2011-07-08 Ba	Test details – Content of msg 7 Binary acknowledge		
Test item	Check	Remark	Result
Transmit a message 7 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 8 Binary broadcast message		
Test item	Check	Remark	Result
Transmit a message 8 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 4 (msg length = 80 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 9 SAR aircraft position report		
Test item	Check	Remark	Result
Transmit a message 9 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 10 UTC and data inquiry		
Test item	Check	Remark	Result
Transmit a message 10 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok
Msg11 response	Check for response with msg 11 if EUT is addressed		Ok
Msg11 response	No response if addressed to other station		Ok

2011-07-08 Ba	Test details – Content of msg 11 UTC date response		
Test item	Check	Remark	Result
Transmit a msg 11 from VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 12 Addressed safety related message		
Test item	Check	Remark	Result
Transmit a message 12 from other AIS transponder or VDL generator addressed to EUT. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 138 bit)		Ok
Message content	Check the the message content is correct.		Ok
Transmit a message 12 addressed to other AIS. Message shall not be output on PI.			
Msg12 to other AIS	Check PI , no VDM		Ok

2011-07-08 Ba	Test details – Content of msg 13 Safety related acknowledge		
Test item	Check	Remark	Result
Transmit a message 13 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 14 Safety related broadcast message		
Test item	Check	Remark	Result
Transmit a message 8 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (length = 144 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 15 Interrogation		
Test item	Check	Remark	Result
Transmit a message 15 from other AIS transponder or VDL generator . Response on this msg is tested under 6.3 18.2 (M.1371 A1/5.3) Interrogation responses			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 16 Assigned mode command		
Test item	Check	Remark	Result
Transmit a message 16 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 96 bit (1 dest.)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 17 GNSS binary broadcast message		
Test item	Check	Remark	Result
Transmit a msg 17 from VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 192 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 18 Standard Class B position report		
Test item	Check	Remark	Result
Transmit a msg 18 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 19 Extended Class B position report		
Test item	Check	Remark	Result
Transmit a msg 19 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 20 Data link management message		
Test item	Check	Remark	Result
Transmit a message 20 from VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (msg length = 160 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 21 ATON report		
Test item	Check	Remark	Result
Transmit a msg 21 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 22 Channel management to an area		
Test item	Check	Remark	Result
Transmit a msg 22 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 22 Channel management, MMSI addressed		
Test item	Check	Remark	Result
Transmit a msg 22 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 23 Group assignment command		
Test item	Check	Remark	Result
Transmit a msg 23 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 24 A Class B CS static data report		
Test item	Check	Remark	Result
Transmit a msg 23 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of msg 24 B Class B CS static data report		
Test item	Check	Remark	Result
Transmit a msg 23 from VDL generator. Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of addressed messages 25		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 4 (msg length = 104 bit)		Ok
Message content	Check the the message content is correct.		Ok
Transmit a message 25 addressed to other AIS. Message shall not be output on PI.			
Msg 25 to other AIS	Check PI , no VDM		Ok

2011-07-08 Ba	Test details – Content of broadcast messages 25		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 168 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Content of addressed messages 26		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 4 (msg length = 200 bit)		Ok
Message content	Check the the message content is correct.		Ok
Transmit a message 26 addressed to other AIS. Message shall not be output on PI.			
Msg26 to other AIS	Check PI , no VDM		Ok

2011-07-08 Ba	Test details – Content of broadcast messages 26		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 168 bit)		Ok
Message content	Check the the message content is correct.		Ok

2011-07-08 Ba	Test details – Long range position report message 27		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 96 bit)		Ok
Message content	Check the the message content is correct.		Ok

4.7.2 16.7.2 Transmitted messages

(M.1371 A1/3.3.7)

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 7 by the EUT.

Record transmitted messages.

Required results

Confirm that EUT transmits messages with correct field contents and format or responses as appropriate. Confirm that messages 4, 9,16, 17, 18, 19, 20, 21, 22 are NOT being transmitted by the EUT.

The message contents of most transmitted messages are checked in special tests

2011-07-11 Ba	Test details – Message 1,2,3 Position report		
Test item	Check	Remark	Result
The message content of message 1,2,3 is checked in 2.3.1 Information content of msg 1			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
	Check that the channel field is empty (NULL) if not TX		Ok
Fill bits	Check that value = 0		Ok
Message content	The message content is tested in 14.3		Ok

2011-07-11 Ba	Test details – Message 5 Static data		
Test item	Check	Remark	Result
The message content of message 5 is checked in 2.3.2 Information content of msg 5.			
Number of sentences	Check that value = 2		Ok
Check sentence number	Check that value = 1,2		Ok
Sequential message ident.	Check that counting from 0...9 modulo 10		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2		Ok
Message content	The message content is tested in 14.3		Ok

2011-07-11 Ba	Test details – Content of msg 6 Addressed binary message		
Test item	Check	Remark	Result
This test can be done in combination with test 2.1.4.1 14.1.4.1 Transmit an addressed message Apply PI sentence: File AIABM_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 10:49	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (msg length = 112 bit)		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Sequence number	Check the field content		Ok
Destination ID (MMSI)	Check the field content		Ok
Retransmit flag	Check the field content		Ok
DAC	Check the field content		Ok
FI	Check the field content		Ok
Binary data	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 7 Binary acknowledge		
Test item	Check	Remark	Result
This test can be done in combination with test 6.1.2 18.1.2 Acknowledgement Message 6 has to be transmitted by other AIS or VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 10:51	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Destination ID 1 (MMSI)	Check the field content		Ok
Sequence number 1	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 8 Binary broadcast message		
Test item	Check	Remark	Result
This test can be done in combination with 6.4 18.3 Broadcast messages Apply PI sentence: File AIBBM_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 10:53	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 4 (msg length = 80 bit)		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
DAC	Check the field content		Ok
FI	Check the field content		Ok
Binary data	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 10 UTC and date inquiry		
Test item	Check	Remark	Result
Activate transmission of msg 10 if implemented (not required)			
Number of sentences	Check that value = 1	UTC 10:52 Tx of message 10 is implemented for the Ed. 2 communication test	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 72 bit)		Ok
Message ID	Check the field content		Ok
Source ID	Check the field content		Ok
Destination ID	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 11 UTC date response		
Test item	Check	Remark	Result
Transmit a msg 10 from VDL generator to request transmission of msg 11 by EUT Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 11:00	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message id	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
UTC year, month, day, hour, minute, second	Check the field content		Ok
Position accuracy flag	Check the field content		Ok
Longitude	Check the field content		Ok
Latitude	Check the field content		Ok
Type of EPFD	Check the field content		Ok
RAIM flag	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 12 Addressed safety related message		
Test item	Check	Remark	Result
This test can be done in combination with test 2.1.4.1 14.1.4.1 Transmit an addressed message Apply PI sentence: File AIABM_safety.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 96bit)		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Sequence number	Check the field content		Ok
Destination ID (MMSI)	Check the field content		Ok
Retransmit flag	Check the field content	0 for first Tx, 1 for retransmission	Ok
Safety related text	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 13 Safety related acknowledge		
Test item	Check	Remark	Result
This test can be done in combination with test 6.1.2 18.1.2 Acknowledgement Send message 12 from other transponder or VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 11:04	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Destination ID 1 (MMSI)	Check the field content		Ok
Sequence number 1	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 14 Safety related broadcast message		
Test item	Check	Remark	Result
This test can be done in combination with 6.4 18.3 Broadcast messages Apply PI sentence: File AIBBM_safety..sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 11:06	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (length = 64 bit)		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Safety related text	Check the field content		Ok

2011-07-11 Ba	Test details – Content of msg 15 Interrogation		
Test item	Check	Remark	Result
This test can be done in combination with 6.3 18.2 (M.1371 A1/5.3) Interrogation responses Apply PI sentence: File AIAIR_35_5_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 11:09	Ok
Check sentence number	Check that value = 1		Ok
Sequential message ident.	Check that field is empty (NULL)		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (msg length = 160 bit)		Ok
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Destination ID 1 (MMSI)	Check the field content		Ok
Message ID 1.1	Check the field content		Ok
Slot offset 1.1	Check the field content = 0		Ok
Message ID 1.2	Check the field content		Ok
Slot offset 1.2	Check the field content = 0		Ok
Destination ID 2 (MMSI)	Check the field content		Ok
Message ID 2.1	Check the field content		Ok
Slot offset 2.1	Check the field content = 0		Ok

2011-	**Tester: Ba**	**Test details:** Message 27 Long range broadcast		
Test item		Check	Remark	Result
Number of sentences		Check that value = 1	These values represent the VDO output	Ok
Check sentence number		Check that value = 1		Ok
Sequential message ident.		Check that field is empty (NULL)		Ok
Channel		Check that the correct value C and D is output		Ok
Fill bits		Check that value = 0		Ok
Message ID		Check the field content		Ok
User ID (MMSI)		Check the field content		Ok
Position accuracy		Check the field content		Ok
RAIM flag		Check the field content		Ok
Navigational status		Check the field content		Ok
Longitude (1/10 min)		Check the field content		Ok
Latgitude (1/10 min)		Check the field content		Ok
SOG (kn)		Check the field content		Ok
COG (degree)		Check the field content		Ok
GNSS position status		Check the field content		Ok

Note) Message 27 should not sent by default.

For test to IEC 61993-2 Ed. 1 we do not require transmission of message 27. If transmission of message 27 is implemented it is tested here.

5 17 Specific tests of Network Layer

(7.4)

5.1 17.1 Dual channel operation

(M.1371 A1/4.1)

5.1.1 17.1.1 Alternate transmissions

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode on default channels AIS1, AIS2. Record transmitted scheduled position reports on both channels. Check CommState for slot allocation.

Required results

Confirm that EUT allocates slots in both channels alternating. Repeat check for data link access period.

2011-06-09 Ba	Test details – Alternate transmissions		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode, set report rate to 10sec with external sensor input. Record transmitted scheduled position reports on both channels. Check Comm State for slot allocation.			
Alternate transmissions	Check that the EUT transmission is alternating	See test 16.6.2	Ok
Comm state	Check that the slots of each channel are allocated on the same channel		Ok
Same test on network entry (data link access period)			
Alternate transmissions	Check that the EUT transmission is alternating	See test 16.6.1	Ok
Comm state	Check that the slots of each channel are allocated on the same channel		Ok

5.2 17.2 Regional area designation by VDL message

(M.1371 A1/4.1))

Method of measurement

Set-u p standard test environment and operate EUT in autonomous mode. Apply Channel management messages (msg 22) to the VDL defining two adjacent regional areas 1 and 2 with different channel assignments for both regions and a transitional zone extending 4nm either side of the regional boundary. At least one channel shall be 12.5kHz channel. Let the EUT approach region 1 from outside region 2 more than 5 NM away from region boundary transmitting on default channels. Record transmitted messages on all 6 channels.

Region	***Primary channel***	***Secondary channel***
Region 1	*CH A1*	*CH B1*
Region 2	*CH A2*	*CH B2*
Default region	*AIS 1*	*AIS 2*

Required results

Check that the EUT transmits and receives on the primary channels assigned for each region alternating channels and doubling reporting rate when passing through the transitional zones. EUT shall revert to default autonomous operation on the regional channels after leaving the transitional zones.

Item	***Area***	***Channels in use***
1	*default region*	*AIS1, AIS2*
2	*first transitional zone*	*AIS1, 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*

This Test is divided in 2 parts:

- The first part checks the general behaviour including check of ACA and TXT output, check of the borders of area an transitional zone, check of the correct frequency use.
- The second part concentrates on the slot allocation and use during a transition from one area (high sea) into another.

2011-06-20 Ba	Test details – part 1: Channel management by VDL msg 22		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode transmitting on channel AIS1/AIS2, send 2 Msg 22 by VDL generator, defining 2 adjacent areas with channels A1, B1 and A2, B2. Use external sensor input to simulate a voyage through both areas. Set transitional zone to 4nm. Set the position outside the areas. “TZ” is used for “transitional zone” Set the positions near the limits of the transitional zones to check the dimensions			
PI output	Check that the msg 22 are output on PI		Ok
Display of defined area	Check that the defined area is correctly stored (displayed on MKD)		Ok
	Check ACA and TXT output on PI (not required but recommended.		Ok
	ACA: check in use flag and time of in use flag		Ok
Item 1: In high sea area	Check that channels AIS1 and AIS2 are in use		Ok

Item 2: Move position into outer TZ of region 2	Check ACA and TXT output (No required)		Ok
	If ACA output: check in use flags and time of in use flag	In use flag = 0	Ok
	Check the limit of the TZ (5 NM = 8.8 minutes)		Ok
	Check that channel AIS 1 and A2 are used		Ok
	Check that reporting rate is doubled		Ok
Item 3: Move position into inner TZ of region 2 (crossing the area border)	Check ACA and TXT output (Required)		Ok
	ACA: check in use flag = 1		Ok
	ACA: check time of in use flag		Ok
	Check the border of area		Ok
Item 4: Move position into region 2 (out of TZ)	Check ACA and TXT output (not required)	There is an ACA and TXT output	Ok
	Check the limit of the TZ (4 NM = 7 minutes)		Ok
	Check that channel A2 and B2 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 5: Move position into TZ between region 1 and 2, inside area 2	Check that channels A2 and A1 are used		Ok
	Check that reporting rate is doubled		Ok
Item 6: Move position into area 1 (inside the TZ) (crossing the area border)	Check ACA and TXT output (Required)	UTC 13:38 There is an ACA of the entered area, with in-use flag = 1	Ok
	Check the border of area		Ok
Item 7: Move position into region 1 (out of TZ)	Check that channels A1 and B1 are used		Ok
	Check the limit of the TZ (4 NM = 7 minutes)		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 8: Move position into TZ of region 1 to high sea	Check that channels A1 and AIS1 are used		Ok
	Check that reporting rate is doubled		Ok
Move position out of the TZ of region 1, into high sea	Check that channels AIS1 and AIS2 are used		Ok

	ACA: check in use flags and time of in use flag	UTC 13:46 • In use flag = 0 • The time of in-use flag change is incorrect. It is the time when the in-use flag had been set to 1 (13:38) IEC 61162, ACA, Note 9 says that it is *"the UTC time that the "in-use flag" field changed to the indicated state"* Retest 2011-11-04 Ba: The time of in-use flag is correctly set for value 0 and 1	Ok Ok
	Check that reporting rate is changed back to normal reporting rate		Ok

Main scope of this table is the correct slot allocation and use on the different channels.

2011-06-10 Ba	Test details – part 2: Channel management by VDL msg 22		
Test item	Check	Remark	Result
The same area and movement is used as in test part 1.			
Item 1: In high sea area	Record 1 frame before entering the area	This test has been performed with areas applied by ACA sentences.	
	Check that channels AIS1 and AIS2 are in use		Ok
Item 2: Move position into transitional area of region 2, first frame after transition	Check that EUT continues TX on AIS1 and AIS2 for 1 frame		Ok
	Check that EUT releases the slots on AIS2 by msg 1 with time-out 0 and no slot offset	The slots on both channels are released	Ok
	Check that channel AIS 1 and **A2** are used for **Rx**		Ok
Item 3: In outer transitional area of region 2, next frames after transition	Check allocation of additional slots on channel A (AIS1) using msg 3	There is a complete new scheduling on channel A	Ok
	Check complete slot allocation on channel B (A2) using msg 3		Ok
	Check that channel AIS 1 and A2 are used for Tx		Ok
	Check that channel AIS 1 and A2 are used for Rx		Ok
	Check that reporting rate is doubled		Ok
	Check that msg on AIS1 are output on PI (VDM/VDO) as channel A and A2 as channel B		Ok

Item 4: Move into inner transitional area of region 2, crossing the area border,	Check that msg on AIS1 are output on PI (VDM/VDO) as channel B and A2 as channel A (channels reverted)		Ok
Item 5: Move position into the area of region 2 (out of TZ), first frame after transition	Check that EUT continues TX on AIS1 and A2 for 1 frame		Ok
	Check that EUT releases all slots on AIS1 by msg 1 with time-out 0 and no slot offset		Ok
	Check that EUT releases every second slot on channel A2 by msg 1 (for reversion to normal reporting rate	All slots are released	Ok
	Check that channel A2 and **B2** are used for **Rx**		Ok
Item 6: Inside area of region 2, next frames after transition	Check allocation of Slots on channel B (B2) using msg 3	There is a network entry procedure on both channels	Ok
	Check that channels A2 and B2 are used for Tx		Ok
	Check that channel A2 and B2 are used for Rx		Ok
	Check that reporting rate is back to normal reporting rate		Ok
	Check that msg on A2 are output on PI (VDM/VDO) as channel A and B2 as channel B		Ok

2011-07-07 Ba	Test details – Check of Tx/Rx mode		
Test item	Check	Remark	Result
Set Tx/Rx-Mode in msg 22 to 0	Check that mode is correctly stored	UTC 14:28	Ok
	Check that channel A and B are used for Tx		Ok
	Check that channel A and B are used for Rx		Ok
Set Tx/Rx- Mode in msg 22 to 1	Check that mode is correctly stored	UTC 14:20 The diagram is recorded on 2011-06-09 UTC 9:00	Ok
	Check that channel A only is used for Tx		Ok
	Check that channel A and B are used for Rx		Ok
	Check that the reporting interval is correct	= 10 s	Ok
Set Tx/Rx-Mode in msg 22 to 2	Check that mode is correctly stored	UTC 14:22	Ok
	Check that channel B only is used for Tx		Ok
	Check that channel A and B are used for Rx		Ok

5.3 17.3 Regional area designation by serial message

(M.1371 A1/4.1.3)

Repeat test 17.2 using ACA serial message for channel assignment.

