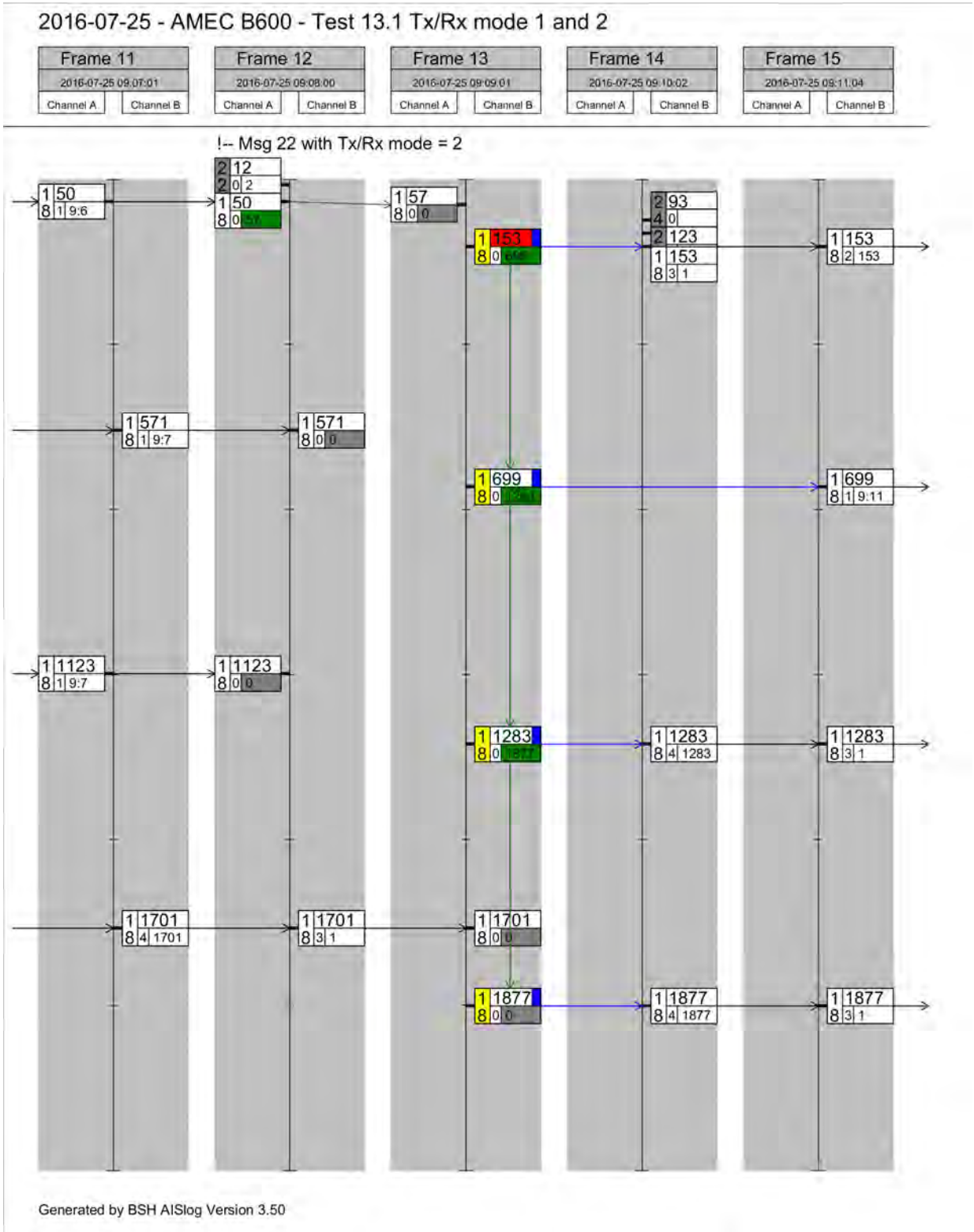

2016-07-22 - AMEC B600 - Test 13.1 Area border transition
Frame 6
2016-07-22 08:38:05
Frame 7
2016-07-22 08:39:05
Frame 8
2016-07-22 08:40:05
Frame 9
2016-07-22 08:41:05
Frame 10
2016-07-22 08:42:05
Channel A
Channel B
!-- Leaving TZ into area 2
Generated by BSH AISlog Version 3.50

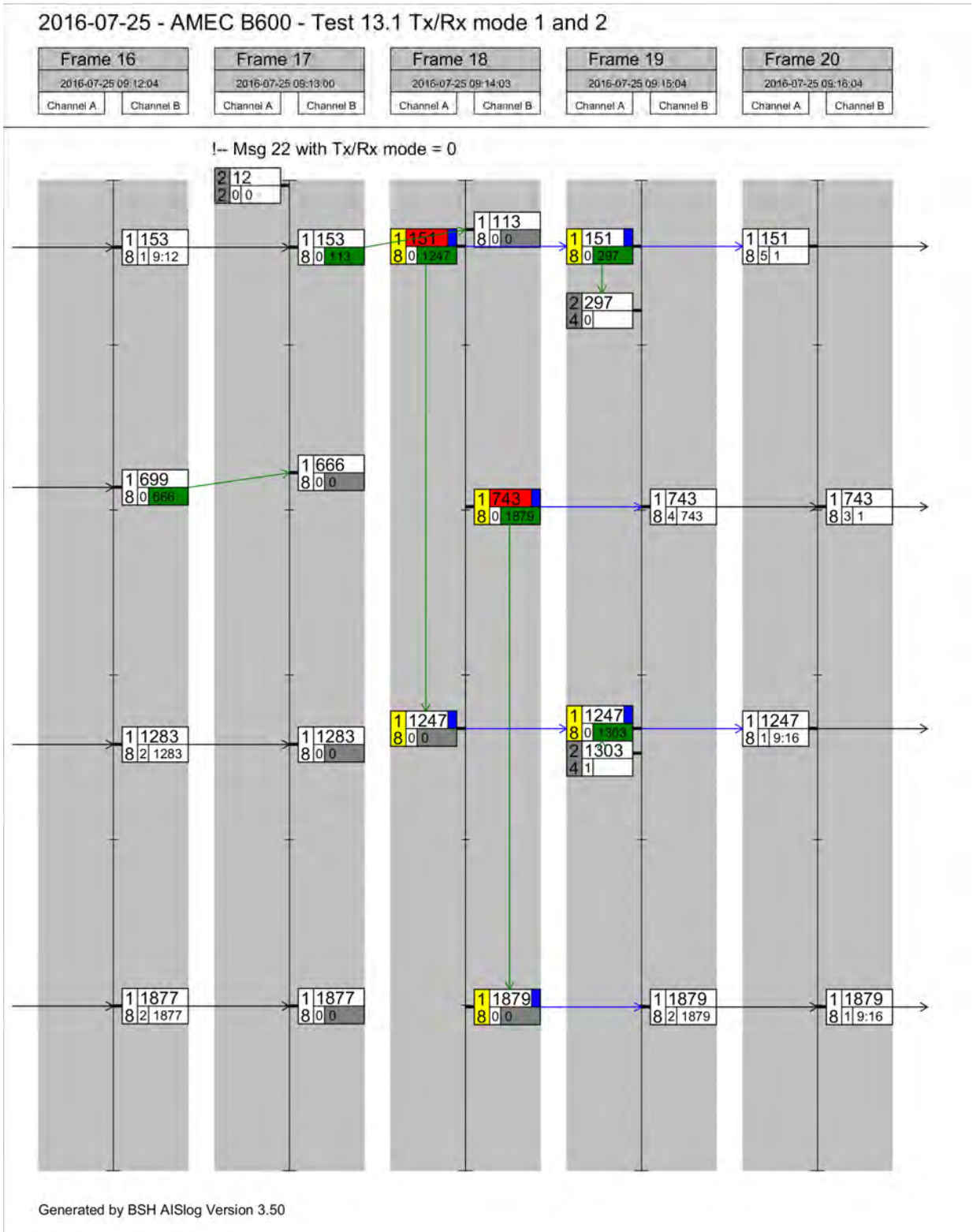
C.8.2 c) Tx/Rx mode 1



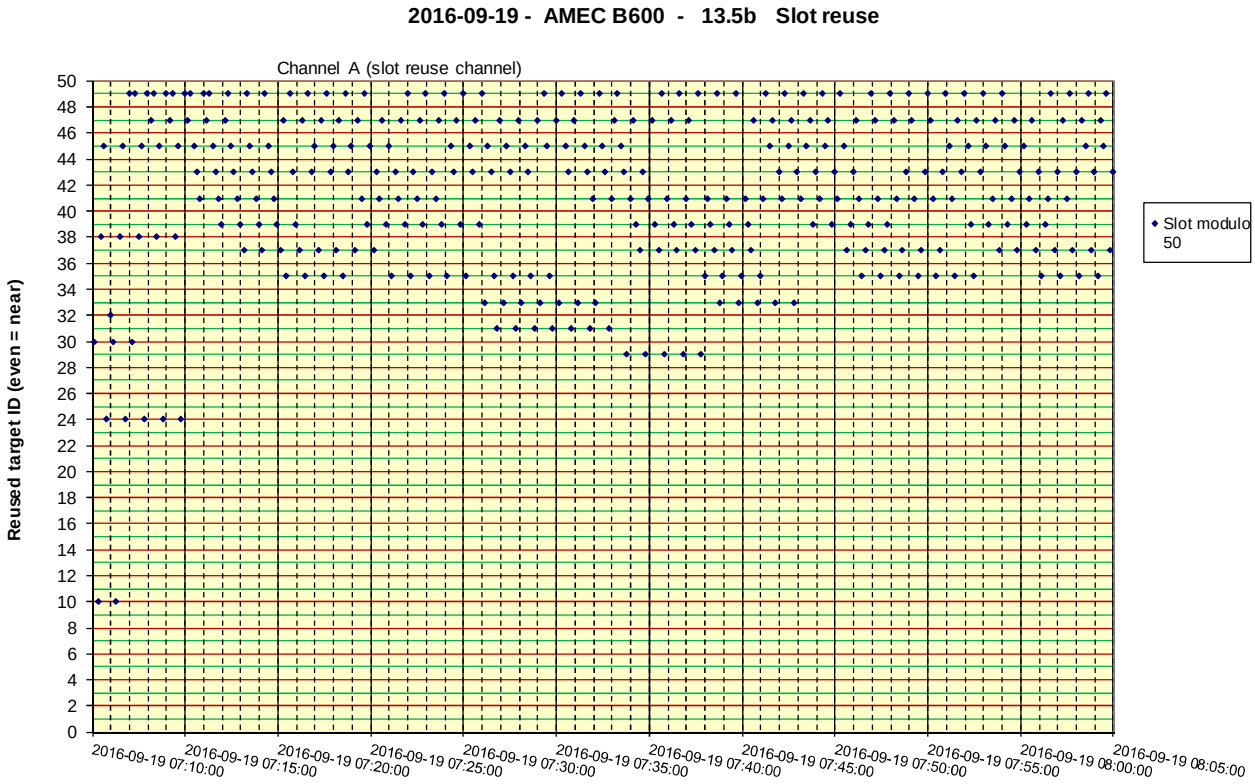


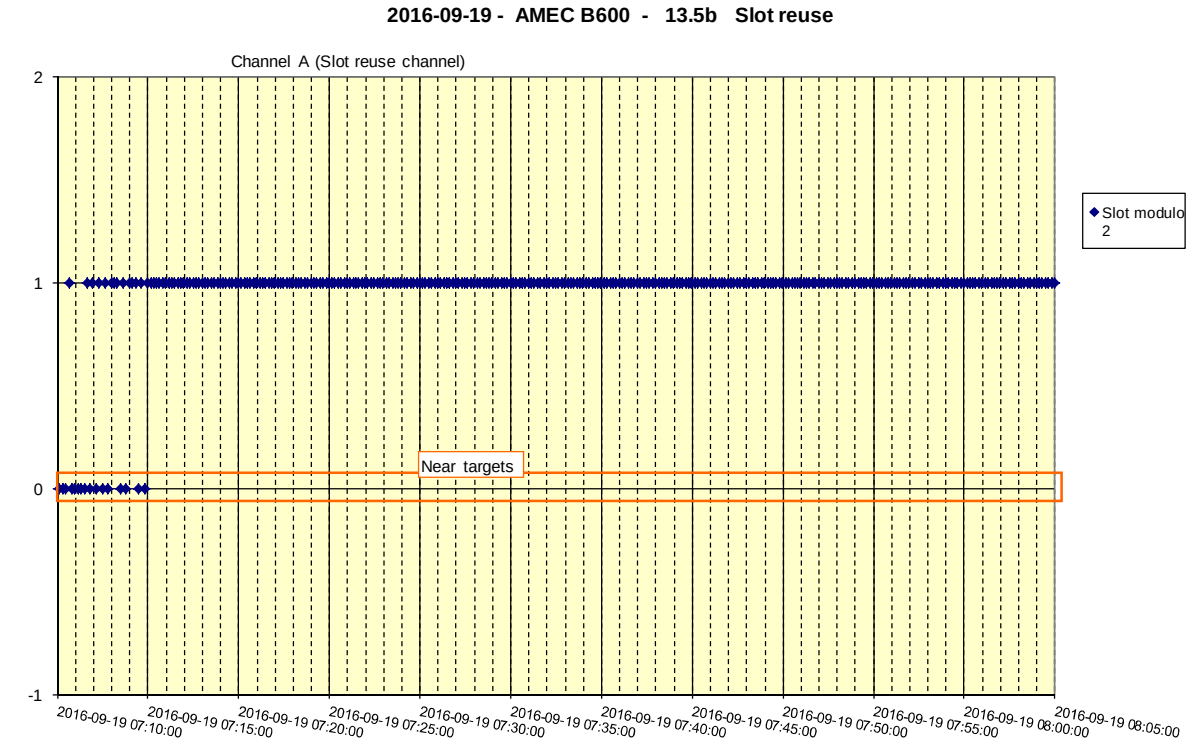
Generated by BSH AISlog Version 3.50


2016-07-25 - AMEC B600 - Test 13.1 Tx/Rx mode 1 and 2
Frame 11
2016-07-25 09:07:01
Frame 12
2016-07-25 09:08:00
Frame 13
2016-07-25 09:09:01
Frame 14
2016-07-25 09:10:02
Frame 15
2016-07-25 09:11:04
Channel A
Channel B
!-- Msg 22 with Tx/Rx mode = 2