2011-11-17 Ba	Test details – Channel management by ACA sentence on PI		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode transmitting on channel AIS1/AIS2, send 2 ACA sentences to the PI , defining 2 adjacent areas with channels A1, B1 and A2, B2. Use external sensor input to simulate a voyage through both areas. Set transitional zone to 1nm. Set the position outside the areas. Areas are in SW quadrant. File name is AIACA_Region_17_3_SW.sst Set the positions near the limits of the transitional zones to check the dimensions			
Display of defined area	Check that the defined area is correctly stored (displayed on MKD)		Ok
	Check ACA and TXT output on PI (not required but recommended.		Ok
Item 1: In high sea area	Check that channels AIS1 and AIS2 are in use		Ok

Item 2: Move position into outer TZ of region 2	Check ACA and TXT output (No required)	UTC 09:58	Ok
	Check the limit of the TZ (5 NM = 5.8 minutes)		Ok
	Check that channel AIS 1 and A2 are used		Ok
	Check that reporting rate is doubled		Ok
Item 3: Move position into inner TZ of region 2 (crossing the area border)	Check ACA and TXT output (Required)	UTC 10:01	Ok
	Check the border of area		Ok
Item 4: Move position into region 2 (out of TZ)	Check ACA and TXT output (not required)	UTC 10:04	Ok
	Check the limit of the TZ (2 NM = 2.3 minutes)		Ok
	Check that channel A2 and B2 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 5: Move position into TZ between region 1 and 2, inside area 2	Check that channels A2 and A1 are used	UTC 10:07	Ok
	Check that reporting rate is doubled		Ok
Item 6: Move position into area 1 (inside the TZ) (crossing the area border)	Check ACA and TXT output (Required)	UTC 10:11	Ok
	Check the border of area		Ok
Item 7: Move position into region 1 (out of TZ)	Check that channels A1 and B1 are used	UTC 10:12	Ok
	Check the limit of the TZ 1 NM = 1.15 minutes)		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 8: Move position into TZ of region 1 to high sea	Check that channels A1 and AIS1 are used	UTC 10:15	Ok
	Check that reporting rate is doubled		Ok
Move position out of the TZ of region 1, into high sea	Check that channels AIS1 and AIS2 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok

2011-11-17 Ba	Test details – Check of Tx/Rx mode		
Test item	Check	Remark	Result
Set Tx/Rx-Mode to 0	Check that mode is correctly stored		Ok
	Check that channel A and B are used for Tx		Ok
	Check that channel A and B are used for Rx		Ok
Set Tx/Rx-Mode to 1	Check that mode is correctly stored	UTC 10:24	Ok
	Check that channel A only is used for Tx		Ok
	Check that channel A and B are used for Rx		Ok
	Check that the reporting rate is correct		Ok
Set Tx/Rx-Mode to 2	Check that mode is correctly stored	UTC 10:27	Ok
	Check that channel B only is used for Tx		Ok
	Check that channel A and B are used for Rx		Ok
Set Tx/Rx-Mode to 3	Check that mode is correctly stored	UTC 10:29	Ok
	Check that EUT is not transmitting		Ok
	Check that channel A and B are used for Rx		Ok

5.4 17.4 Power setting

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Transmit channel management message (msg 22) defining output power high/low.

Repeat test using ACA and manual input.

Required result

Check that EUT sets output power as defined.

2011-07-11 Ba	Test details – Power setting by msg 22		
Test item	Check	Remark	Result
The EUT has to be in an area with regional operating settings and the channels as used in the following msg 22. Transmit a msg 22 from VDL generator like the following: 22,0,2345,0,2086,1086,0,**1**,[MMSI(MSB)],[MMSI(LSB)],1,0,0,,0			
Channel switch	Check that the EUT doesn't switch channels		Ok
Power low	Check that the transmitting power is changed from high to low		Ok
MKD	Check the low power settings are displayed on MKD		Ok
Transmit the same message 22, but power setting to 0 = high power			
Power high	Check that EUT reverts to high power		Ok

2011-07-11 Ba	Test details – Power setting by ACA		
Test item	Check	Remark	Result
Apply the following message at PI: File name = AIACA_region_in_ch86.sst. Set power flag to 1 = low power and channels to actually used channels			
Power low	Check that the transmitting power is changed from high to low		Ok
MKD	Check the low power settings are displayed on MKD		Ok
Transmit the same ACA sentence, but power setting to 0 = high power			
Power high	Check that EUT reverts to high power		Ok

2011-07-11 Ba	Test details – Power setting by manual input		
Test item	Check	Remark	Result
Set the power level of the region in use to low power, Don't change the channels			
Power low	Check that the transmitting power is changed from high to low	The power could not be changed because of an MKD problem: The region display is incorrect. When selecting "High sea" from the regions list the channels of the area in use are displayed. When selecting "current region" from the regions list the AIS1 and AIS2 channels are displayed, and the corner points set to 0. Retest 2011-11-03 Ba: The power level can be set to low power	Ok
Set power level back to high power.			
Power high	Check that EUT reverts to high power	Test 2011-11-03 Ba:	Ok

5.5 17.5 Message priority handling

(M.1371 A1/4.1.8)

Method of measurement

Set-up standard test environment and operate test equipment with 90% channel load. Set the EUT to max reporting rate of 2 sec by applying a speed of >23kn and a ROT of >20°/sec. Record VDL messages and check for used slots. Initiate the transmission of two 5 slot messages (msg 12 and msg 8) by the EUT. Record transmitted messages on both channels.

Required results

Check that EUT transmits the messages in correct order according to their priority (ITU-R M.1371 A/3.3.8.1 table 13).

This test is modified in that way that first a BBM sentence is sent to make the EUT busy with a transmission process. Then the 2 test sentences with msg 8 and msg 12 are applied.

Otherwise the EUT has already started the transmission process of the first msg, has allocated slots or even has already transmitted the msg before the input of the ABM sentence with the msg 12 has been completed. In this case it would not be possible to transmit the msg 12 first.

2011-07-11 Ba	Test details – Message priority handling		
Test item	Check	Remark	Result
Simulate a channel load of 90% on both channels, set reporting rate to 2 s Apply an BBM sentence with msg 8 and immediately following an ABM sentences with msg 12 to the PI port. File name is AIBBM_ABM_17_5.sst Check transmissions by VDL analyser.			
Transmission order	Check that msg 12 is transmitted first because of higher priority	UTC 13:55	Ok

5.6 17.6 Slot reuse (link congestion)

(M.1371 A1/4.4)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Transmit a Data Link Management message (msg 20) to the EUT with slot offset and increment to allocate slots for a base station. Assure that at test receiver location the signal level received from EUT exceeds the signal level received from test transmitter. Record transmitted messages and check frame structure. Set up additional test targets to simulate a VDL load of >90% until slot reuse by EUT is observed.

Required results

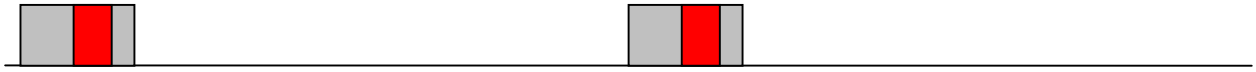
Check that the nominal reporting rate for Position Report msg 1 is achieved ±10% (allocating slots in selection interval SI) under link congestion conditions. Confirm that the slot occupied by the most distant station (within selection interval) is used by the slot reuse algorithm.

Check that a station is not subject to slot reuse more than once a frame. Check that slots allocated by a local base station are not subject to slot reuse.

Used test procedure:

In one frame 3 blocks of 60 targets are transmitted in consecutive slot. The 3 blocks start at slot 1, 751 and 1501.

The EUT is set to 2 s reporting rate to increase the probability that the relevant selection intervals are completely covered by targets..



The grey area is covered by targets, the red area is the selection interval of 15 slots.

The targets are numbered from 1 to 60 and transmitted in the order of the IDs. They are divided into 2 groups:

- The even numbered targets have a low distance (1..2 NM),
- the odd numbered targets have a high distance to the EUT (about 30 NM)

This test have to be run for at minimum 30 minutes to observe a sufficient number of slot allocations (every 3-8 min). The selected slots of the selection intervals covered by targets have to be checked.

2011-07-12 Ba	Test details – Slot reuse		
Test item	Check	Remark	Result
This test can be done as described before.			
Reporting rate, use of selection interval	Check that the slots are selected within the SI		Ok
Slot reuse	Check that only the slots of odd numbered targets are used	• In one case (UTC 10:48) the slots of a near station (target 26) are reused. It has been verified that the target has been received in the previous frames. • In all other cases the slots of distant stations are used. <u>Retest 2011-11-03 Ba:</u> Only distant stations are reused	Ok
	Check that a the slot of a target is not used twice in a frame		Ok
Reserved Slot	Check that slots reserved by msg 20 are not used	The test of use of reserved slots is done in 16.6.5 Fixed allocated transmissions (FATDMA)	N/A

5.7 17.7 Management of received regional operating settings

(7.4.1)

5.7.1 17.7.1 Test for replacement or erasure of dated or remote regional operating settings

(7.4.1)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Send a valid regional operating setting to the EUT by msg 22 with the regional operating area including the own position of the EUT. Consecutively send a total of seven (7) valid regional operation settings to EUT, using both msgs 22 and DSC telecommands, with regional operating areas not overlapping to the first and to each other. Perform the following in the order shown:

a) Send a ninth msg 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 miles from all regions defined by previous commands.

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

Required results

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

a) The EUT shall return to the default operating settings.

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 shall be erased due to Step 2, and since there is no other regional operating setting due to their non- overlapping definition, the EUT shall return 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.

2011-11-04 Ba	Test details – Test of replacement or erasure of dated or remote regional operating settings		
Test item	Check	Remark	Result
The following check of area entries can be done by MKD or by request of ACA			
Send by message 22 • 1 area including own position • 7 areas not overlapping, not including own position File name: AIACA_8_regions_17_7_1.sst	Check that area 1...8 are displayed on MKD	The stored regions are correctly displayed on MKD	Ok
	Check that all 8 areas are output on PI after request by sentence xxAIQ,ACA		Ok
a) Send a 9. msg 22 to the EUT	Check that the first area is deleted	the most distant area, area 8, is deleted. This is according to the new draft Ed.2	Ok
	Check that the EUT returns to the default operating settings	Because of the behaviour according to Ed. 2 the EUT does not return to the default settings	Ok
b) step 1: Set own position to one of the 7 areas	Check that the EUT changes its operating settings according to that region		Ok
b) step 2: Send an area overlapping the area of step 1 not including own position	Check the overlapped area is deleted and replaced by the new one		Ok
	Check that the EUT reverts to the default operating settings		Ok
d) <u>Erasure by distance</u>: Move own position of EUT to a distance of more than 500 miles from all regions defined by previous commands	Check that all areas are deleted		Ok
<u>Check of erasure</u>: Set own position of EUT to within all regions defined by the previous telecommands.	Check that the EUT operates with the default settings because the areas are deleted		Ok

5.7.2 17.7.2 Test of correct input via Presentation Interface or MKD

(7.4.1)

Method of measurement

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

following tests in the following order:

a) Send msg 22 or a DSC telecommand with valid regional operating settings to the EUT with a regional operating area, which contains the current position of own station.

b) Input a different, valid regional operating setting via the MKD.

c) Send a different regional operating setting with a regional operating area which partly overlaps the regional operating area input via the MKD to the EUT via the Presentation Interface in the previous step, and which contains the present position of own station.

d) Input the default operating settings via the MKD for the regional operating area, which was received by the previous command via the Presentation Interface.

e) Send msg 22 or a DSC telecommand with a different regional operating setting to the EUT with a regional operating area, which contains current position of own station.

f) Within two hours, after e), send a different regional operating setting to the EUT via Presentation Interface with a valid regional operating area overlapping the regional operating area sent to the EUT by msg 22 or a DSC telecommand.

Required results

a) Confirm that the EUT uses the regional operating settings commanded by msg 22 or DSC telecommand.

b) Step 1: Confirm that the regional operating settings of the previous msg 22 or DSC telecommand are displayed to the user on the MKD for editing.

Step 2: Check, that the EUT allows the user to edit the displayed regional operating settings. Check, that the EUT does not accept incomplete or invalid regional operating settings. Check, that the EUT accepts a complete and valid regional operating setting.

Step 3: Check, that the EUT prompt the user to confirm the intended change of regional operating settings. Check, that the EUT allows the user to return to the editing menu or to abort the change of the regional operating settings.

Step 4: Check, that the EUT uses the regional operating settings input via the MKD.

c) Check, that the EUT uses the regional operating settings received via the Presentation Interface.

d) Check, that the EUT accepts the default operating settings for the regional operating area received in c). Check, that the EUT uses the default operating settings.

e) Check, that the EUT uses the regional operating settings commanded to it by msg 22 or DSC telecommand.

f) Check, that the EUT does not use the regional operating setting commanded to it via the Presentation Interface.

2011-11-04 Ba	Test details – Correct input via Presentation Interface or MKD		
Test item	Check	Remark	Result
Send msg 22 with same settings as in 17.2 Channel management, set position of own ship into this area			
a) Use of settings	Confirm that the EUT uses the regional operating settings commanded by msg 22		Ok
b) MKD input Entering new area by MKD	Step 1: Confirm that the regional operating settings of the previous msg 22 is displayed to the user on the MKD for editing.		Ok
	Step 2: Check, that the EUT allows the user to edit the displayed regional operating settings.		Ok
	Check, that the EUT does not accept incomplete or invalid regional operating settings.		Ok
	Check, that the EUT accepts a complete and valid new regional operating setting.		Ok
	Step 3: Check, that the EUT prompt the user to confirm the intended change of regional operating settings		Ok
	Check, that the EUT allows the user to return to the editing menu or to abort the change of the regional operating settings.		Ok
Move position inside the new area	Step 4: Check, that the EUT uses the regional operating settings input via the MKD.		Ok
c) New area by ACA Input a new area via PI (ACA sentence) overlapping area of b), position inside	Check, that the EUT uses the regional operating settings received via PI		Ok
d) Default settings via MKD Input the default operating settings via the MKD for the regional operating area of c)	Check, that the EUT accepts the default operating settings for the regional operating area		Ok
	Check, that the EUT uses the default operating settings	The settings are used	Ok
e) Area setting by VDL Send message 22 with a different regional operating setting to the EUT with a regional operating area, which contains current position of own station	Check, that the EUT uses the regional operating settings commanded to it by message 22		Ok

f) Priority of VDL msg Rejection of a shipborne (ACA) regional operating setting when overlapping a setting from base station not older than 2 hours (Clarifications to 1371, 2.54 paragraph 4	Check, that the EUT does not accept the regional operating setting commanded to it via the Presentation Interface.		Ok

5.7.3 17.7.3 Test of addressed telecommand

(7.4.1)

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 msg 22 or a DSC telecommand 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 msg 22 or an addressed DSC telecommand 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.

Required results

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

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

c) Check, that the EUT reverts to default.

2011-07-15 Ba	Test details – Test of addressed telecommand		
Test item	Check	Remark	Result
a) Send msg 22 with valid regional operating settings, with a regional operating area, which contains the current position of own station.	Check, that the EUT uses the regional operating settings commanded to it		Ok
b) Send an addressed message 22 to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it	UTC 11:33	Ok
b) Send an addressed msg 22, addressed **as ID 2**, to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it		Ok

c) Move the EUT out of the regional operating area defined by the previous addressed telecommand	Check, that the EUT reverts to default	UTC 11:42	Ok

5.7.4 17.7.4 Test for invalid regional operating areas (3 areas with same corner)

(7.4.1)

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 msg 22 or DSC telecommand, Presentation Interface input and manual input via MKD. The current own position of the EUT shall be within the regional operating area of the third regional operating set ting.

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

Required test results

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

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

2011-11-04 Ba	Test details – Test for invalid regional operating areas (three regional operating areas with same corner		
Test item	Check	Remark	Result
a) Send three different valid regional with adjacent corners by ACA, File name: AIACA_region_17_7_4.sst Position inside 3rd area.	Check, that the 3rd area is refused and settings are not used	The third area is not refused Remark: A fourth area with the same corner as the 3 other is not accepted Retest 2012-02-02 Ba: UTC 15:13 The third area is not accepted	Ok
b) Move own position to the first 2 areas	Check, that the EUT uses the operational settings of these areas		Ok

5.7.5 17.7.5 Self-Certification of other conditions

(7.4.1)

The fulfilment of all other conditions of 7.4.1 shall be self-certified by the manufacturer.

Date	Result	Status

5.8 17.8 Continuation of autonomous mode reporting rate

(M.1371- 1 A2/3.3.6, IALA Technical clarifications to recommendation ITU- R M.1371- 1)

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 mode-reporting rate.

Required result

Ensure that the autonomous reporting rate is maintained.

2011-07-15 Ba	Test details – Continuation of autonomous mode reporting rate		
Test item	Check	Remark	Result
Set the EUT into a transitional zone Send assignment commands msg 16 with an higher update rate to the EUT			
Rate assignment command in a transitional zone	Check that an rate assignment command is ignored in a transitional zone	UTC 11:52 The assignment command is accepted. Retest 2011-11-03 Ba: There is a VDM output but Message 16 is ignored	Ok
Slot assignment command in a transitional zone	Check that an slot assignment command is ignored in a transitional zone	UTC 11:58 The assignment command is accepted. Retest 2011-11-03 Ba: There is a VDM output but Message 16 is ignored	Ok

6 18 Specific tests of Transport Layer

(7.5)

6.1 18.1 Addressed messages

(M.1371 A1/5.3.1)

6.1.1 18.1.1 Transmission

(M.1371 A1/5.3)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Set up a test target for scheduled transmissions on channel AIS1 only. Initiate the transmission of an addressed binary message (msg 6) by the EUT (test target as destination). Record transmitted messages on both channels.