Generated by BSH AISlog Version 3.50

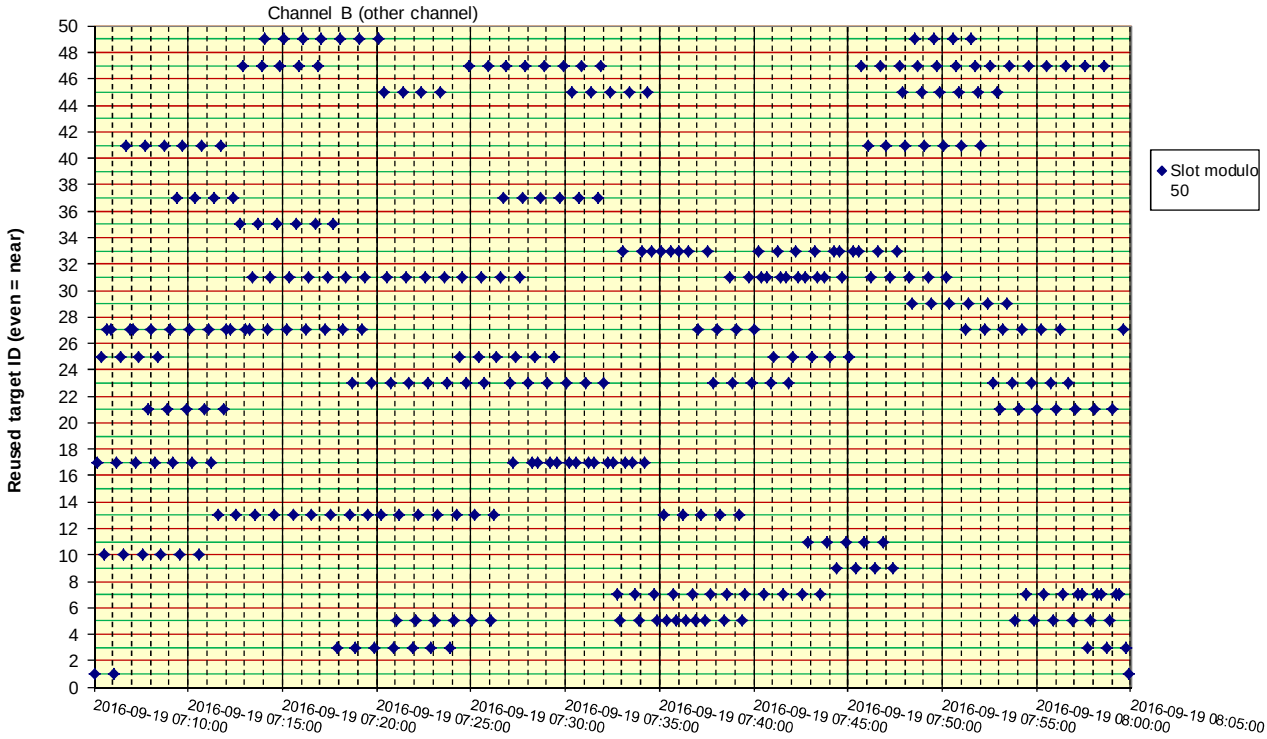

2016-07-25 - AMEC B600 - Test 13.1 Tx/Rx mode 1 and 2
Frame 16
2016-07-25 09:12:04
Channel A
Channel B
Frame 17
2016-07-25 09:13:00
Channel A
Channel B
Frame 18
2016-07-25 09:14:03
Channel A
Channel B
Frame 19
2016-07-25 09:15:04
Channel A
Channel B
Frame 20
2016-07-25 09:16:04
Channel A
Channel B
!-- Msg 22 with Tx/Rx mode = 0
Generated by BSH AISlog Version 3.50