Required results

Check that the EUT transmits msg 6 on channel AIS1. Repeat test for AIS2.

Basic test of addressed message is made in **2.1.4.1** 14.1.4.1 Transmit an addressed message

The test procedure is modified in that way that the test target is transmitting on both channels, and in case of channel = 0 it is checked that the transmission is always on that channel on that the target transponder was last received.

2011-07-13 Ba	Test details - Addressed binary message 6		
Test item	Check	Remark	Result
Transmit an addressed binary message 6 by sending an ACA sentence to the PI. PI sentence: File AIABM_bin.sst: !AIABM,1,1,2,000005002,x,6,06P0test,0 Change transmission channel x according to test item Transmit some messages for each test item and check the used channel.			
Channel = 0 (autoselect)	Check tx on last received channel		Ok
Channel = 1 (A)	Check Tx on channel A		Ok
Channel = 2 (ch. B)	Check Tx on channel B		Ok
Channel = 3 (ch. A+B)	Check Tx on channel A+B		Ok

2011-07-13 Ba	Test details - Addressed safety related message 12		
Test item	Check	Remark	Result
Transmit an addressed safety related message 12 by sending an ACA sentence to the PI. PI sentence: File AIABM_safety.sst: !AIABM,1,1,2,000005002,x,12,D5CD,0 (D5CD = „TEST“. Change transmission channel x according to test item Transmit some messages for each test item and check the used channel.			
Channel = 0 (autoselect)	Check tx on last received channel		Ok
Channel = 1 (ch. A)	Check Tx on channel A		Ok
Channel = 2 (ch. B)	Check Tx on channel B		Ok
Channel = 3 (ch. A+B)	Check Tx on channel A+B		Ok

6.1.2 18.1.2 Acknowledgement

Method of measurement

Operate standard test environment and EUT in autonomous mode. Apply up to 4 addressed binary messages (msg 6; EUT as destination) to the VDL on Channel AIS 1. Record transmitted messages on both channels. Repeat with AIS2.

Required results

Confirm that EUT transmits a binary acknowledge message (msg 7) with the appropriate sequence numbers within 4 sec on the channel where the msg 6 was received. Confirm that EUT transmit the result with an appropriate message to PI.

A basic receive test is made in 2.1.4.2 14.1.4.2 Receive addressed message.

The content fields of the transmitted acknowledgement should be checked in 4.7.2 16.7.2 Transmitted messages.

2011-07-13 Ba	Test details - Acknowledgement of binary message 6		
Test item	Check	Remark	Result
Transmit 4 addressed binary message with consecutive Sequential message identifiers from other Transponder File name: AIABM_4_bin.sst			
Rx of messages (VDM)	Check that the messages are received by VDM output on PI of EUT	UTC 14:42	Ok
Transmission of acknowledgement msg 7	Check transmission of ackn. by VDO output of EUT		Ok
Sequence numbers	Check that sequence number in ackn = sequence number of Rx message		Ok
Ackn. channel	Check that ackn Tx channel = Rx channel		Ok

RX of ackn. msg 7	Check that the ackn. msg are received by Transmitter (VDM/ABK)		Ok

6.1.3 18.1.3 Transmission Retry

(M.1371 A1/5.3.1)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Initiate the transmission of up to 4 addressed binary messages by the EUT which will not be acknowledged (i.e. destination not available). Record transmitted messages.

Required results

Confirm that EUT retries the transmission up to 3 times (configurable) for each addressed binary message. Confirm that the time between transmissions is 4 to 8 sec. Confirm that EUT transmit the overall result with an appropriate message to PI.

Basic test of addressed message is made in **2.1.4.1** 14.1.4.1 Transmit an addressed message

2011-07-13 Ba	Test details - Addressed binary message 6		
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: The message is addressed to a not available transponder. So no acknowledgement is received. Record the VDO output of VDE with time stamp.			
VDO output of EUT	Check the transmission by VDO	UTC 14:44	Ok
Number of repetitions	Note and check the number or repetitions	In some cases there are only 2 repetitions (3 transmissions) Retest 2011-11-03 Ba: There is no retry. There is an ABK with status 3 (successful transmission) and no retry Retest 2012-02-02 Ba: UTC 15:14 There are always 3 repetitions	Ok

Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	1,10,4 In the 10 s interval one Tx may be missing 5,6,5 2,5,5,8 6,4,5 1,5,7,6 Retest 2011-11-03 Ba: Could not be checked because there was no retry Retest 2012-02-02 Ba: UTC 15:14 5, 7, 5 4, 5, 4 5, 6, 5	Ok
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)	$AIABK,00001005,A,6,2,1	Ok
Message sequence numbers	Check message sequence numbers of transmissions and ABK		Ok

2011-07-13 Ba	Test details - Addressed safety related message 12		
Test item	Check	Remark	Result
Transmit an addressed safety related message 12 by sending an ABM sentence to the PI. PI sentence: File AIABM_safety.sst: The message is addressed to a not available transponder. So no acknowledgement is received. Record the VDO output of VDE with time stamp.			
VDO output of EUT	Check the transmission by VDO	UTC 14:46	Ok
Number of repetitions	Note the number or repetitions	In some cases there are only 2 repetitions (3 transmissions) Retest 2011-11-03 Ba: In 4 test there were 3 repetitions	Ok
Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	2, 3, 6, 6 2, 4, 5, 6 2, 4, 10 1, 6, 9 In the 9 and 10 s intervals one Tx may be missing Retest 2011-11-03 Ba: The time was: 8, 5, 5 5, 6, 6 6, 6, 5 4, 6, 6	Ok
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)	AIABK,00001005,A,12,2,1	Ok
Message sequence numbers	Check message sequence numbers of transmissions and ABK		Ok

6.2 18.1.4 Acknowledgement of Addressed safety related messages

Repeat test under 18.1.2 with addressed safety related message.

The contents of the acknowledgement should be entered in test 4.7.2 16.7.2 Transmitted messages

2011-07-13 Ba	Test details - Acknowledgement of safety related text message 12		
Test item	Check	Remark	Result
Transmit 4 safety related text messages 12 with consecutive sequential message identifiers from other Transponder			
Rx of messages (VDM)	Check that the messages are received by VDM output on PI of EUT	UTC 14:47	Ok
Transmission of acknowledgement msg 13	Check transmission of ackn. by VDO output of EUT		Ok
Sequence numbers	Check that sequence number in ackn = sequence number of Rx message		Ok
Ackn. channel	Check that ackn Tx channel = Rx channel		Ok
RX of ackn. msg 13	Check that the ackn. msg are received by Transmitter (VDM/ABK)		Ok

6.3 18.2 (M.1371 A1/5.3) Interrogation responses

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Apply an interrogation message (msg 15; EUT as destination) to the VDL according to message table 7 for responses with msg 5 and slot offset set to defined value on channel AIS 1. Record transmitted messages on both channels.

Required results

Check that EUT transmits the appropriate interrogation response message as requested on channel AIS1. Repeat test for AIS2.

A simple operational test is made in 2.1.3.2 14.1.3.2 Interrogation response

The check of the contents of the transmitted message should be entered in 4.7.2 16.7.2 Transmitted messages

The test cases “case 1” to “case 4” are the four cases as defined in ITU-R M1371, 3.3.8.2.11 Message 15 Interrogation

The requests have to be made by the VDL generator, because a mobile transponder cannot generate requests with slot offset.

2011-07-13 Ba	Test details - case 1- Interrogation of msg 5, Ch 1		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 5 with given slot offset 10 slots A response shall automatically be transmitted by the EUT Request is transmitted on channel 1			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 14:52	Ok
TX of response (VDO)	Check that response is transmitted by EUT (VDO)		Ok
Response on VDL	Check the response on VDL with the VDL analyser, note slot offset		Ok
Response channel	Check that the response is transmitted on the request channel		Ok

2011-07-13 Ba	Test details - case 1 - Interrogation of msg 5, Ch 2		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 5 with given slot offset 10 slots A response shall automatically be transmitted by the EUT Request is transmitted on channel 2			
RX of request by EUT	Check that the request message is received by the EUT (VDM)		Ok
TX of response (VDO)	Check that response is transmitted by EUT (VDO)		Ok
Response on VDL	Check the response on VDL with the VDL analyser, note slot offset		Ok
Response channel	Check that the response is transmitted on the request channel		Ok

2011-07-13 Ba	Test details - case 2 - Interrogation of msg 3 and 5		
Test item	Check	Remark	Result

Transmit an interrogation message 15 requesting msg 3 and 5 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)		Ok
TX of response 1 (VDO)	Check that response is transmitted by EUT (VDO)		Ok
Response 1 on VDL	Check the response on VDL with the VDL analyser		Ok
Slot selection	Check that the slot offset 1 defined in the request is used		Ok
TX of response 2 (VDO)	Check that response is transmitted by EUT (VDO)		Ok
Response 2 on VDL	Check the response on VDL with the VDL analyser		Ok
Slot selection	Check that the slot offset 2 defined in the request is used		Ok

2011-07-13 Ba	Test details - case 3 Interrogation of msg 5		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 3 from other AIS and msg 5 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 14:58	Ok
TX of response (VDO)	Check that response msg 5 is transmitted by EUT (VDO)		Ok
Response on VDL	Check the response on VDL with the VDL analyser		Ok
Slot selection	Check that the slot offset defined in the request 2.1 is used		Ok

2011-07-13 Ba	Test details - case 4 - Interrogation of msg 3		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 3,5 from other AIS and msg 3 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 14:57	Ok
TX of response (VDO)	Check that response msg 5 is transmitted by EUT (VDO)		Ok
Response on VDL	Check the response on VDL with the VDL analyser		Ok
Slot selection	Check that the slot offset defined in the request 2.1 is used		Ok

6.4 18.3 Broadcast messages

(M.1371 A1/5.3)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Initiate the transmission of 5 binary broadcast messages (msg 8) by the EUT. Record transmitted messages on both channels.

Required results

Check that EUT transmits the msg 8 messages on channels A and B alternating.

Test of multislot broadcast messages is done in 2.2 14.2 Multiple slot messages

The check of message contents should be entered in 4.7.2 16.7.2 Transmitted messages

2011-07-13 Ba	Test details - Binary broadcast message 8		
Test item	Check	Remark	Result

Transmit 5 binary broadcast messages 8 by sending 5 BBM sentences to the PI. PI sentence: File AIBBM_5_bin.sst: !AIBBM,1,1,[7;8;9;0;1],0,8,06P0test1,0 AIS channel for broadcast is 0: autoselect The file contains 5 BBM sentences with consecutive sequential message identifiers.			
VDO output of EUT	Check the VDO output on PI	UTC 15:00	Ok
Channel	Check Tx alternating channels A and B		Ok
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,,A,8,7,3 $AIABK,,B,8,8,3 $AIABK,,A,8,9,3 $AIABK,,B,8,0,3 $AIABK,,A,8,1,3	Ok
Message sequence number	Check that message sequence number in ABK = Sequential message identifier of BBM sentence		Ok
MMSI	Check Transmitter MMSI		Ok

2011-07-13 Ba	Test details - Safety related broadcast message 14		
Test item	Check	Remark	Result
Transmit 5 safety related broadcast messages 14 by sending 5 BBM sentences to the PI. PI sentence: File AIBBM_5_safety.sst: !AIBBM,1,1,[6;7;8;9;0],0,8,D5CDi,0 AIS channel for broadcast is 0: autoselect The file contains 5 BBM sentences with consecutive sequential message identifiers.			
VDO output of EUT	Check the VDO output on PI	UTC 15:01	Ok
Channel	Check Tx alternating channels A and B		Ok
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,,A,14,6,3 $AIABK,,B,14,7,3 $AIABK,,A,14,8,3 $AIABK,,B,14,9,3 $AIABK,,A,14,0,3	Ok
Message sequence number	Check that message sequence number in ABK = Sequential message identifier of BBM sentence		Ok
MMSI	Check Transmitter MMSI		Ok

7 19 Specific Presentation Interface Tests

(7.6)

7.1 19.1 General

The EUT (Equipment Under Test) including all necessary test equipment shall be set-up and checked that it is operational before testing commences.

The manufacturer shall provide sufficient technical documentation of the EUT and its interfaces in particular.

The following tests shall be carried out under "Normal" environmental conditions as defined in IEC 60945.

Where appropriate, tests against different clauses of this and other chapters may be carried out simultaneously.

2011-07-15 Ba	Test details - General interface tests		
Test item	Check	Remark	Result
Checksum	Check that the output sentences include a checksum		Ok
	Check that the checksum is correct		Ok

7.1.1 New general tests introduced in IEC 61162-1 Ed. 4

7.1.1.1 Test for B.4.10 Correct use of special characters starting a sentence

The AIS Class A has to implement sentences with “$” and “!”.
It has to be checked that there is no malfunction when valid sentences are interleaved with tag block starting character “\”.

2011-11-21 Ba	Test details - Positon input with tag blocks		
Test item	Check	Remark	Result
Apply a set of position input data interleaved with lines containing tag blocks to a sensor input			
Sensor data	Verify that the sensor data are correctly used		Ok
	Confirm that no malfunction is observed		Ok
Apply a set of position input data to a sensor input. The sensor data sentences are headed by tag blocks			
Sensor data	Check if the sensor data are correctly used		Ok
	Confirm that no malfunction is observed		Ok

7.1.1.2 Test for B.4.11 Correct parsing of received sentences

It has to be checked that any characters between the end of a valid line and the starting character of the next line are ignored

2011-11-21 Ba	Test details - Positon input with additional characters		
Test item	Check	Remark	Result
Apply a set of position input data interleaved with lines containing a number of valid and invalid characters.			
Sensor data	Verify that the sensor data are correctly used		Ok
	Confirm that no malfunction is observed		Ok
Apply a set of position input data to a sensor input. The sensor data sentences are headed by a number of valid or invalid characters			
Sensor data	Verify that the sensor data are correctly used		Ok
	Confirm that no malfunction is observed		Ok

7.1.1.3 Test for B.4.12 Future extensions of received sentences

It has to be checked that known input sentences are accepted if additional fields are added at the end. The additional fields can be ignored.

This test does not check all possible sentences. It is assumed that there is a general methode to ignore additional fields.

2011-11-22 Ba	Test details - Positon input with future extensions		
Test item	Check	Remark	Result
Apply know PI port input sentences with additional fields			
SSD input	Verify that the SSD input data are correctly used	Not accepted Retest 2012-02-02 Ba: The SSD input is accepted	Ok
VSD input	Verify that the VSD input data are correctly used	Not accepted Retest 2012-02-02 Ba: The VSD input is accepted	Ok
ACA input	Verify that the ACA input data are correctly used	Not accepted Retest 2012-02-02 Ba: The ACA input is accepted	Ok
Apply known sensor input sentences with additional fields			
GLL input	Verify that the GLL input data are correctly used		Ok
GGA input	Verify that the GGA input data are correctly used		Ok
GNS input	Verify that the GNS input data are correctly used		Ok
RMC input	Verify that the RMC input data are correctly used		Ok
VTG input	Verify that the VTG input data are correctly used		Ok
HDT input	Verify that the HDT input data are correctly used		Ok
ROT input	Verify that the HDT input data are correctly used		Ok

7.2 19.2 Check of the manufacturer's documentation

(7.6.1)

The following checks for formal consistency and compliance shall be made for all ports

- *approved sentences against IEC 61162*

- *proprietary sentences against IEC 61162*
- *usage of fields as required for different functions including provided default values or settings*
- *transmission intervals against IEC 61162*
- *configuration of hardware and software if this is relevant to the interface performance and port selection*

The following checks for compliance with IEC 61162

- *output drive capability*
- *load on the line of inputs*
- *electrical isolation of input circuits*

This test does not check the documentation, this is done in 1.7 4.3 Manuals.
Here the function of the EUT is checked using the documentation information, the content of the documentation is checked if the EUT complies with the requirements.

2012-02-06 Ba	Test details - Check of manufacturers documentation		
Test item	Check	Remark	Result
Approved sentences	Check approved sentences against IEC 61162		Ok
Proprietary sentences	Check proprietary sentences against IEC 61162	No proprietary sentences used	N/A
Usage of Fields	Check usage of fields		Ok
Transmission intervals	Check transmission intervals		Ok
Hardware configuration	Check hardware configuration		Ok
Output drive capability	Check output drive capability		Ok
Input load	Check input load		Ok
Electrical Isolation	Check electrical isolation		Ok

7.3 19.3 Electrical test

(7.6.1)

Method of test

Input / Output Ports configured as IEC 61162-1 or IEC 61162-2 shall be tested according to the relevant standard with regard to minimum and maximum voltage and current at the input terminals.

Required results

The interfaces shall fulfil the requirements of the relevant standards.

2011-11-21 Ba	Test details - Electrical test of inputs		
Test item	Check	Remark	Result
Minimum voltage	Check that input works with minimum input voltage		Ok
Maximum voltage	Check that input is not damaged by maximum input voltage		Ok
Input current	Check the input current against the IEC 61162-1 or IEC 61162-2	Input current: +/- 5 V: +/- 0,7 mA +/- 10 V: +/- 1,3 mA +/- 15 V: +/- 2,0 mA	Ok
Electrical Isolation	Check that sensor inputs are electrically isolated		Ok
	Check that high speed inputs are electrically isolated		Ok

7.4 19.4 Test of input sensor interface performance

(7.6.2)

Method of measurement

Connect all inputs and outputs of the EUT as specified by the manufacturer and simulate VDL-messages using test system. Operate inputs with simulated sensor data that are both the relevant data and additional data with formatters not provided for the relevant input. Each sensor input shall be loaded with 70 to 80 percent of the interface's capacity. Record the VDL and output from the EUT's high speed port.

Required results

Verify that the output on the VDL and the presentation interface agree with simulated input and all output data is transmitted without loss or additional delay

2011-11-21 Ba	Test details - Test of input sensor interface performance		
Test item	Check	Remark	Result
Load all 3 sensor inputs with 70-80 % of the interface's capacity 1 Sensor input at 4800 with position data 1 Sensor input at 4800 with log data 1 Sensor input at 38400 with heading and ROT data			
VDL contents	Check that the VDL contents agree with in input data	Remark: Test has been performed with 4800 Bd for all inputs because setting of sensor inputs to 38400 Bd does not yet work	Ok
VDO output	Check that VDO outputs on both high speed ports agree with the sensor input data		Ok
Loss of data	Check that VDL messages are transmitted without loss of sensor data		Ok
	Check that output data at VDO output are sent without loss of sensor data		Ok
Delay of data	Check that there is no delay from sensor input change to VDL messages		Ok
	Check that there is no delay from sensor input change to VDO output		Ok

7.5 19.5 Test of sensor input

(7.6.2)

Method of measurement

Set-up standard test environment and operate inputs with simulated sensor data. Record VDL output.

a) simulate sensor information for position, speed, heading, ROT

b) simulate invalid and unavailable data

Required results

a) Verify that the recorded VDL message contents agree with the simulated sensor information.

b) Verify that affected data is set to default values.

Switch off internal GPS to get default values in case of invalid sensor data. The intention of this test is to check the conversion of sensor input data to the VDL messages, VDO output and MKD display including the test, if invalid and unavailable data are recognised.

Fall back behaviour at sensor fail is checked in another test (see 2.9.3 14.9.3 Monitoring of sensor data).

For message content of VDL messages 1, 2, 3 (position reports) no special test is required. Please enter the results of this test in that test table (go to 2.3.1 Information content of msg 1 at the end of this test).

7.5.1 GLL sentence

2011-07-15 Ba	Test details – GLL position input		
Test item	Check	Remark	Result
Apply simulated GLL sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Set status/mode to **A,A** Check on VDL	Check latitude		Ok
	Check longitude		Ok
	Check PA-Flag = 0		Ok
Check VDO output on PI	Check latitude		Ok
	Check longitude		Ok
	Check PA-Flag = 0		Ok
Check Display on MKD	Check latitude		Ok
	Check longitude		Ok
	Check PA-Flag = 0		Ok
Set status/mode to **A,D** (differential mode)	Check PA-Flag = 1 on VDL		Ok
	Check PA-Flag = 1 in VDO		Ok
	Check display of differential mode on MKD		Ok
Set status/mode to **V,N** (invalid data) Check on VDL	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
Check on VDO output of PI	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
Check display on MKD	Check latitude = "-----"		Ok
	Check longitude = "-----"		Ok
	Check PA-Flag = 0		Ok
Set status/mode to **V,E** (Estimated position) Check on VDL or PI output	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
Set status/mode to **V,M** (manual position) Check on VDL or PI output	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
No GBS sentence applied	Check that RAIM-Flag = 0		Ok

7.5.2 GGA sentence

2011-07-15 Ba	Test details - GGA GPS position input		
Test item	Check	Remark	Result
Apply simulated GGA sentence to the sensor input File name is ais02_gga_vtg_hdt_rot.sst			
Set Mode = 1 (**autonomous**) Check on VDL	Check latitude	GGA sentence is not supported. It is not a required sentence for Ed. 2	Ok
	Check longitude		N/A
	Check PA-Flag = 0		N/A
Set mode = 2 (**differential**) Check on VDL	Short check data ok		N/A
	Check PA-Flag = 1 on VDL		N/A
Set mode = 3 (GPS-PPS) Check on VDL	Short check data ok		N/A
	Check PA-Flag = 0 on VDL		N/A
Set mode =4 (RTK fixed) Check on VDL	Short check data ok		N/A
	Check PA-Flag = 1 on VDL		N/A
Set mode =5 (RTK float Check on VDL	Short check data ok		N/A
	Check PA-Flag = 1 on VDL		N/A
Set mode = 6 (dead reck.) Check on VDL	Check that timestamp = 62 Note if data = default		N/A
Set mode = 7 (manual) Check on VDL	Check that timestamp = 61 Note if data = default		N/A
Set mode = 8 (simulated) Check on VDL	Check that timestamp = 63 Short check default data		N/A
Set mode = 0 (**no fix**) Check on VDL	Check latitude = 91º		N/A
	Check longitude = 181º		N/A
	Check that timestamp = 63		N/A
	Check PA-Flag = 0		N/A

7.5.3 GNS sentence

2011-07-15 Ba	Test details – GNS satellite position input		
Test item	Check	Remark	Result
Apply simulated GNS sentence to the sensor input, check on VDL File name is ais03_gns_vtg_hdt_rot.sst			
Set Mode = **AA** (autonomous GPS/GLONASS) Check on VDL	Check latitude	UTC 13:10	Ok
	Check longitude		Ok
	Check PA-Flag = 0		Ok
	Check RAIM-Flag = 0		Ok
Set Mode = AN (autonomous GPS/no GLONASS)	Short check data ok		Ok
	Check PA-Flag = 0 on VDL		Ok
Set Mode = A (autonomous GPS/no GLONASS)	Short check data ok		Ok
	Check PA-Flag = 0 on VDL		Ok
Set Mode = NA (no GPS/ autonomous GLONASS)	Short check data ok		Ok
	Check PA-Flag = 0 on VDL		Ok
Set Mode = **DA** (differential GPS/ autonomous GLONASS)	Short check data ok		Ok
	Check **PA-Flag = 1** on VDL		Ok
Set Mode = DD (differential GPS/ differential GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set Mode = DN (differential GPS/ no GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set Mode = D (differential GPS/ no GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set Mode = AD (autonomous GPS/ differential GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set Mode = ND (no GPS/ differential GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok

Set mode = E (estimated position.)	Check that timestamp = 62 or 63 Note if data = default	Timestamp = 60 Timestamp 60 means that the time stamp is not available. The more appropriate would be 62 if the estimated position is provided or 63 if no position is provided Data = default Retest 2011-11-03 Ba: time stamp = 62 The usage depends on the navigational status flag: S, C, no field: Position is used, ALR 25,26 U, N: Default position, ALR 25,26 See Note) Retest 2012-02-02 Ba: The positon is used with time stamp 62	Ok
Set mode = M (manual position)	Check that timestamp = 61 Note if data = default	Timestamp = 60 Timestamp 60 means that the time stamp is not available. The more appropriate would be 61 if the manual position is provided or 63 if no position is provided Data = default Retest 2011-11-03 Ba: time stamp = 61 The usage depends on the navigational status flag: S, C, no field: Position is used, ALR 25,26 U, N: Default position, ALR 25,26 See Note) Retest 2012-02-02 Ba: The positon is used with time stamp 62	Ok

Set mode = S (simulated position)	Check that timestamp = 63 Short check default data	Position data are used. Timestamp = actual time A simulated position should not be used because it does not represent the real position of the ship. Retest 2011-11-03 Ba: Time stamp = 63 The usage depends on the navigational status flag: S, C: Position is used, ALR 25,26 U, N, no field: Default position, ALR 25,26 A simulated position should never be used for AIS transmission! See Note) Retest 2012-02-02 Ba: The default positon is used with time stamp 63	Ok
Set mode = AA Add an Navigational status field at the end			
Enter Navigational status field value “S” (safe)	Check latitude	The GNS sentence with the new Navigational status field at the end is not accepted Retest 2011-11-03 Ba: GNS with navigational status field is accepted	Ok
	Check longitude		Ok
Enter Navigational status field value “C” (caution)	Check latitude		Ok
	Check longitude		Ok
Enter Navigational status field value “U” (unsafe)	Check latitude	Position is not used	Ok
	Check longitude	Time stamp = 60, should be 63 Retest 2012-02-02 Ba: The positon is used with normal time stamp	Ok
Enter Navigational status field value “V” (not available)	Check latitude	Position is not used	Ok
	Check longitude	Time stamp = 60, should be 63 Retest 2012-02-02 Ba: The positon is used with normal time stamp	Ok

Set Mode = **NN** (no GPS/ no GLONASS)	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
	Check that timestamp = 63	Time stamp = 60 Timestamp 60 means that the time stamp is not available. The correct value is 63 which means that no position is provided Retest 2011-11-04 Ba: Time stamp = 63	Ok

Note)
The Navigational Status Indicator represents the result of the RAIM function. Therefore it is not applicable for the Mode Indicator values E, M, S and N. In these modes the value of the Navigational Status Indicator should always be “V”.

The value “V” of the Navigational Status Indicator does not mean that the position is invalid or not available. It means that the RAIM result is not available. So no information about the quality of the position is available. This may result in setting the RAIM flag to 0.

The main information about the availabitity of the position is the Mode indicator.

I have made a table with a proposal about the use of position sensor data depending on the
- Mode indicator
- Navigational Status Indicator

Mode indicator	Status (RMC)	Navigational status			
Navigational status		S Safe	C Caution	U Unsafe	V Status not valid
A Autonomous	A	used	used	Used	Used
D, F, P, R Differential	A	used	used	Used	used
E Estimated	V	----	----	----	Time stamp 62 Optional used
M Manual	V	----	----	----	Time stamp 61 Optional used
S Simulated	V	----	----	----	Time stamp 63 Not used
N No fix	V	----	----	----	Time stamp 63 Not used

	Invalid combination

The Navigational status field should not be a null field. If the Navigational status field is not provided it should be handled like „V“ (Navigational status not valid, equipment is not providing navigational status indication).

Unfortunately I had a requirement for sensor data = default for Navigational status field = U and V. After talking with our GPS engineer this seems not to be correct.

7.5.4 RMC sentence

2011-07-15 Ba	Test details – RMC position input		
Test item	Check	Remark	Result
Apply simulated RMC sentence to the sensor input File name is ais04_rmc_hdt_rot.sst			
Set status/mode to **A,A** Check on VDL	Check latitude	UTC 13:34	Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
	Check PA-Flag = 0		Ok
Set status/mode to **A,D** (differential mode)	Short check of valid data		Ok
	Check PA-Flag = 1 in VDO		Ok
Set status/mode to **A,P** (Precise)	Check latitude		Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
Set status/mode to **A,R** (Real time kinematic)	Check latitude		Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
Set status/mode to **V,S** (Simulator mode)	Check latitude = 91°		Ok
	Check longitude = 181°		Ok
	Check SOG = 102,3 kn		Ok
	Check COG = 360°		Ok
Set status/mode to **V,N** (invalid data) Check on VDL	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok
	Check SOG = 102.3		Ok
	Check COG = 360°		Ok
Set status/mode to **V,E** (estimated position) (Test if also status is evaluated)	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check SOG = 102.3		Ok
	Check COG = 360°		Ok
Set status/mode to **V,M** (manual position) (Test if also status is evaluated)	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check SOG = 102.3		Ok
	Check COG = 360°		Ok

Set mode = AA Add an Navigational status field at the end			
Enter Navigational status field value “S” (safe)	Check latitude	The RMC sentence with the new Navigational status field at the end is not accepted Retest 2011-11-22 Ba: The The RMC sentence with the new Navigational status field at the end is accepted	Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
Enter Navigational status field value “C” (caution)	Check latitude		Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
Enter Navigational status field value “U” (unsafe)	Check latitude	The sensor data are not used. Time stamp = 60, should be 63 See Note at GNS Retest 2012-02-02 Ba: The positon is used with normal time stamp	Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok
Enter Navigational status field value “V” (not available)	Check latitude	The sensor data are not used. Time stamp = 60, should be 63 See Note at GNS Retest 2012-02-02 Ba: The positon is used with normal time stamp	Ok
	Check longitude		Ok
	Check SOG		Ok
	Check COG		Ok

7.5.5 DTM sentence

2011-07-15 Ba	Test details – DTM reference datum		
Test item	Check	Remark	Result
Apply simulated position sentences with DTM. Start with datum not WGS 84, change to WGS 84 and back to not WGS 84			
Apply **GLL** sentence with DTM File name: ais1d_gll_dtm_vtg_hdt_rot.sst Datum = not WGS 84	Check on VDL that data are default data	UTC 14:01	Ok
Set Datum = WGS 84	Check that data are valid		Ok
Set Datum = not WGS 84	Check that data are changed to default		Ok
Apply **GNS** sentence with DTM File name: ais3d_gns_dtm_vtg_hdt_rot.sst Datum = not WGS 84	Check on VDL that data are default data		Ok
Set Datum = WGS 84	Check that data are valid		Ok
Set Datum = not WGS 84	Check that data are changed to default		Ok
Set Datum = WGS 84	To get valid data for further tests		Ok

7.5.6 GBS sentence

2011-07-15 Ba	Test details – GBS input		
Test item	Check	Remark	Result
Apply simulated GLL sentence with GBS sentence to the sensor input File name is ais01g_gll_vtg_gbs_hdt_rot.sst			
Fields with expected error of Lat and Lon contain values	Check that RAIM-Flag = 1		Ok
Fields with expected error of Lat and Lon are empty (NULL fields)	Check that RAIM-Flag = 0		Ok
Apply GLL sentence in normal mode (mode flag = A)			
Set expected error in GPS sentence to < 10 m	Check that PA flag = 1		Ok
Set expected error in GPS sentence to > 10 m	Check that PA flag = 0		Ok
Apply GLL sentence in differential mode (mode flag = D)			
Set expected error in GPS sentence to < 10 m	Check that PA flag = 1		Ok
Set expected error in GPS sentence to > 10 m	Check that PA flag = 0		Ok

IEC 61162-2 Ed. 4	Check with a GBS according to Ed. 4 (two additional fields	The GBS sentence is not accepted with additional fields Retest 2011-11-04 Ba: The GBS sentence is accepted with additional fields	Ok

7.5.7 VTG sentence

2011-07-15 Ba	Test details – VTG speed input		
Test item	Check	Remark	Result
Apply simulated VTG sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Set mode to **A** (autonomous) Check on VDL	Check SOG		Ok
	Check COG		Ok
Check VDO output on PI	Check SOG		Ok
	Check COG		Ok
Check Display on MKD	Check SOG		Ok
	Check COG		Ok
Set mode to **D** (differential)	Short check SOG/COG ok		Ok
Set mode to **N (**invalid) Check on VDL	Check SOG = 102.3 (default)		Ok
	Check COG = 360 (default)		Ok
Check VDO output on PI	Check SOG = 102.3 (default)		Ok
	Check COG = 360 (default)		Ok
Check Display on MKD	Check SOG = "-----"		Ok
	Check COG = "-----"		Ok
Set mode to **P** (Precise)	Check SOG	SOG = default Retest 2011-11-04 Ba: SOG is used	Ok
	Check COG	COG = default Retest 2011-11-04 Ba: COG is used	Ok
Set mode to E (estimated)	Short check SOG/COG default		Ok
Set mode to M (manual)	Short check SOG/COG default		Ok
Set mode to S (simulated)	Short check SOG/COG default		Ok
Delete SOG-N field and add SOG K-Field (speed in km/h)	Check SOG value in VDL It has to be converted into knots or set to default		Ok

7.5.8 VBW sentence

2011-07-15 Ba	Test details – VBW log input with VTG sentence valid		
Test item	Check	Remark	Result
Apply simulated VBW sentence to the sensor input File name is ais06_gll_vtg_vbw_hdt_rot.sst			
Status of bottom track: **A** (valid) Ahead and across speed available. Check on VDL	Check that SOG = resultant of ahead and across speed	12.2	Ok
	COG = calculated from SOG vector and heading	Heading 0°: 9.5° Heading 90°: 99.5° Heading 270°: 279.5°	Ok
Check on VDO output of PI	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value		Ok
Check on MKD	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value		Ok
Status of bottom track: **V** (invalid) Ahead and across speed not empty. Water speed valid ! Check on VDL	SOG from VTG		Ok
	COG from VTG		Ok
Check on VDO output of PI	SOG from VTG		Ok
	COG from VTG		Ok
Check on MKD	SOG from VTG		Ok
	COG from VTG		Ok
Status of bottom track: A (valid) Ahead available, **across speed empty (**e.g. single axis log)	SOG from VTG		Ok
	COG from VTG		Ok
Status of bottom track: A (valid) Ahead and across speed available, **Heading invalid**	SOG from VTG	From VBW Retest 2011-11-04 Ba: SOG is take for VTG	Ok
	COG from VTG	It is alway 160.5°, independent of the previous heading value. The same value is displayed on MKD Retest 2011-11-04 Ba: SOG is take for VTG	Ok