C.9 13.5 Slot reuse and FATDMA reservations

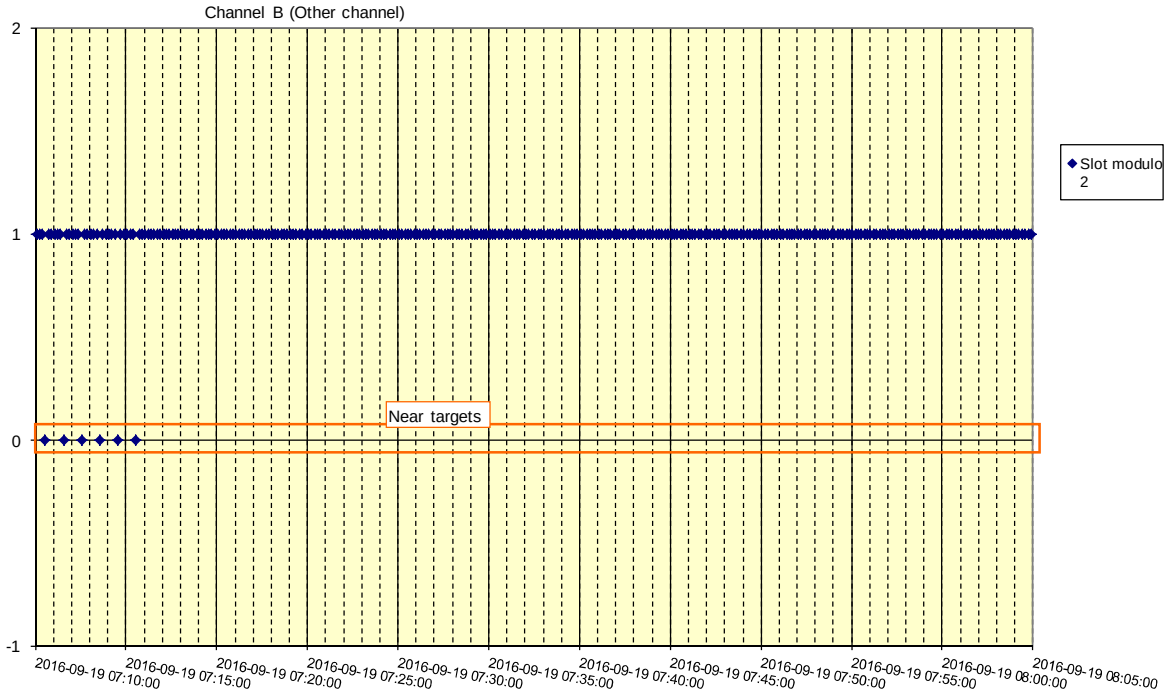




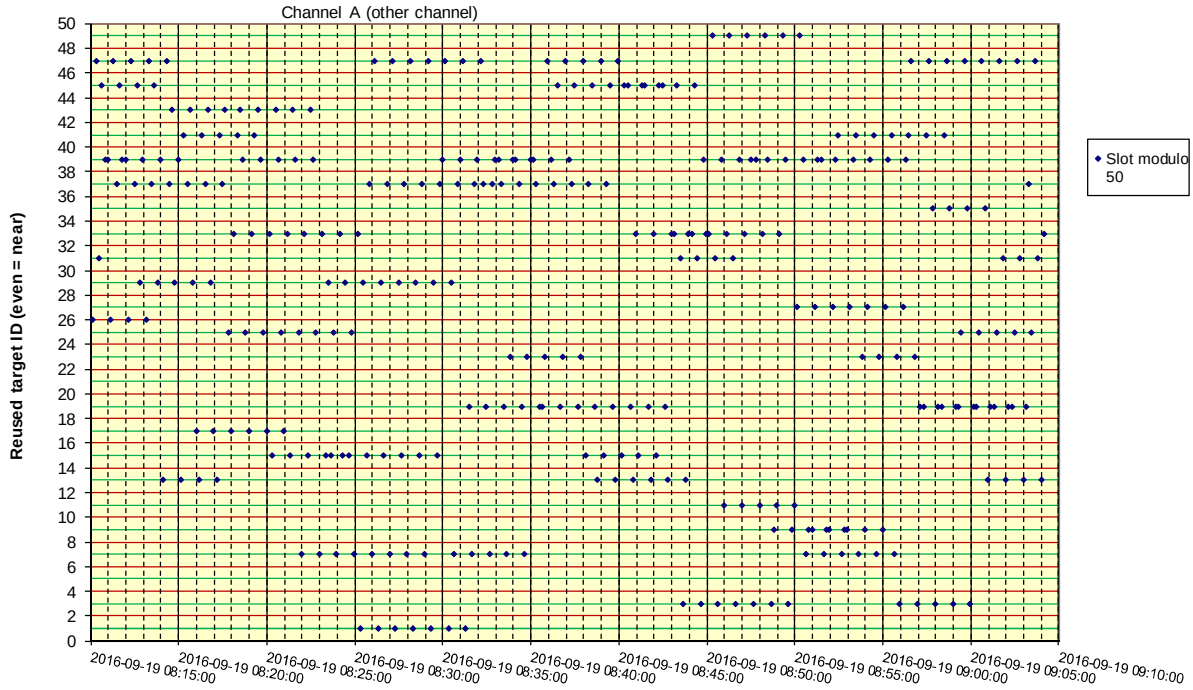
2016-09-19 - AMEC B600 - 13.5b Slot reuse



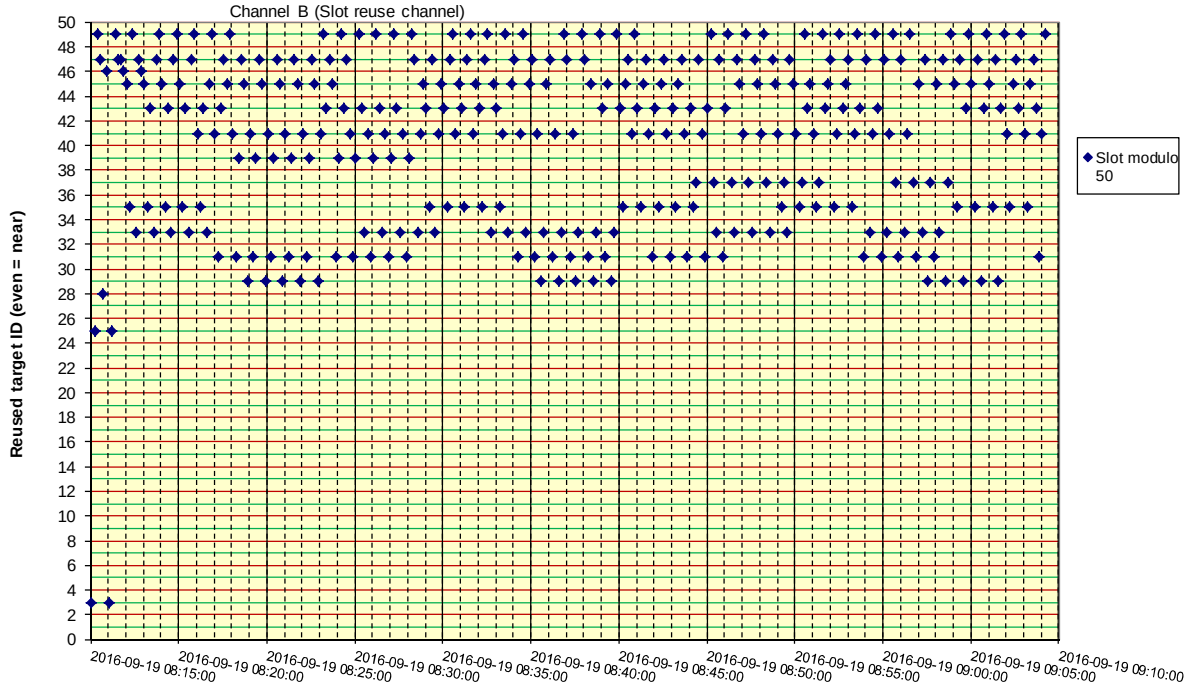
2016-09-19 - AMEC B600 - 13.5b Slot reuse