2011-07-15 Ba	Test details – VBW log input, no VTG		
Test item	Check	Remark	Result
Apply simulated VBW sentence to the sensor input, GPS disconnected, No VTG speed available File name is ais08_gll_vbw_hdt_rot.sst			
<u>Status of bottom track: **A**</u> (valid) Ahead and across speed available. Check on VDL	Check that SOG = resultant of ahead and across speed		Ok
	COG = calculated from SOG vector and heading		Ok
Check on VDO output of PI	Check SOG = VDL SOG value		Ok
	Check COG = calculated from SOG vector and heading		Ok
Check on MKD	Check SOG = VDL SOG value		Ok
	Check COG = calculated from SOG vector and heading		Ok
<u>Status of bottom track: **V**</u> (invalid) Ahead and across speed not empty. Water speed valid ! Check on VDL	SOG = default		Ok
	COG = default		Ok
Check on VDO output of PI	SOG = default		Ok
	COG = default		Ok
Check on MKD	SOG = default		Ok
	COG = default		Ok
<u>Status of bottom track: A</u> (valid) Ahead available, **across speed empty (**e.g. single axis log)	SOG = default		Ok
	COG = default		Ok
<u>Status of bottom track: A</u> (valid) Ahead and across speed available, **Heading invalid**	SOG from VBW or default	From VBW	Ok
	COG = default	COG = 160.5° <u>Retest 2011-11-04 Ba:</u> COG = 160.5° <u>Retest 2012-02-02 Ba:</u> COG = default	Ok

7.5.9 OSD sentence

2011-07-15 Ba	Test details – OSD own ship data input		
Test item	Check	Remark	Result
Apply simulated GLL and OSD sentence to the sensor input. External GLL is required for the test because with internal position the speed is taken from the internal source too. File name is ais09_gll_osd.sst			
Heading status = A (valid) Speed reference = B (bottom) Check on VDL	Check SOG from OSD		Ok
	Check COG from OSD		Ok
	Check heading from OSD		Ok
Check VDO output on PI	Check SOG from OSD		Ok
	Check COG from OSD		Ok
	Check heading from OSD		Ok
Check Display on MKD	Check SOG from OSD		Ok
	Check COG from OSD		Ok
	Check heading from OSD		Ok
Set speed reference to P (Positioning system)	Check SOG and COG from OSD		Ok
Set speed reference to R Radar tracking	Check SOG and COG from OSD		Ok
Set speed reference to W (Water speed)	Check SOG = default		Ok
	Check COG = default		Ok
	Check heading from OSD		Ok
Set speed reference to M (Manual)	Check SOG = default		Ok
	Check COG = default		Ok
	Check heading from OSD		Ok
Set speed reference to P (Positioning system) Set **heading status = V** (invalid)	Check SOG from OSD		Ok
	Check COG from OSD		Ok
	Check heading = default		Ok
Change speed reference from N (kn) to K (km/h)	Check SOG value in VDL It has to be converted into knots		Ok

7.5.10 HDT sentence

2011-07-15 Ba	Test details – HDT heading input		
Test item	Check	Remark	Result
Apply simulated HDT sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Heading value = 359.0	Check heading on VDL		Ok
	Check heading on VDO		Ok
	Check heading in MKD		N/A
Change value to 359.9	Check that heading on VDL = 359 or 0, **not 360**	359 Retest 2011-11-04 Ba: Heading value = 360 360 is not a valid heading value, it has to be 0 Retest 2012-02-02 Ba: Heading = 0°	Ok
Delete heading value (empty field)	Check that heading = default on VDL		Ok
	Check that heading = default on VDO		Ok
	Check that heading = default on MKD		N/A
Change talker to “HC” (Magnetic compass)	Check that heading is not used		Ok

7.5.11 ROT sentence

2011-07-15 Ba	Test details – ROT Rate of Turn input		
Test item	Check	Remark	Result
Apply simulated ROT sentence to the sensor input, Talker = TI File name is ais01_gll_vtg_hdt_rot.sst			
ROT status = **A** (valid) ROT value = 0.0 degr./min	Check ROT on VDL		Ok
	Check ROT on VDO		Ok
	Check ROT on MKD	Not displayed	N/A
Change rate of turn to different values according to the check column and check the VDL value. The VDL value has to be the nearest value according the conversion formula (see conversion table)	10 converted to 10.0 (15)		Ok
	20 converted to 19.7 (21)		Ok
	60 converted to 61.1 (37)		Ok
	180 converted to 177.2 or 182.8 (63/64)	177.2	Ok
	360 converted to 361.6 (90)		Ok
	720 converted to 708.7 (126)		Ok
	-20 converted to 19.7 (-21)		Ok
	-720 converted to –708.7 (-126)		Ok
Set ROT status = **V** (invalid)	Check that ROT = default on VDL (default = -731.4 = -128)	• 0 if heading available • default = -731.4 if heading is not available	Ok Ok
	Check that ROT = default on VDO		Ok
	Check that ROT = default on MKD		N/A
ROT status = A (valid) ROT value = 0.0 degr./min Select other source of ROT (Talker not TI or configuration setting)	Check ROT = 0.0 on VDL		Ok
	Check ROT = 0.0 on VDO		Ok
	Check ROT = 0.0 on MKD		Ok
Change rate of turn to different values according to the check column and check the VDL value. Values have to be according to 6.10.3.6	9 converted to 0		Ok
	11 converted to 720		Ok
	- 9 converted to 0		Ok
	-11 converted to -720		Ok
ROT status = V (invalid) Change heading with different rates	Check ROT = 0.0	UTC 15:00	Ok
	9°/min converted to 0		Ok
	12°/min converted to 720	= 0 Retest 2011-11-04 Ba: ROT = 720 (127)	Ok
	15°/min converted to 720	= 0 Retest 2011-11-04 Ba: ROT = 720 (127)	Ok
	20°/min converted to 720	Changing between 0 and 720 Retest 2011-11-04 Ba: ROT = 720 (127)	Ok
	30°/min converted to 720	= 720	Ok
	-9°/min converted to 0		Ok

	-12°/min converted to 720	= 0 Retest 2011-11-04 Ba: ROT = -720 (-127)	Ok
	-15°/min converted to 720	= 0 Retest 2011-11-04 Ba: ROT = -720 (-127)	Ok
	-20°/min converted to 720	= 0 Retest 2011-11-04 Ba: ROT = -720 (-127)	Ok
	-30°/min converted to 720	= 720	Ok

7.5.12 Additional Tests

2011-11-04 Ba	Test details – Additional Tests		
Test item	Check	Remark	Result
Apply simulated sensor sentences to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Send sentences without checksum, check on VDL	Check position = default		Ok
	Check SOG/COG = default		Ok
	Check heading = default		Ok
	Check ROT = default		Ok
Send sentences with false checksum, check on VDL	Check position = default		Ok
	Check SOG/COG = default		Ok
	Check heading = default		Ok
	Check ROT = default		Ok
Back to valid checksum Set baud rate of simulator to 38400 Bd, The purpose is to check if input survives wrong baudrate.	Check position = default		Ok
	Check SOG/COG = default		Ok
	Check heading = default		Ok
	Check ROT = default		Ok
Set baud rate of simulator and sensor input also to 38 400, check on VDL	Check position	Data = default. EUT still accepts data with 4800 Bd. Tested with all 3 sensor ports. It seems that the baudrate of the sensor ports is not changed according to the MKD setting <u>Retest 2012-02-03 Ba:</u> The new settings are accepted only after restart of the unit. There should be a warning when the baudrate has been changed that a restart is needed. <u>Retest 2012-02-08 Ba:</u> A popup windows requests to reboot the transponder which can be done by pushing the “Reboot” button of this window.	Ok
	Check SOG/COG		Ok
	Check heading		Ok
	Check ROT		Ok

2011-11-21 Ba	Test details – Different inputs		
Test item	Check	Remark	Result
Apply simulated sensor sentences to the sensor inputs File name of 1st part is ais01_gll_vtg_hdt_rot.sst			
Connect simulator to sensor input 2. Change configuration according to the used input	Check position		Ok
	Check SOG/COG		Ok
	Check heading		Ok
	Check ROT		Ok
Connect simulator to sensor input 3. Change configuration according to the used input	Check position		Ok
	Check SOG/COG		Ok
	Check heading		Ok
	Check ROT		Ok
• Connect simulator output 1 to sensor input 1 and apply GLL and VTG. File name is ais10_gll_vtg.sst • Connect simulator output 2 to sensor input 2 and apply VBW . , File name is ais11_vbw.sst • Connect simulator output 3 to sensor input 3 and apply HDT and ROT. File name is ais12_hdt_rot.sst	Check position		Ok
	Check SOG and COG		Ok
	Check heading		Ok
	Check ROT		Ok

7.6 19.6 Test of high speed output

(7.6.3)

Method of measurement

Set-up standard test environment and simulate VDL-position reports using test system. Record output from the EUT high speed port (see table 11).

Required results

Verify that the recorded message contents agree with the simulated VDL contents (VDM) and own transmitted data (VDO) and in accordance with the sentence specifications of IEC 61162-1.

This contents of VDM and VDO are checked in

- 4.7.1 16.7.1 Received messages and
- 4.7.2 16.7.2 Transmitted Messages

7.6.1 VDM – Received message

2011-11-21 Ba	Test details – Content of received messages		
Test item	Check	Remark	Result
Transmit all types of messages from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Message id	8 binary broadcast message, multi slot File name: AIBBM_multi_bin.sst		
Number of sentences	Check that value = 3		Ok
Check sentence number	Check that value = 1,2,3 according to length of message		Ok
Sequential message ident.	Check that counting from 0...9 modulo 10		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 1008 bit)		Ok
Message id	14 Safety related broadcast message, multi slot File name: AIBBM_multi_safety.sst		
Number of sentences	Check that value = 3		Ok
Check sentence number	Check that value = 1,2,3		Ok
Sequential message ident.	Check that counting from 0...9 modulo 10		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (msg length = 1000)		Ok
	Additional checks		
Length of sentence	Confirm that no sentence exceeded the length of 82 character (no warning from monitor program)		Ok
Checksum	Confirm that no sentence had a wrong checksum (no warning from monitor program)		Ok

7.6.2 VDO Transmitted messages

2011-11-21 Ba	Test details – Content of transmitted messages		
Test item	Check	Remark	Result
Transmit all applicable types of messages Check the field content of the fields listed under Test item.			
Message id	8 binary broadcast message, multi slot File name: AIBBM_multi_bin.sst		
Number of sentences	Check that value = 3		Ok
Check sentence number	Check that value = 1,2,3 according to length of message		Ok
Sequential message ident.	Check that counting from 0...9 modulo 10		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 0 (msg length = 1008 bit)		Ok
Message id	14 Safety related broadcast message, multi slot File name: AIBBM_multi_safety.sst		
Number of sentences	Check that value = 3		Ok
Check sentence number	Check that value = 1,2,3		Ok
Sequential message ident.	Check that counting from 0...9 modulo 10		Ok
Channel	Check that the correct value A and B is output		Ok
Fill bits	Check that value = 2 (msg length = 1000 bit)		Ok
	Additional checks		
Length of sentence	Confirm that no sentence exceeded the length of 82 character (no warning from monitor program)		Ok
Checksum	Confirm that no sentence had a wrong checksum (no warning from monitor program)		Ok

7.7 19.7 High speed output Interface performance

(7.6.3)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Increase the VDL load to >90%. Record transmitted messages and check PI output of EUT on port for "external Display" and "auxiliary Display".

Required results

Confirm that EUT outputs all received messages to the PI. Repeat test for port "auxiliary display".

Date	Result	Status
2011-06-09 Ba	100% on both channels	Ok

7.8 19.8 Test of high speed input

(7.6.3)

Method of measurement

Set-up standard test environment. Apply simulated input data, in accordance with the sentence specifications of IEC 61162-1 and 7.6.3.3 table 10, to the EUT and record VDL output.

Required results

Verify that the VDL message contents agree with simulated input data.

All sentences except VSD and SSD are tested in special test items

2011-06-16 Ba	Test details – Evaluation of SSD sentence		
Test item	Check	Remark	Result
Apply an SSD sentence to an high speed input (PI)			
VDL transmission	Check that msg 5 is transmitted after change of data by SSD sentence	UTC 11:11	Ok
	Check that msg 5 is transmitted only if a field has been changed		Ok
Call sign	Check that the new call sign is transmitted in msg 5		Ok
	Check that the new call sign is displayed on MKD		Ok
Ship's name	Check that the new ship's name is transmitted in msg 5		Ok
	Check that the new ship's name is displayed on MKD		Ok
External sensor A – Distance from bow B – Distance from stern C – Distance from port D – Distance from starboard	Check that the new dimensions are transmitted in msg 5		Ok
	Check that the new dimensions are displayed on MKD		Ok
Internal Sensor A – Distance from bow B – Distance from stern C – Distance from port D – Distance from starboard	Check that the new dimensions are transmitted in msg 5		Ok
	Check that the new dimensions are displayed on MKD		Ok
DTE indicator flag	Check if the DTE flag is entered in VDL message 5 Not required	Remark: There was in incorrect MKD connection lost alarm. Under this condition the DTE flag in message 5 was set according to the SSD input	Ok

2011-06-16 Ba	Test details – Evaluation of VSD sentence		
Test item	Check	Remark	Result
Apply an VSD sentence to an high speed input (PI)			
VDL transmission	Check that msg 5 is transmitted after change of data by VSD sentence		Ok
	Check that msg 5 is transmitted only if a field has been changed		Ok
Navigational status	Check that the new Navigational status is transmitted in msg 1		Ok
	Check that the Navigational status is displayed on MKD		Ok
Type of ship and cargo	Check that the new type is transmitted in msg 5		Ok
	Check that the new type of ship is displayed on MKD		Ok
Maximum actual static draught	Check that the new draught is transmitted in msg 5		Ok
	Check that the new draught is displayed on MKD		Ok
Destination	Check that the new destination is transmitted in msg 5		Ok
	Check that the new destination is displayed on MKD		Ok
Estimated Time of Arrival (ETA)	Check that the new ETA is transmitted in msg 5		Ok
	Check that the new ETA is displayed on MKD		Ok
Regional application flag	Check if the regional application flag is entered in VDL message 1	The regional application bits are not used in message 1 Remark: Even if the Regional application flag bits are currently not used it should be possible to set them to be prepared for future use. <u>Retest 2011-07-13 Ba:</u> The Regional application flag are set according to the VSD definition (2 Special manoeuvre indicator bits and 2 Spare bits)	Ok
Persons on board	Check if the persons on board are displayed on MKD Not required		Ok

8 20 DSC functionality tests

(M.1371 A3)

Remark: Because of the changes in ITU-R M.1371-4 this section is completely taken from the Ed. 2 CDV.

Definition

The EUT shall correctly process the channel management command by DSC messages addressed to the stations in the designated geographical area or the stations individually designated.

Method of measurement

For the tests in this clause, set the EUT into autonomous mode using channels AIS 1 and AIS 2 with a reporting interval of 2 s. Standard AIS channel management by DSC calls consisting of format specifier 103 and message symbol number 104 with expansion symbols 09, 10, 12, 13 shall be applied to the EUT using a base station MMSI as follows.

Apply a geographical channel management call using symbol constructions: "103" "geographical coordinates" "103" "source MMSI" "104" "primary CH No" "secondary CH No" "NE of CH management area" "SW of CH management area". Apply the call with EOS = 117 and EOS = 127.

Move the EUT outside the channel management area.

Apply an individual channel management call using symbol constructions: "120" "EUT MMSI" "103" "source MMSI" "104" "primary CH No" "secondary CH No" "NE of CH management area" "SW of CH management area". Apply the call with EOS = 117 and EOS = 127.

Move the EUT outside the channel management area.

Apply incorrect MMSI, position outside addressed geographic area, different course, or ship's type.

Apply an extraneous call using symbol constructions: "120" "EUT MMSI" "103" "source MMSI" "104" "03" "01" "120". (Active alternative system with group number 1 and sequence number 120).

Transmit a DSC telecommand using a non-base station MMSI.

Required results

The following items shall be verified.

Verify that the EUT operates on the designated channels with the transition boundary of 5 NM.

Verify that the EUT reverts to the operation on AIS 1 and AIS 2 channels.

Verify that the EUT operates on the designated channels with the transition boundary of 5 NM.

Verify that the EUT reverts to the operation on AIS 1 and AIS 2 channels.

Verify that the EUT operation is not affected.

Verify that the EUT operation is not affected.

2011-11-17	**Tester: Ba**	**Test details:** Regional area designation		
Test item		Check	Remark	Result
a) Send a area addressed region setting call		Check that an ACA sentence is output at PI port	UTC 14:30	Ok

	Check that new region is stored in the region list of the EUT		Ok
	Check that the transitional zone size is 5 NM		Ok
	Check that the area settings are used.		Ok
b) Move the position of EUT out of the area	Check that the default channels are used	UTC 11:40	Ok
c) Set Position of EUT inside the area Send a selective region setting call	Check that an ACA sentence is output at PI port	UTC 14:54	Ok
	Check that new region is stored in the region list of the EUT		Ok
	Check that the transitional zone size is 5 NM		Ok
	Check that the area settings are used.		Ok
d) Move the position of EUT out of the area	Check that the default channels are used		Ok
e) check of additional selection			
e) Set Position of EUT inside the area Send a selective region setting call with incorrect MMSI	Check that the new settings of the selective call are ignored	There is a test output of the received DSC call but the area is not stored	Ok
Send a area addressed region setting call, EUT outside the addressing area	Check that the new area is ignored and not stored		Ok
Send a area addressed region setting call including a course, matching the course of the ship.	Check that the new area is stored		Ok
Send a area addressed region setting call including a course, not matching the course of the ship.	Check that the new area is ignored and not stored		Ok
Send a area addressed region setting call including a ship's type, matching the ship's type of EUT	Check that the new area is stored	UTC 15:24	Ok
Send a area addressed region setting call including a ship's type, not matching the ship's type of EUT	Check that the new area is ignored and not stored Check that the new area is stored	UTC 15:23	Ok
f) extraneous call			
Apply a call : "120" "EUT MMSI" "103" "source MMSI" "104" "03" "01" "120".	Check that the EUT operation is not affected		Ok

e) check of additional selection			
Send a area addressed region setting call, EUT inside the addressing area Source MMSI is a non-base station MMSI	Check that the new area is ignored and not stored	UTC 15:28	Ok

9 21 Long Range functionality tests

(9)

9.1 21.1 LR interrogation

(9.2)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Apply a LR addressed interrogation message to the LR-interface port of EUT; Record LR output port and AIS high-speed output port Set EUT to

- *Automatic response*
- *Manual response via MKD*
- *Manual response via PI*

Required results

Check that EUT displays LR interrogation messages and sends to PI.