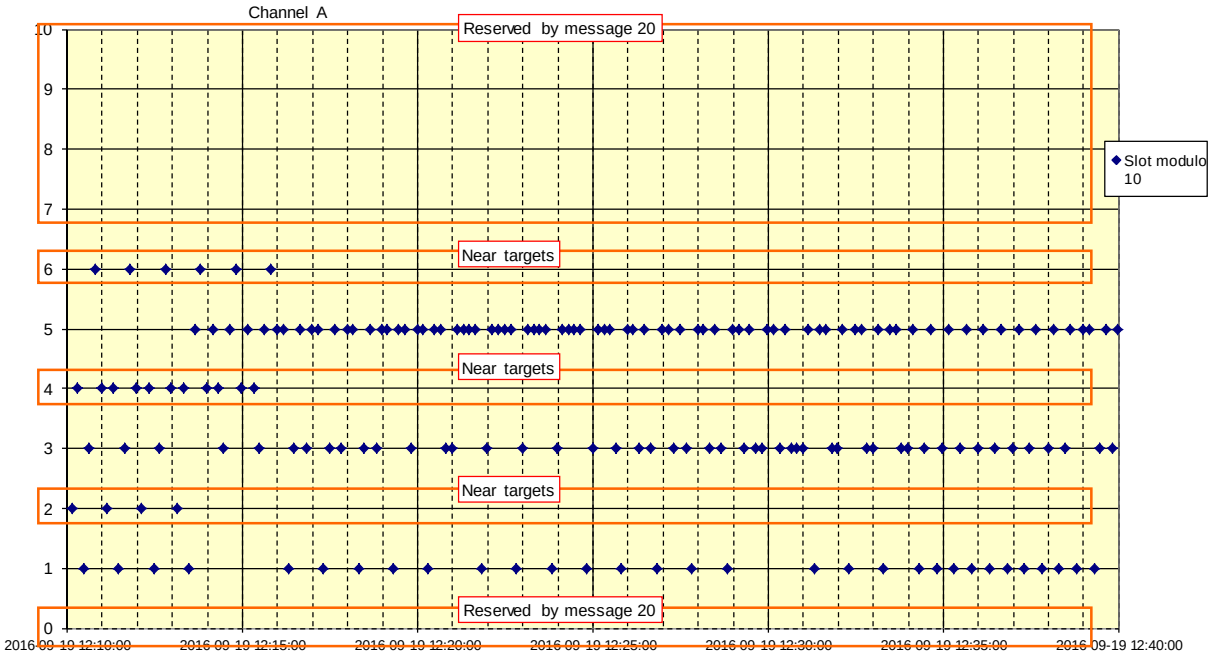
2016-09-19 - AMEC B600 - 13.5c Slot reuse



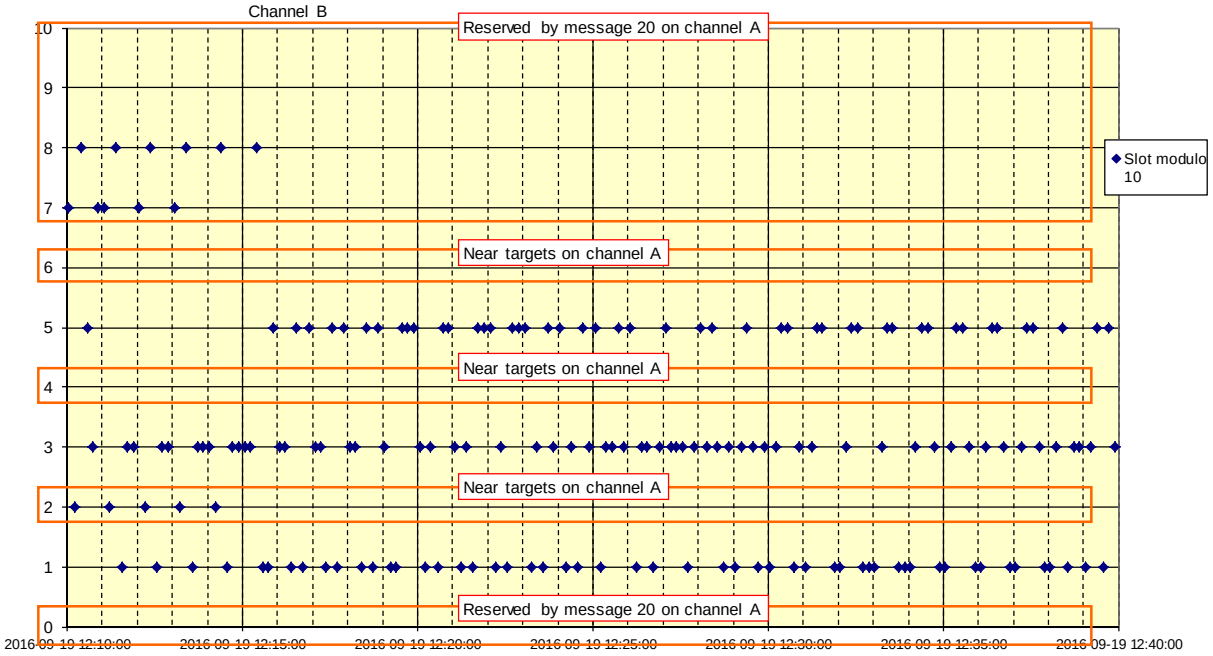
2016-09-19 - AMEC B600 - 13.5c Slot reuse



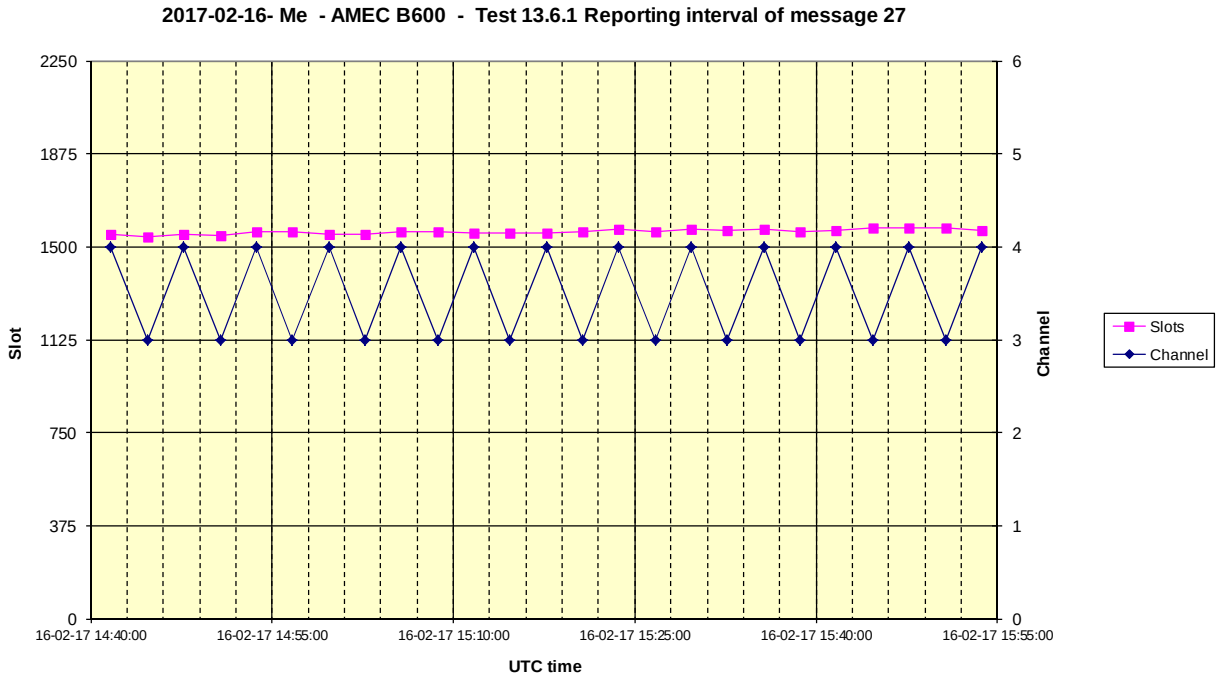
2016-08-26 Ba - AMEC B600- 13.5d Slots selection with reservations on channel A.