Check that EUT outputs a LR position report message

- *Automatically (and indicates action on display)*
- *After manual confirmation via MKD*
- *After manual confirmation via PI*

2011-11-18 Ba	Test details – LR automatic response, all data		
Test item	Check	Remark	Result
Set EUT to automatic response. Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Response	Check that a response is output on LR port	UTC 10:23	Ok
Display on MKD	Check that the request is displayed on MKD		Ok
	Check that replay status is displayed on MKD	"Automatic response" is displayed	Ok
PI output	Check that LR interrogation and response is output on PI		Ok
Contents of LRF response	Check output of LRF sentence		Ok
	Check that sequence number = request		Ok
	Check MMSI = requestor		Ok
	Check name of requestor		Ok
	Check function request = request		Ok
	Check that function reply is according to the availability of data (2=avail, 3= not av.)		Ok
Contents of LR1 response	Check output of LR1 sentence		Ok

	Check that sequence number = request = LRF		Ok
	Check MMSI of responder = own MMSI		Ok
	Check MMSI of requestor		Ok
	Check ship's name		Ok
	Check Call sign		Ok
	Check IMO number		Ok
Contents of LR2 response	Check output of LR2 sentence		Ok
	Check that sequence number = request = LRF		Ok
	Check MMSI of responder = own MMSI		Ok
	Check date, UTC		Ok
	Check Lat, Lon		Ok
	Check COG		Ok
	Check SOG		Ok
Contents of LR3 response	Check output of LR3 sentence		Ok
	Check that sequence number = request = LRF		Ok
	Check MMSI of responder = own MMSI		Ok
	Check destination		Ok
	Check ETA		Ok
	Check draught	Value in dm	Ok
	Check ship/cargo	Value = 2nd digit of the Type of ship and cargo See note) Retest 2012-02-06 Ba: The 2 digit ship and cargo type is output	Ok
	Check length of ship		Ok
	Check breadth of ship		Ok
	Check ship type	Value = first digit of the Type of ship and cargo. See note) Retest 2012-02-06 Ba:	Ok
	Check persons	= 26	Ok

Note)
The standard is not really clear and rather confusing.

The implementation to separate the 2 digits of the Type of ship and cargo value into the two fields is rather confusing. We recommend to use the same 2 digit value as used in message 5 for both fields, according to the most implementations.

2011-11-18 Ba	Test details – Manual Confirmation		
Test item	Check	Remark	Result
Set EUT to manual response. Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Display on MKD	Check that the request for manual response is displayed on MKD	UTC 10:16	Ok
	Check that response is transmitted after manual confirmation on MKD		Ok

2011-11-18 Ba	Test details – Confirmation via PI		
Test item	Check	Remark	Result
Set EUT to external or manual confirmation as implemented Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Confirmation via PI	Check that the request for manual response is output on PI (Copy of long range request input)	UTC 10:18	Ok
	Check that response is transmitted after external confirmation via PI using the LRF sentence		Ok

9.2 21.2 LR “all ships” interrogations

(9.2)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Apply a LR “all ships” interrogation message to the LR-interface port of EUT defining a geographical area which contains own ships position; Record LR output port. Set EUT to

- *Automatic response*
- *Manual response.*

Repeat check with own ship outside specified area.

Required results

Check that EUT outputs a LR position report message

- *Automatically (and indicates action on display)*
- *After manual confirmation.*

No response shall be output on the repeat check.

2011-11-18 Ba	Test details – Area addressing - Automatic response		
Test item	Check	Remark	Result
Set EUT to automatic response Apply an area addressed request to the LR port of EUT requesting position and speed information			
Own position in Area File name: LRI_LRF_area_CEF.sst	Check that the request is automatically responded	UTC 11:37	Ok
	Check that the request and response status is displayed on MKD		Ok
	Check that the request and response is output on PI		Ok
Own position not in Area File name: LRI_LRF_out_area_CEF.sst	Check that the request is not responded		Ok
	Check that the request is not displayed on MKD		Ok
	Check that the request is not output on PI		Ok

2011-11-18 Ba	Test details – Area addressing – Manual confirmation		
Test item	Check	Remark	Result
Set EUT to manual response Apply an area addressed request to the LR port of EUT requesting position and speed information			
Own position in Area File name: LRI_LRF_area_CEF.sst	Check that the request is displayed on MKD	UTC 11:40	Ok
	Check that response is transmitted on confirmation on MKD		Ok
	Check that the request and response is output on PI		Ok
Own position not in Area File name: LRI_LRF_out_area_CEF.sst	Check that the request is not displayed on MKD		Ok
	Check that the request is not output on PI		Ok

9.3 21.3 Consecutive LR “all ships” interrogations

(9.2)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Set EUT to automatic mode. Apply 5 LR “all ships” interrogation messages to the LR-interface port of EUT defining a geographical area which contains own ships position;

Record LR output port. Set the control flag in the LRI message to

- *0 (reply on first interrogation only)*
- *1 (reply on all applicable interrogations)*

Required results

Check that EUT outputs a LR position report message

- *On the first interrogation only*
- *On all interrogations.*

2011-11-18 Ba	Test details – Area addressing - Automatic response		
Test item	Check	Remark	Result
Set EUT to automatic response Apply some area addressed requests to the LR port of EUT requesting position and speed information File name: LRI_LRF_area_CEF.sst			
Control flag = 1 (reply on all requests)	Check that the 1. request is automatically responded	UTC 11:42	Ok
	Check that the following interrogations are responded		Ok
Control flag = 0 (reply only on first request) Change MMSI to get the first response	Check that the 1. request is automatically responded	UTC 11:43	Ok
	Check that the following interrogations are not responded		Ok
	Check that the following interrogations are not displayed on MKD		Ok
	Check that the following interrogations are not output on PI		Ok

9.4 21.2 Long-range application by broadcast

(See 8.3)

Note)

For test to IEC 61993-2 Ed. 1 we do not require transmission of message 27. If transmission of message 27 is implemented it is tested here.

Message 27 should not sent by default.

9.4.1 21.2.1 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.

Do not apply Message 4 and Message 23.

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.

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.

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. ~~Message 23 fields after station type shall not match current settings of EUT~~.

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

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.

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 4.

~~Disable the EUT to transmit Message 27.~~

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:

EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels with 3 min reporting interval.

Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels with 3 min reporting interval.

Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels] with 3 min reporting interval.

EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~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.

Irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels with 3 min reporting interval.

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

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

~~EUT does not transmit Message 27.~~

~~NOTE The frequencies used for this test (in square brackets) are tentative values pending decisions by the ITU World Radiocommunication Conference 2012 (WRC 12).~~

2011-11-22	**Tester:**	**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 with from the same base station MMSI.				
a) no message 4 and message 23		Check that message 27 is transmitted		Ok
		Check Tx channels C and D		Ok
		Check that the transmission is alternating between C and D		Ok
		Check reporting interval = 3 min		Ok
		Check message 27 content		Ok
b) Apply message 4 only				
Apply message 4 with long range control bit set to 0		Check that message 27 is transmitted with 3 min interval		Ok
Apply message 4 with long range control bit set to 1		Check that message 27 is transmitted with 3 min interval		Ok
c) Apply 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	Test 2012-02-03 Ba UTC 15:20	Ok
d) 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 EUT stops transmission of message 27	UTC 11:37 The transmission of message 27 continues. Retest 2012-02-03 Ba The EUT stops transmission of message 27	Ok
		Verify that the information of message 23 after station type is ignored	Test 2012-02-03 Ba Other information is ignored	Ok
Apply message 4 with long range control bit set to 1		Check that message 27 is transmitted with 3 min interval	Test 2012-02-03 Ba Msg 27 is transmitted	Ok
e) Apply message 23 with station type 10 (long range coverage area), transmit message 4 with a different MMSI than message 23 EUT inside the coverage area				
Apply message 4 with long range control bit set to 0		Check that message 27 is transmitted with 3 min interval	Test 2012-02-03 Ba UTC 15:30	Ok
f) 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	Test 2012-02-03 Ba Msg 27 is not transmitted	Ok
Stop messages 23 after 6 minutes		Check that EUT starts transmission of Message 27 after the time-out of message 23 (4... 8 min)	Test 2012-02-03 Ba Msg 27 is transmitted after	Ok

		about 8 min	
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	Test 2012-02-03 Ba UTC 15:38	Ok
Stop message 4 after 6 minutes	Check that EUT starts transmission of Message 27 later than 3 minutes after end of message 4	Message 27 starts about 9 minutes after end of message 4	Ok

9.4.2 21.2.2 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 ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels with 3 min reporting interval.

~~*EUT transmits Message 27 alternating on [CH 75 156,775 MHz] and [CH 76 156,825 MHz] with 3 min reporting interval.*~~

~~*EUT transmit Message 27 when the Message 4 control bit is set to 1 from the nearest base station with same MMSI as the Message 23, and ignores the Message 4 control bit from other base stations.*~~

c) EUT ~~does not~~transmit~~s~~ Message 27~~when the Message 4 control bit is set to 0 from the nearest base station with the same MMSI as the Message 23, and ignores the control bit of Message 4 from other base stations~~.

d) Irrespective of the Message 4 long range control bit status of both base stations, EUT transmits Message 27 alternating on ~~[CH 75 156,775 MHz] and [CH 76 156,825 MHz]~~the designated long-range channels with 3 min reporting interval.

2012-02-06	**Tester: Ba**	**Test details:**	
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 = 2 s	Check that Message 23 is received (VDM output)		Ok
Reporting rate	Check that the reporting interval is changed to 2 s		Ok
Message 23 timeout	Verify that EUT reverts to normal operation mode after 4... 8 min		Ok
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	UTC 09:29	Ok
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	UTC 09:14	Ok
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	UTC 09:35	Ok
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	UTC 09:38	Ok

Annex A Test equipment

A.1 Test equipment summary

#	Description	Type	Identification
1	VDL Analyser / Generator	Attingimus UAIS Test unit	S/N 001 BSH PC5593 SW AISterm V1.0rev47 AISmain V1.47011120R
2	Target simulator	Simutech	BSH PC3007 SW BSHSIM7T
3	Presentation Interface Monitor	BSH	BSH PC 3481 BSH PC 3544 SW NewMoni V2.1
4	DSC Testbox	DEBEG 3817 DEBEG 6348	S/N 475533
	Auxiliaries:		
5	Digital Multimeter	Voltcraft	S/N 1010365036
6	Fluke Scopemeter	123	BSH 101275/2001
7	5 Converters RS 422 to RS 232		
8	1 fixed voltage power supply (24 V/10A)		
9	3 adjustable power supplies (30 V/5 A)		
10	active retransmitting GPS antenna		

A.1.1 VDL Analyser / Generator

The VDL Analyser / Generator:

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

A.1.2 Target simulator

The target simulator consists of a standard PC with
- special Radar and Target Simulator software
- extension boards for generation of Radar signals and RS422 serial output signals

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

A.1.3 Presentation Interface Monitor

The Presentation Interface Monitor is a PC software running on two standard PCs.
It is used to
- simulate Sensor inputs
- analyse the AIS high speed input / output
- analyse the AIS long range function
- generate DSC calls for the DSC test box and to display, log and evaluate the received DSC calls from EUT.

For that purpose it includes the functions:
- coding / decoding of NMEA 6-bit data fields
- online AIS message filtering
- online AIS message editing
- load and transmit predefined sequences
- online modification of transmitted sequences

A.1.4 DSC Testbox

The DSC test box includes:

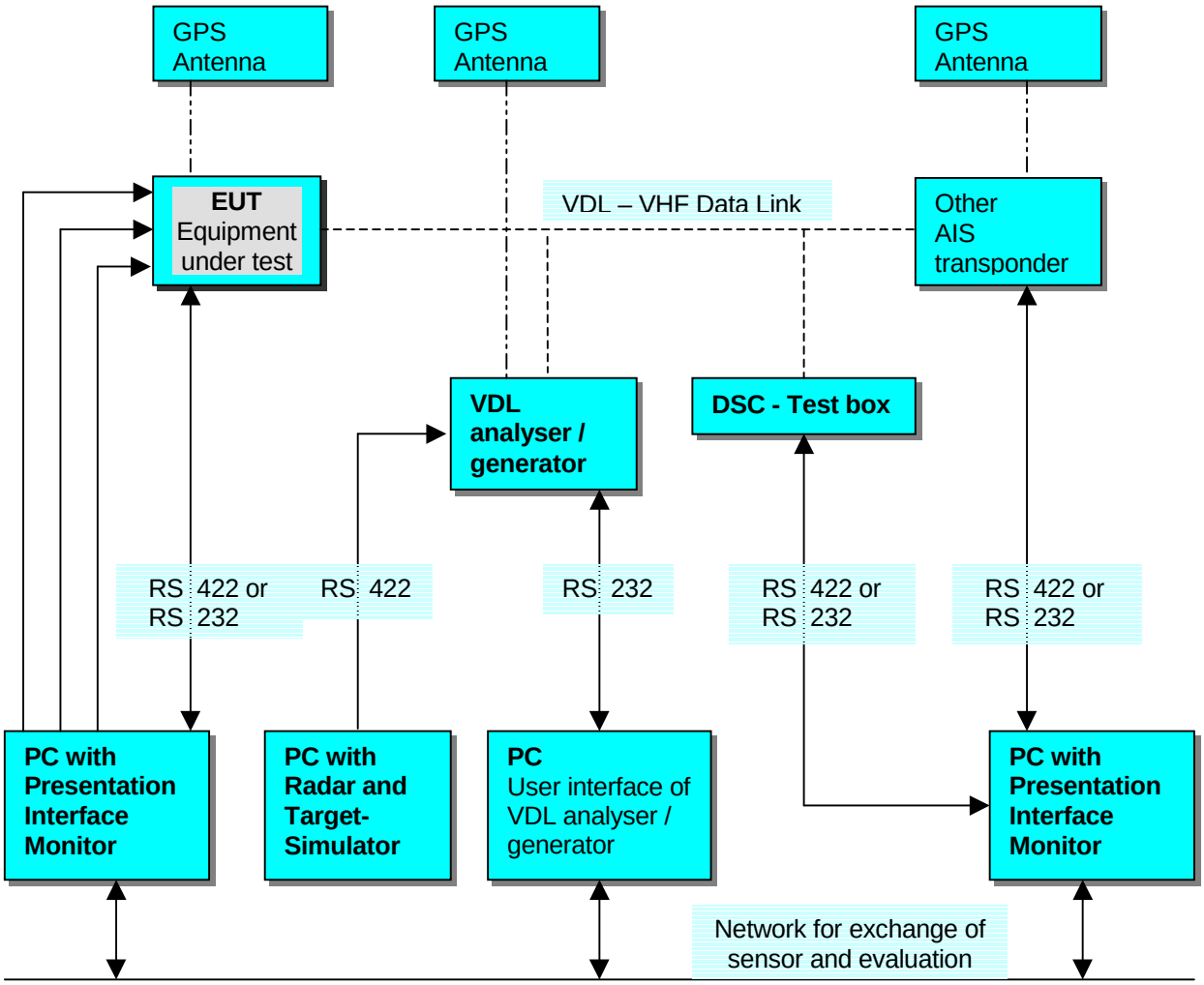
- A standard VHF DSC controller DEBEG 3817 with open interface
- A standard VHF radiotelephone DEBEG 6348

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

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

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

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 Sensor input

Sensor input sentences	
File name	Description
Sentences	
AIS01_gll_vtg_hdt_rot.sst	Standard sensor input sentences
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS01d_dtm_gll_vtg_hdt_rot.sst	Standard sensor input with DTM
Similar files with an additional DTM sentence are also available for the other position sentence sets and not listed explicitely	
$GPDTM,w84,,,,,,P90 *$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A* *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS01g_gll_vtg_gbs_hdt_rot.sst	Standard sensor input with GBS sentence
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$GPGBS,141800.00,2.6,2.8,4.2,,,,* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS01x_gll_vtg_hdt_rot_180.sst	Standard sensor input at Longitude of 180°
$GPGLL,0001.00,N,17959.00,W,141800.00,A,A *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$TIHDT,359.9,T* *$TIROT,0.0,A*	