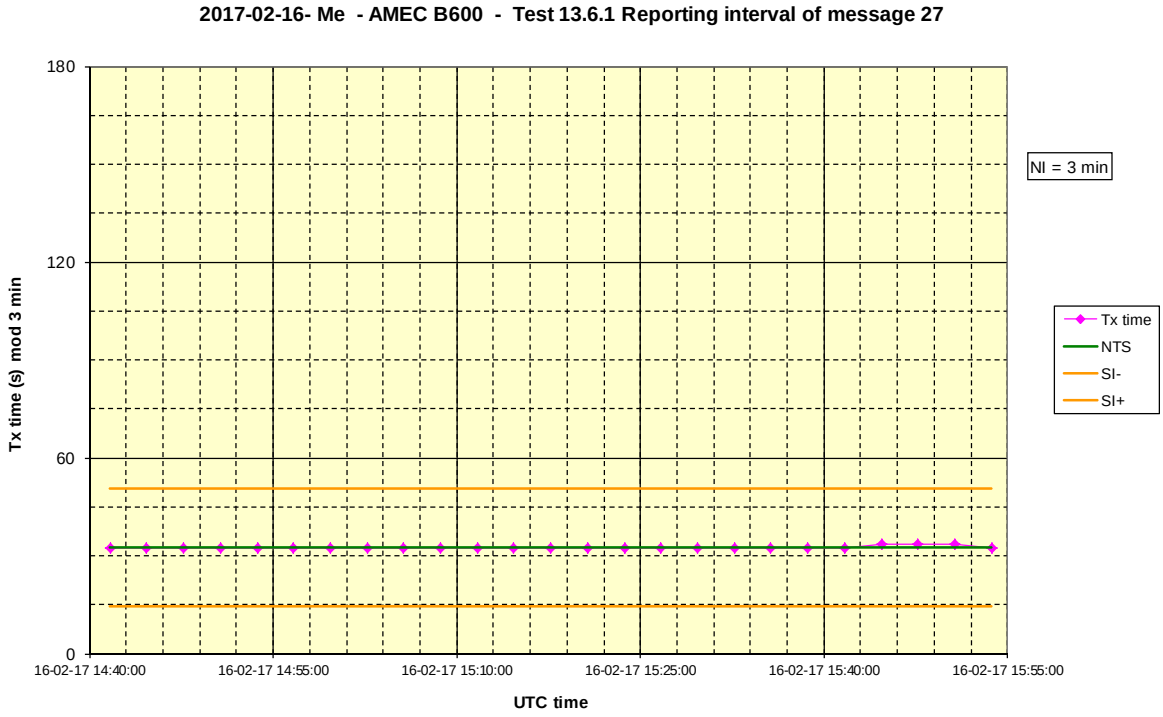


2016-08-26 Ba - AMEC B600- 13.5d Slots selection with reservations on channel A.

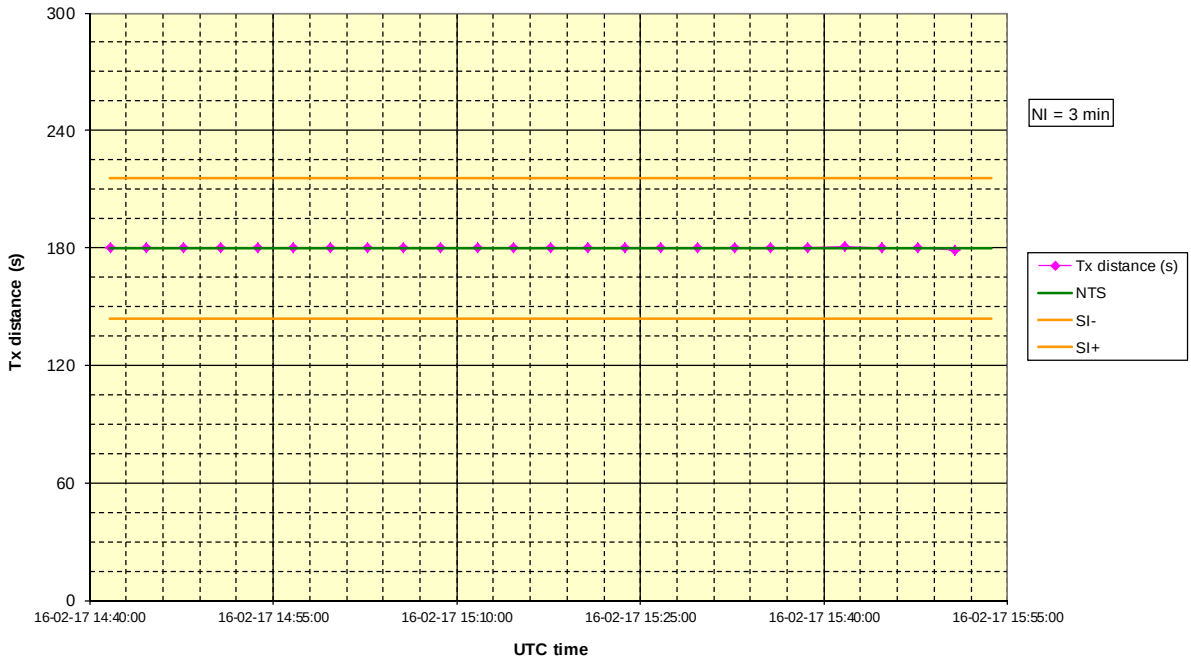


C.10 13.6 Long range broadcast

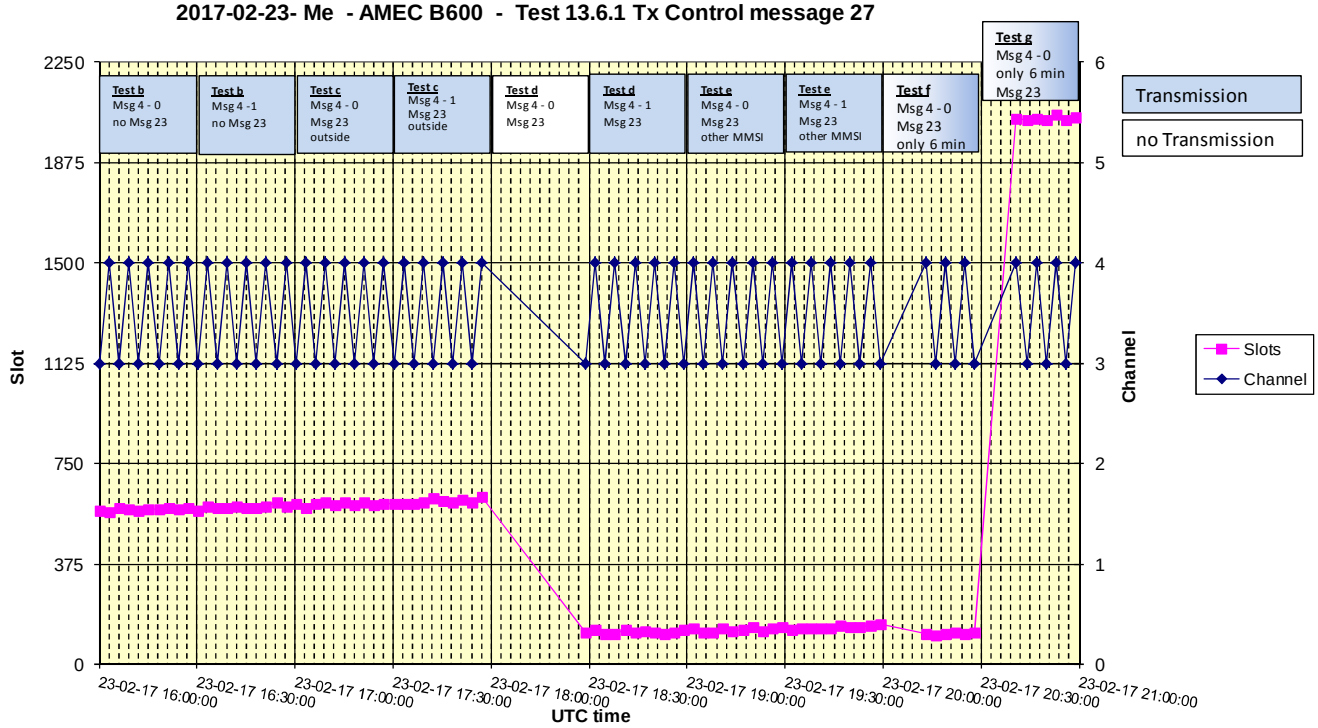




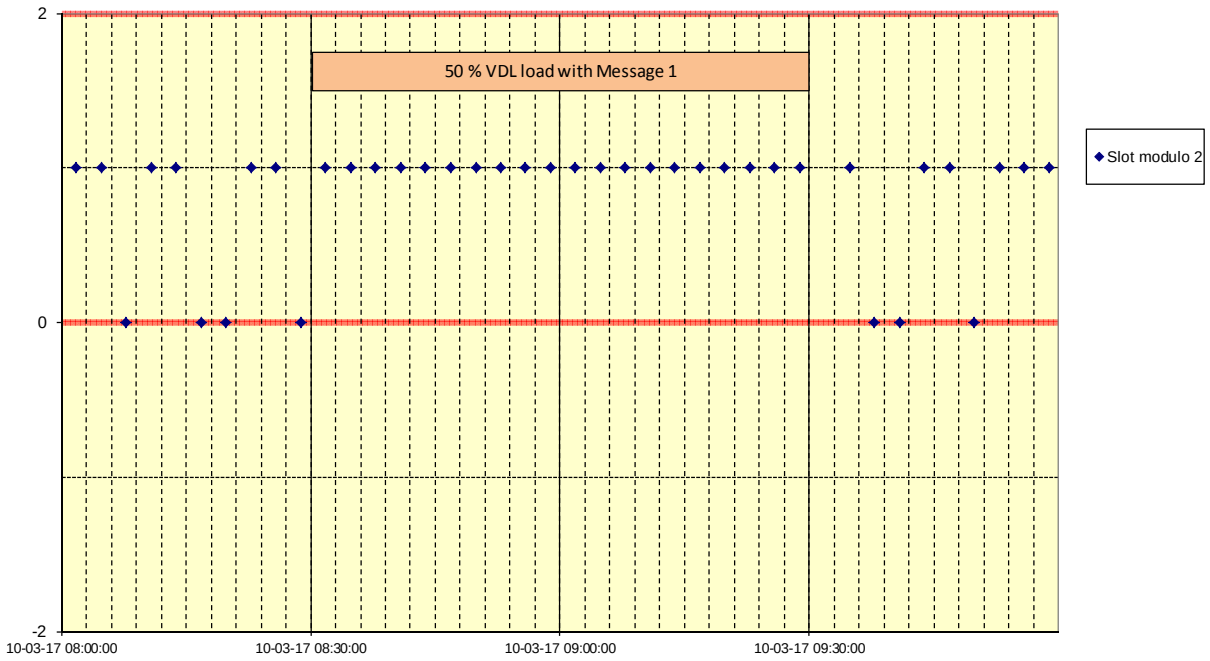
2017-02-16- Me - AMEC B600 - Test 13.6.1 Reporting interval of message 27



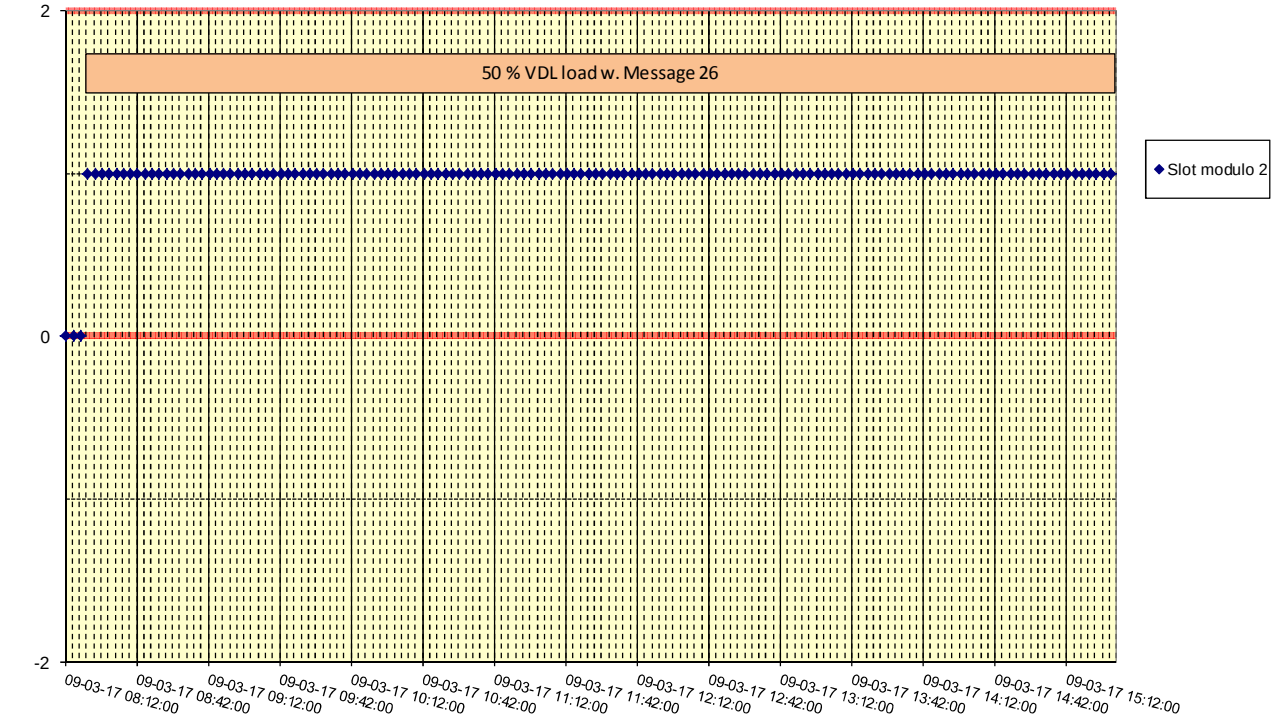
2017-02-23- Me - AMEC B600 - Test 13.6.1 Tx Control message 27