AIS02_gga_vtg_hdt_rot.sst	Sensor Input set with GGA position
$GPGGA,092854,5330.1234,N,01001.2345,E,1,3,1.2,65.2,M,45.1,M,,,* *$GPVTG,350.0,T,,M,10.0,N,,K,A *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS02d_dtm_gga_vtg_hdt_rot.sst	Sensor Input set with GGA position and DTM
$GPDTM,999,,,,,,,P90 *$GPGGA,092854,5330.1234,N,01001.2345,E,1,3,1.2,65.2,M,45.1,M,,,* *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS03_gns_vtg_hdt_rot.sst	Sensor input set with GNS position
$GNGNS,122500.00,5330.1234,N,01001.2345,E,AA,5,1.2,35.5,41.1,,* *$GNVTG,350.0,T,,M,10.0,N,,K,A *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS04_rmc_hdt_rot.sst	Sensor input set with RMC position and speed
$GPRMC,122500.00,A,5330.1234,N,01001.2345,E,11.2,352.2,120202,2.0,E,A *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS06_gll_vtg_vbw_hdt_rot.sst	Sensor input set with speed by VBW and VTG
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$GPVTG,350.0,T,,M,10.0,N,,K,A* *$VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS07_osd.sst	Single OSD sentence
$INOSD,359.9,A,5.2,B,12.6,B,150.0,1.2,N	
AIS08_gll_vbw_hdt_rot.sst	Standard sensor input with VBW instead of VTG
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V* *$TIHDT,359.9,T* *$TIROT,0.0,A*	
AIS09_gll_osd.sst	Sensor input set with GLL and OSD
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$INOSD,359.9,A,5.2,B,12.6,B,150.0,1.2,N*	
AIS10_gll_vtg.sst	GPS receiver sentences (GLL and VTG)
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A *$GPVTG,350.0,T,,M,10.0,N,,K,A*	
AIS11_vbw.sst	Log sentence VBW
$VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V	
AIS12_hdt_rot.sst	Gyro sentences (HDT and ROT)
$TIHDT,359.9,T *$TIROT,0.0,A*	

B.1.2 Settings (VSD,SSD)

Settings (VSD,SSD)	
File name	Description
Sentences	
AISSD_transpondertype.sst	Settings of static data, specific set for each transponder type
$AISSD,callsign,name,100,20,15,10,1,GP	
AIVSD_Hamburg.sst	Settings of voyage related data
$AIVSD,51,11.5,26,HAMBURG,131020,20,05,0,0	

B.1.3 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,1,1,2,000001005,1,6,06P0test,0	
AIABM_safety.sst	Standard addressed safety related message
!AIABM,1,1,2,000001005,1,12,D5CD,0	
AIABM_4_bin.sst	Set of 4 addressed binary messages
!AIABM,1,1,3,000008001,1,6,06P0test,0 *!AIABM,1,1,0,000008001,2,6,06P0test,0* *!AIABM,1,1,1,000008001,1,6,06P0test,0* *!AIABM,1,1,2,000008001,2,6,06P0test,0*	
AIABM_4_safety.sst	Set of 4 addressed safety related messages
!AIABM,1,1,0,000001005,1,12,D5CD,0 *!AIABM,1,1,1,000001005,1,12,D5CD,0* *!AIABM,1,1,2,000001005,1,12,D5CD,0* *!AIABM,1,1,3,000001005,1,12,D5CD,0*	
AIBBM_bin.sst	Standard binary broadcast message
!AIBBM,1,1,6,1,8,06P0test,0	
AIBBM_safety.sst	Standard safety related broadcast message
!AIBBM,1,1,6,1,14,D5CD,0	

AIBBM_5_bin.sst	Set of 5 binary broadcast messages
!AIBBM,1,1,7,0,8,06P0test1,0 *!AIBBM,1,1,8,0,8,06P0test2,0* *!AIBBM,1,1,9,0,8,06P0test3,0* *!AIBBM,1,1,0,0,8,06P0test4,0* *!AIBBM,1,1,1,0,8,06P0test5,0*	
AIBBM_5_safety.sst	Set of 5 safety related broadcast messages
!AIBBM,1,1,6,0,14,D5CDi,0 *!AIBBM,1,1,7,0,14,D5CDj,0* *!AIBBM,1,1,8,0,14,D5CDk,0* *!AIBBM,1,1,9,0,14,D5CDl,0* *!AIBBM,1,1,0,0,14,D5CDm,0*	
AIBBM_bin_stuffing.sst	Special message for bit stuffing test
!AIBBM,1,1,6,1,8,06Qv>khvOP,4	
AIBBM_multi_bin.sst	Long 5 slot binary broadcast message
!AIBBM,4,1,6,2,8,06P045678901234567890123456789012345678901234567890,0 *!AIBBM,4,2,6,2,8,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,3,6,2,8,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,4,6,2,8,0123456789012345678901234567890123456789012345678901,4*	
AIBBM_multi_safety.sst	Long 5 slot safety related broadcast message
!AIBBM,4,1,6,2,14,012345678901234567890123456789012345678901234567890,0 *!AIBBM,4,2,6,2,14,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,3,6,2,14,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,4,6,2,14,012345678901234567890123456789012345678901234567890,0*	
AIBBM_multi_bin_1.sst	Longer than 5 slots binary broadcast message, all bits 1
!AIBBM,4,1,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 *!AIBBM,4,2,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0* *!AIBBM,4,3,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0* *!AIBBM,4,4,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0*	
AIBBM_ABM_17_5.sst	Set of 2 long messages 8 and 12 for message priority test
!AIBBM,4,1,6,2,8,06P045678901234567890123456789012345678901234567890,0 *!AIBBM,4,2,6,2,8,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,3,6,2,8,012345678901234567890123456789012345678901234567890,0* *!AIBBM,4,4,6,2,8,012345678901234567890123456789012345678901234567890,0* *!AIABM,4,1,2,000001005,1,12,012345678901234567890123456789012345678901234567890,0* *!AIABM,4,2,2,000001005,1,12,012345678901234567890123456789012345678901234567890,0* *!AIABM,4,3,2,000001005,1,12,012345678901234567890123456789012345678901234567890,0* *!AIABM,4,4,2,000001005,1,12,012345678901234567890123456789012345678901234567890,0*	

AIBBM_25.sst	25 broadcast message to check 20 slots per frame rule
!AIBBM,1,1,6,1,8,06P0test1,0 *!AIBBM,1,1,6,1,14,D5CD1,0* *!AIBBM,1,1,7,1,8,06P0test2,0* *!AIBBM,1,1,7,1,14,D5CD2,0* *!AIBBM,1,1,8,1,8,06P0test3,0* *!AIBBM,1,1,8,1,14,D5CD3,0* *!AIBBM,1,1,9,1,8,06P0test4,0* *!AIBBM,1,1,9,1,14,D5CD4,0* *!AIBBM,1,1,0,1,8,06P0test5,0* *!AIBBM,1,1,0,1,14,D5CD5,0* *!AIBBM,1,1,1,1,8,06P0test6,0* *!AIBBM,1,1,1,1,14,D5CD6,0* *!AIBBM,1,1,2,1,8,06P0test7,0* *!AIBBM,1,1,2,1,14,D5CD7,0* *!AIBBM,1,1,3,1,8,06P0test8,0* *!AIBBM,1,1,3,1,14,D5CD8,0* *!AIBBM,1,1,4,1,8,06P0test9,0* *!AIBBM,1,1,4,1,14,D5CD9,0* *!AIBBM,1,1,5,1,8,06P0test10,0* *!AIBBM,1,1,5,1,14,D5CD10,0* *!AIBBM,1,1,6,1,8,06P0test11,0* *!AIBBM,1,1,6,1,14,D5CD11,0* *!AIBBM,1,1,7,1,8,06P0test12,0* *!AIBBM,1,1,7,1,14,D5CD12,0* *!AIBBM,1,1,7,1,8,06P0test13,0*	
AIAIR_5.sst	Simple interrogation for msg 5
$AIAIR,000001005,5,,,,,	
AIAIR_35_5.sst	Interrogation of msg 3 and 5 from ID1 and msg 5 from ID2
$AIAIR,000005002,3,,5,,000007001,5,,	
AIS_DSI.sst	Test that EUT ignores command to send a DSC msg
$AIDSI,1,1,2210393930,,,,03,,11,,	

B.1.4 Regional operational settings (ACA)

Regional operational settings (ACA)	
File name	Description
Sentences	
AIACA_Region_in_ch86.SST	Region around standard position with test channels
$ECACA,2,5400.0,N,01030.0,E,5300.0,N,00930.0,E,4,2086,0,1086,0,0,1,,,	
AIACA_Region_out_ch74_76.SST	Region not including standard position with channels 74 and 76
$ECACA,2,5500.0,N,00900.0,E,5400.0,N,00800.0,E,4,0074,0,0076,0,0,1,,,	
AIACA_Region_17_3_SW.SST	2 adjacent regions in SW quadrant, for test 17.3
$ECACA,2,3000.00,S,01200.00,W,3100.00,S,01300.00,E,1,2081,0,1081,0,0,1,,,* *$ECACA,2,3000.00,S,01100.00,W,3100.00,S,01200.00,E,1,2082,0,1082,0,0,1,,,	
AIACA_8_Regions_17_7_1.SST	8 different regions to fill quickly the complete list, for test 17.7.1
$ECACA,,5400.00,N,01030.00,E,5300.00,N,00930.00,E,2,72,0,74,0,0,1,,,* *$ECACA,,5200.00,N,00700.00,E,5100.00,N,00600.00,E,2,2060,0,1060,0,0,1,,, *$ECACA,,5200.00,N,00900.00,E,5100.00,N,00800.00,E,2,2061,0,1061,0,0,1,,,* *$ECACA,,5200.00,N,01100.00,E,5100.00,N,01000.00,E,2,2062,0,1062,0,0,1,,,* *$ECACA,,5200.00,N,01300.00,E,5100.00,N,01200.00,E,2,2063,0,1063,0,0,1,,,* *$ECACA,,5200.00,N,01500.00,E,5100.00,N,01400.00,E,2,2064,0,1064,0,0,1,,,* *$ECACA,,5100.00,N,00800.00,E,5000.00,N,00700.00,E,2,2065,0,1065,0,0,1,,,* *$ECACA,,5100.00,N,01000.00,E,5000.00,N,00900.00,E,2,2066,0,1066,0,0,1,,,*	
AIACA_Region_17_7_2_c.SST	Region for test 17.7.2 c
$ECACA,2,5430.00,N,01200.00,E,5300.00,N,01100.00,E,4,2083,0,1083,0,0,1,,,	
AIACA_Region_17_7_2_f.SST	Region for test 17.7.2 f
$ECACA,2,5300.00,N,01320.00,E,5200.00,N,01200.00,E,4,2081,0,1081,0,0,1,,,	
AIACA_Region_17_7_4.SST	4 adjacent regions for test 17.7.2 f
$ECACA,2,5800.00,N,00800.00,E,5700.00,N,00700.00,E,4,2081,0,1081,0,0,1,,,* *$ECACA,2,5800.00,N,00900.00,E,5700.00,N,00800.00,E,4,2082,0,1082,0,0,1,,, *$ECACA,2,5700.00,N,00800.00,E,5600.00,N,00700.00,E,4,2083,0,1083,0,0,1,,,* *$ECACA,2,5700.00,N,00900.00,E,5600.00,N,00800.00,E,4,2084,0,1084,0,0,1,,,*	
AIACA_Region_lon180.SST	Special region at longitude = 180°
$ECACA,2,0100.00,N,17900.00,W,0100.00,S,17900.00,E,2,0074,0,0076,0,0,1,,,	
AIACA_Set_channel.SST	Set channel command, without area co-ordinates
$ECACA,,N,,W,,N,,W,2,2074,0,2076,0,0,1,,,,	
Request_ACA.SST	Request of ACA sentences from EUT
$ECAIQ,ACA	

B.1.5 Long range requests

The of long range requests include a MMSI number which is changed according to the actual MMSI number the EUT

Long Range (LRI, LRF)	
File name	Description
Sentences	
LRI_LRF_MMSI_all.sst	Request of all data addressed by MMSI
$LRLRI,5,0,211003000,000002002,,,,,,,* *$LRLRF,5,211003000,VTS,ABCEFIOPUW,	
LRI_LRF_area_CEF.sst	Request of some data addressed by area
$LRLRI,6,1,211003000,,6000.0,N,2000.0,E,4000.0,N,0500.0,E *$LRLRF,6,211003000,VTS,CEF,*	
LRI_LRF_out_area_CEF.sst	Request of some data addressed by area, standard position not in area
$LRLRI,6,1,211003000,,6000.0,N,1500.0,E,5500.0,N,0800.0,E *$LRLRF,6,211003000,VTS,CEF,*	
LRI_LRF_area_at_180_CEF.sst	Request of some data addressed by area, area around longitude of 180°and latitude of 0°
$LRLRI,6,1,211003000,,0500.0,N,17500.0,W,0500.0,S,17500.0,E *$LRLRF,6,211003000,VTS,CEF,*	
LRF_ack_all.sst	For external confirmation of request
$LRLRF,5,211003000,VTS,ABCEFIOPUW,	

B.2 DSC sentences

The sentences are listed as they are applied to the DSC Testbox for transmission of DSC test calls. There is a special format used based on an earlier definition of NMEA private sentences.

The frame for transmitting a DSC call is:
$PDEBT,CCDSC,T,00014600<call content>FF

The <call content> has to be entered in Hex code, 2 hex numbers for each 7 bit DSC symbol, without spaces, beginning with the format specifier which included only ones. The DSC coding and addition of redundancy (3 bit symbol redundancy and symbol repetition) are done by the test box. The content description of the calls is available on request.

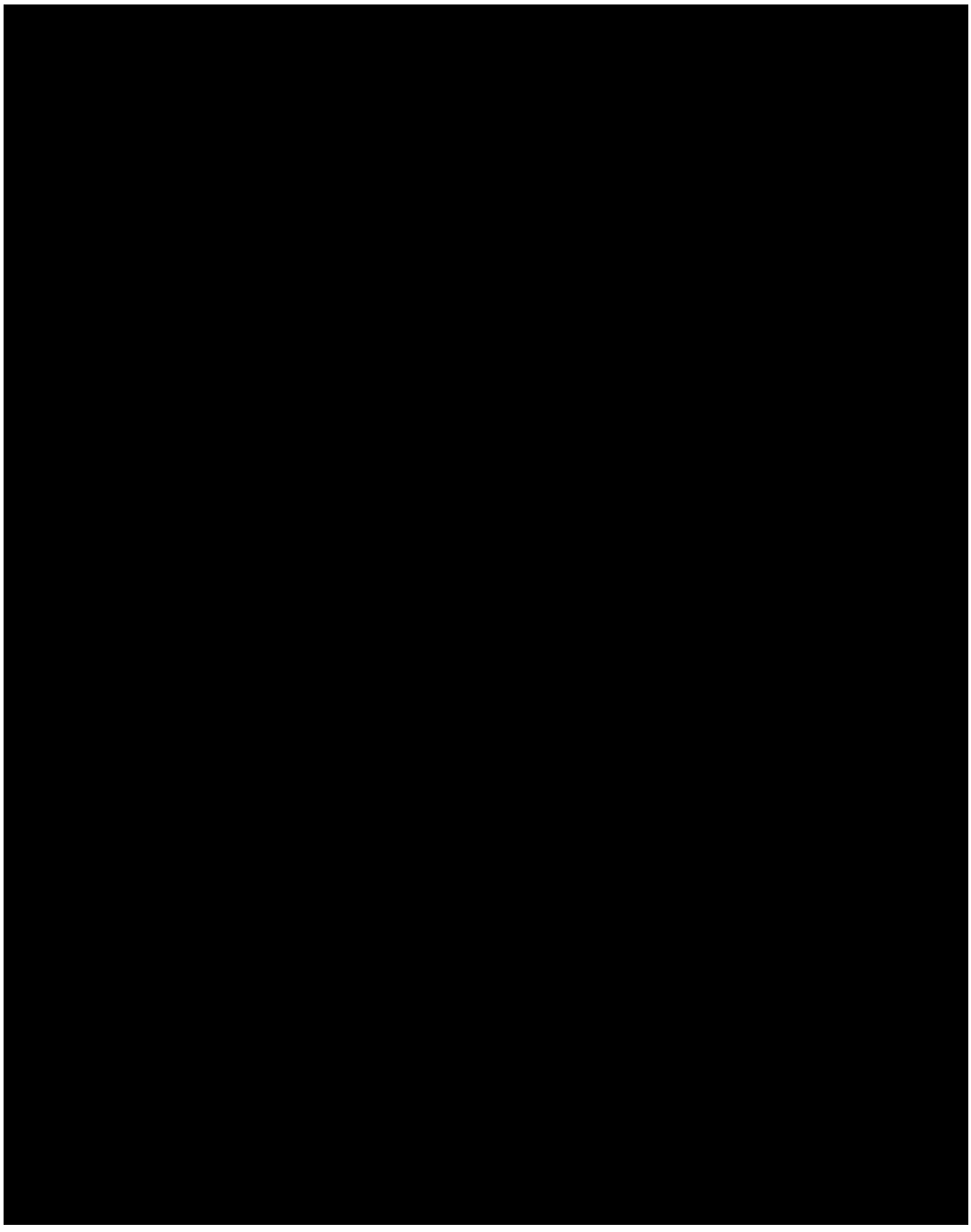
The DSC sentences include MMSI number which is changed according to the actual MMSI number the EUT.