2017-03-10 - AMEC B600 - Test 13.6.1 Use of free slots at 50% VDL load for Message 27

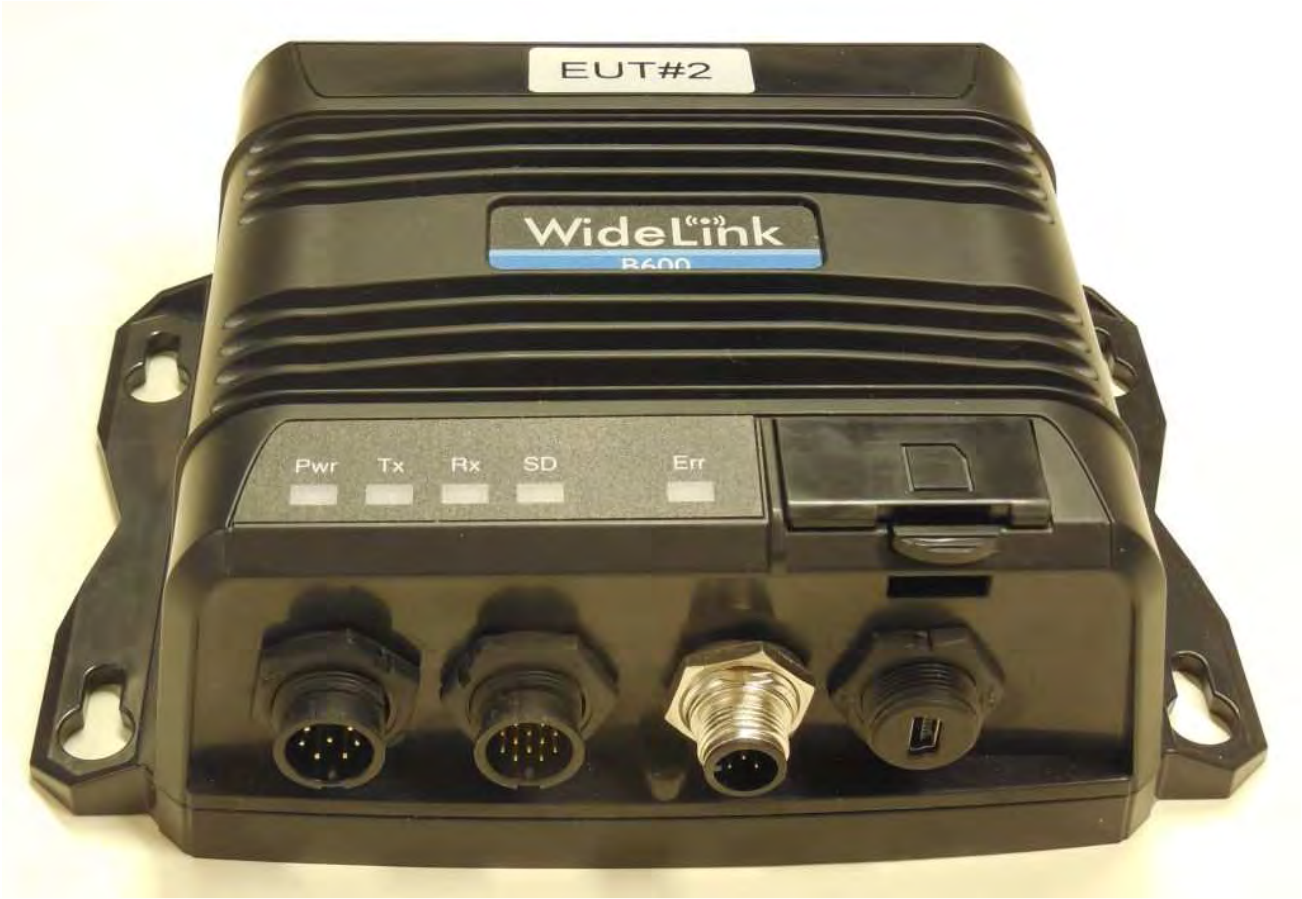


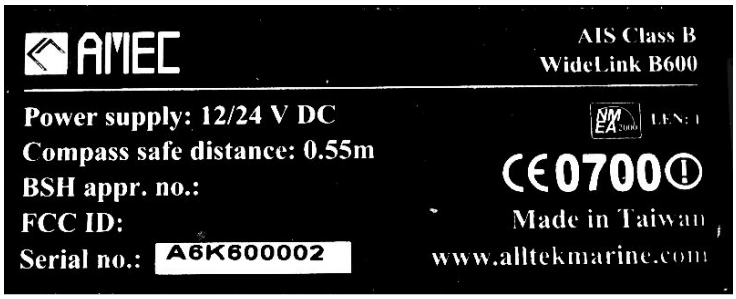
2017-03-09 - AMEC B600 - Test 13.6.1 Use of free slots at 50% VDL load for Message 27

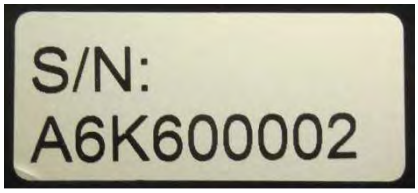


Annex D Photos of equipment under test

D.1 Transponder unit








EUT#2
WideLink
B600
Pwr
Tx
Rx
SD
Err

D.2 GPS antenna