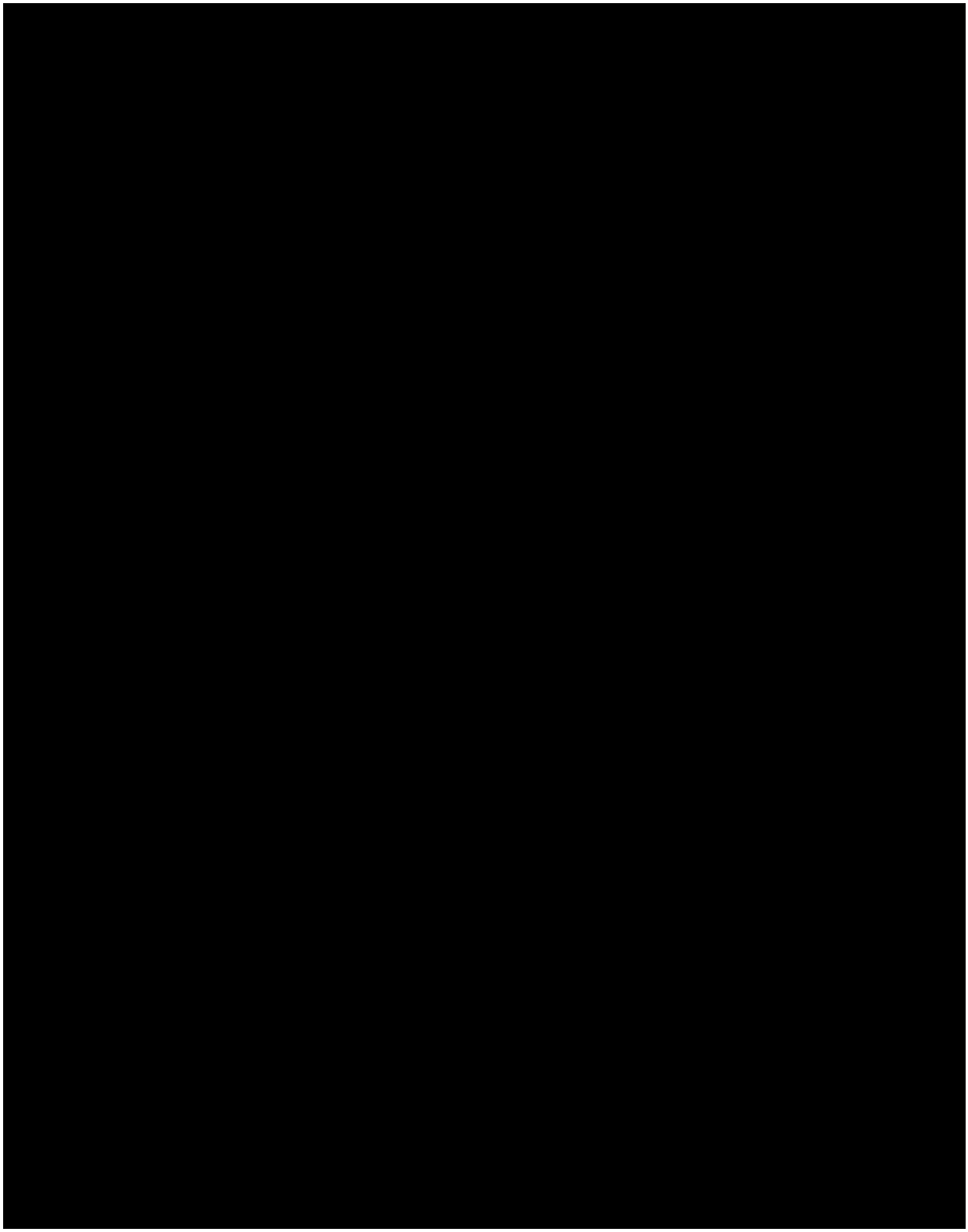
DSC Sentences	
File name	Description
Sentences	
Test_Signal_1.sst	Standard test signal no 1, selective position and name request.
$PDEBT,CCDSC,T,00014600780000001005067150A27271E676F75FF	
area_pos_name_rq.sst	Position and name request addressed to an area, standard position inside
$PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E676F75FF	
area_pos_name_rq_180.sst	Position and name request addressed to an area around a longitude of 180° and latitude of 0°.
$PDEBT,CCDSC,T,000146006700030001 4F1E003C003C0067150A27271E676F75FF	
sel_set_region.sst	Selective regional setting by DSC, standard pos. outside, channel 61
$PDEBT,CCDSC,T,00014600780000001005067150A27271E68090A3D00680A143D00680C053C00011400680D053200010A0075FF	
sel_set_region_in.sst	Selective regional setting, standard position inside, channel 72, 73, 12.5 kHz
$PDEBT,CCDSC,T,00014600780000001005067150A27271E680900480A680A00490A680C05280001030068 0D051E00005D0075FF	
sel_set_ais_channel_ch65.sst	Setting AIS channel to 65
$PDEBT,CCDSC,T,00014600780000001005067150A27271E68090A4100680A14410075FF	
sel_check_channel.sst	Test of channel use in 20.4
$PDEBT,CCDSC,T,00014600780000001010067150A27271E654875FF *$PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E676F75FF*	
area_set_region.sst	Area addressed regional setting, standard position inside address, but not inside area, Ch 60
$PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E68090A3C00680A143C00680C05 1400005A00680D050A0000500075FF	
area_set_region_20_2.sst	Area addressed regional setting for test 20.2
$PDEBT,CCDSC,T,00014600670F3200000E00005A005A0067150A27271E6809145200680A0A5200680C0F 1E00011E00680D0F140001280075FF *$PDEBT,CCDSC,T,00014600670F3200000E00005A005A0067150A27271E6809145100680A0A5100680C0F 1400011E00680D0F0A0001280075FF*	
Sequence_20_1sst	Area addressed regional setting, standard position inside address, but not inside area, Ch 60
$PDEBT,CCDSC,T,00014600780000001010067150A27271E676F75FF *$PDEBT,CCDSC,T,000146006606000 50A0A64150A27271E646E5A00487E7E7E7FFF* *$PDEBT,CCDSC,T,00014600780000001010067150A27271E676F75FF* *$PDEBT,CCDSC,T,00014600780000001010067150A27271E646E5A00487E7E7E75FF* *$PDEBT,CCDSC,T,00014600780000001010067150A27271E676F75FF*	
Test_sequence_20_3.sst	Sequence of an area addressed call and continues transmission of other call for test of free channel check
$PDEBT,CCDSC,T,000146006705320000091E003C003C0067150A27271E676F75FF *$PDEBT,CCDSC,T,00084600780000000010167150A27271E676F75FF*	
Sel_act_alt_system.sst	Activate an alternative system
$PDEBT,CCDSC,T,00014600780000000A0567150A27271E6803017875FF	

Annex C Test Diagrams

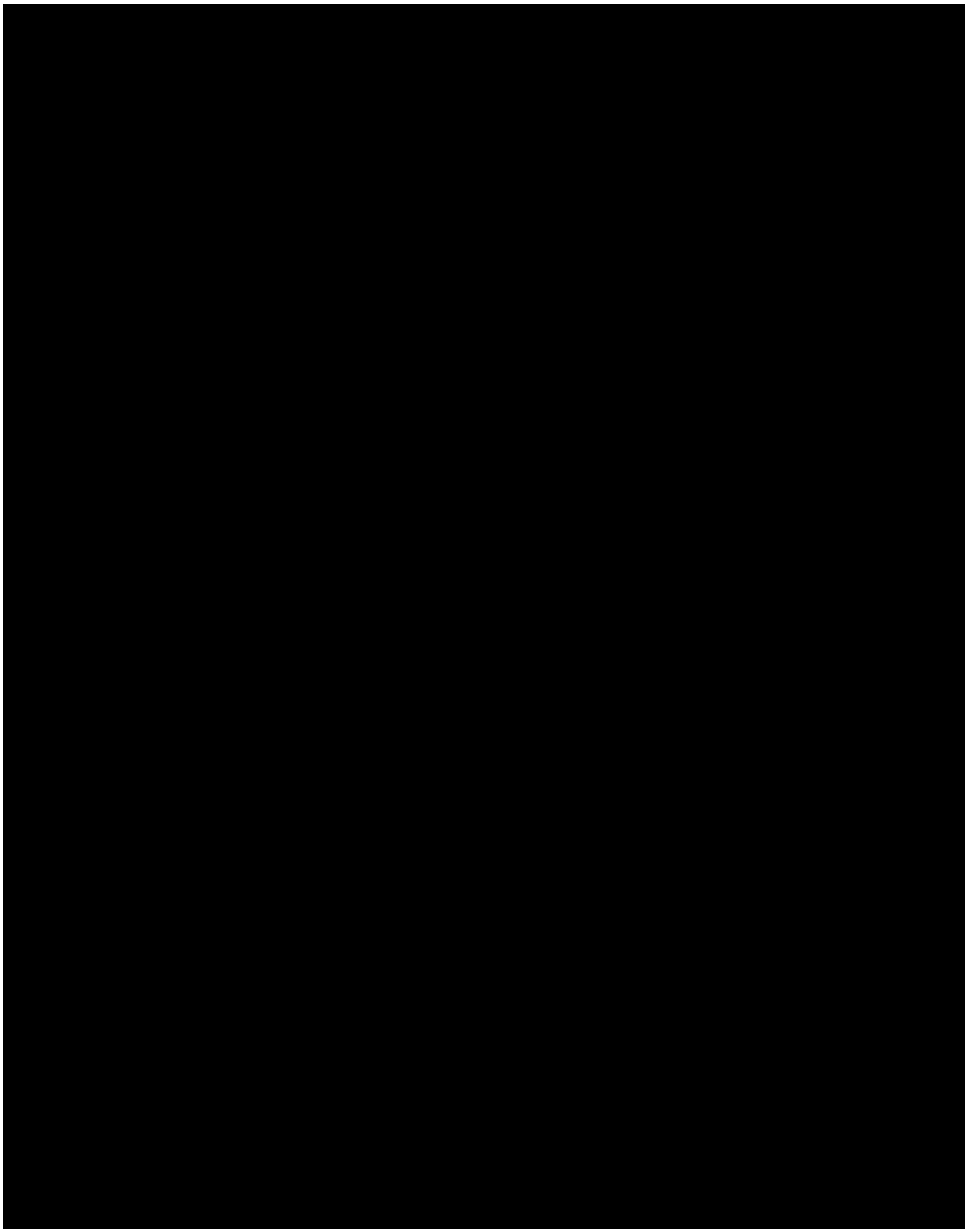
C.1 14.4.1 Reporting rates

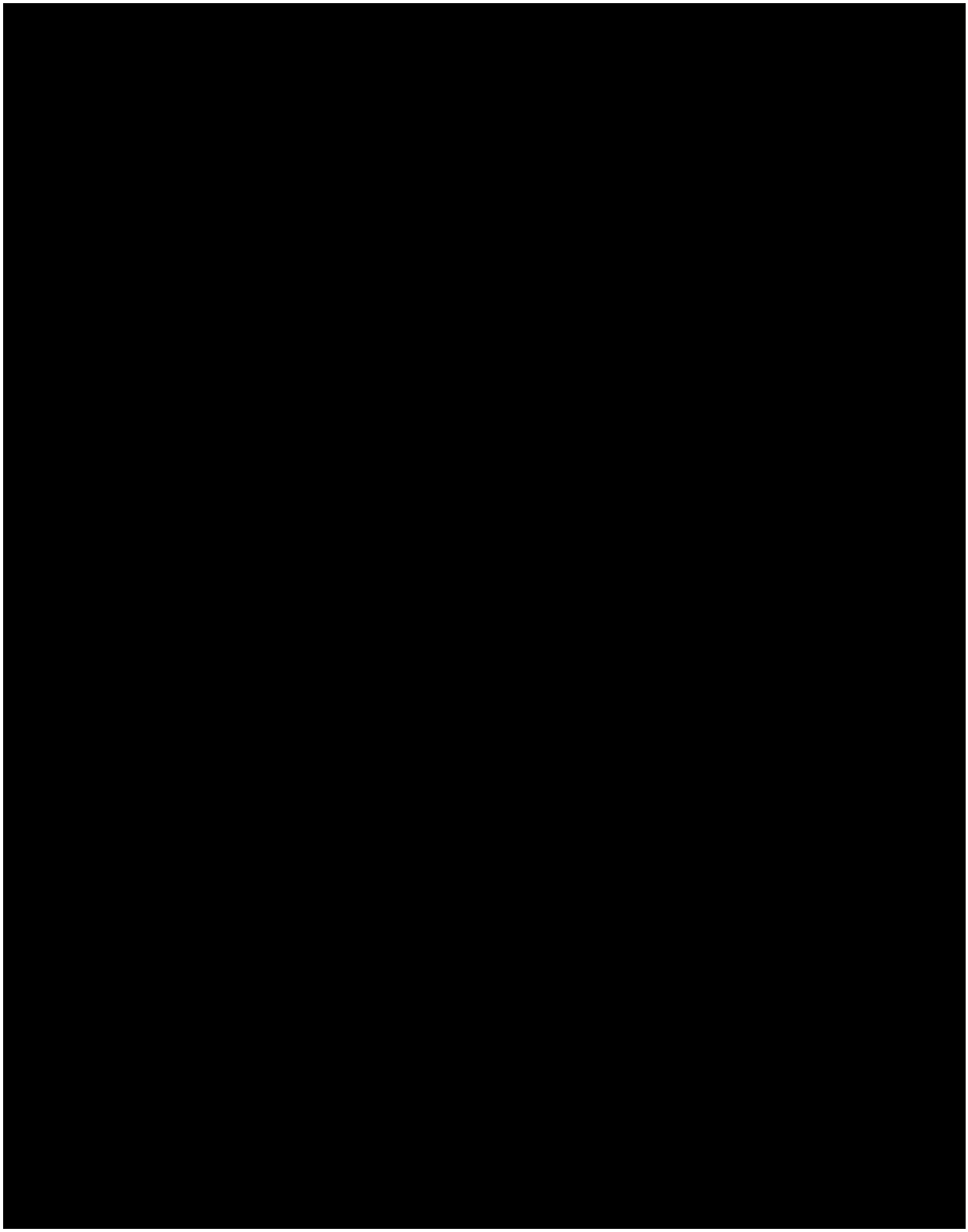
C.1.1 Reporting rate by speed change, 10 kn



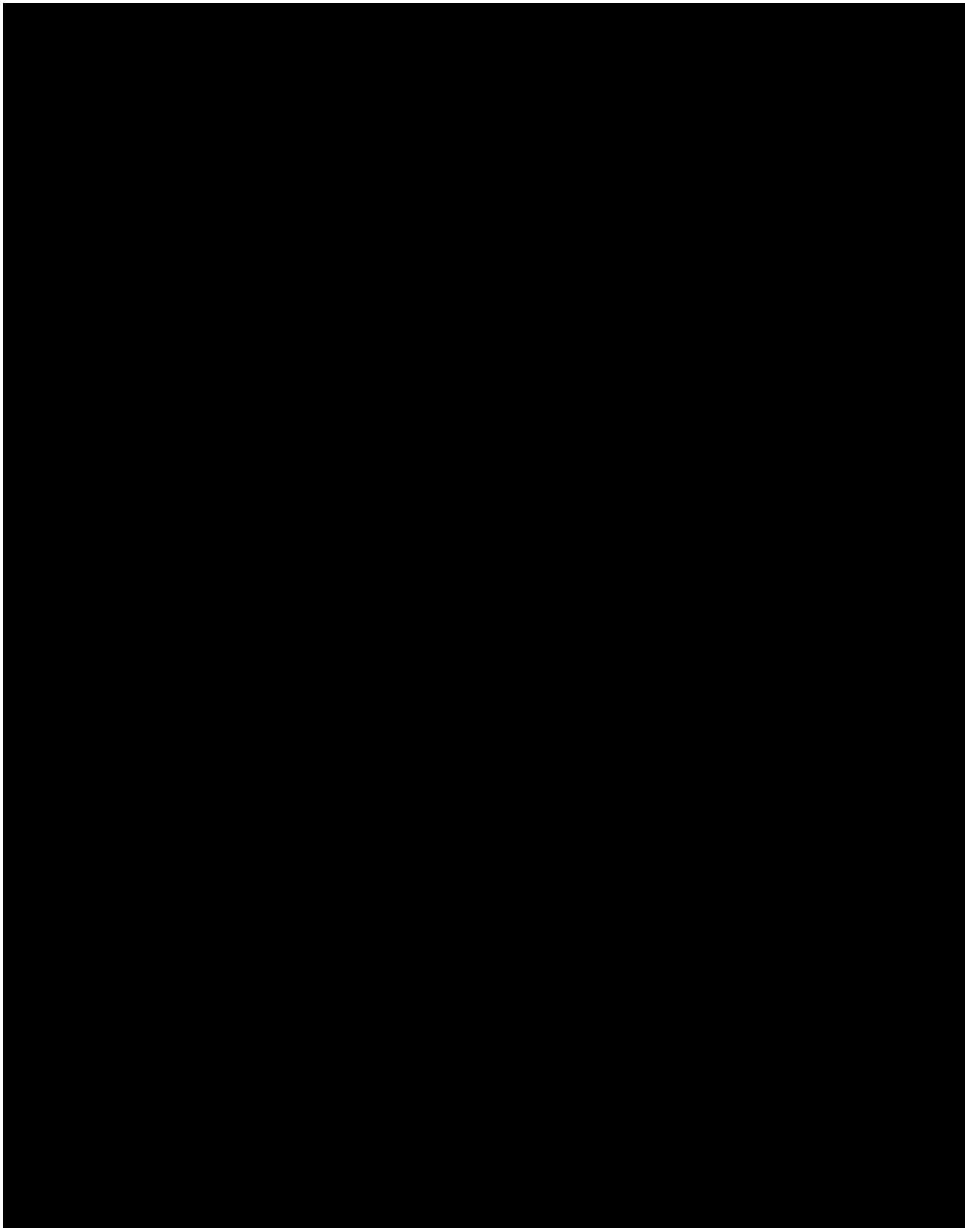


C.1.2 Reporting rate by speed change, 15 kn

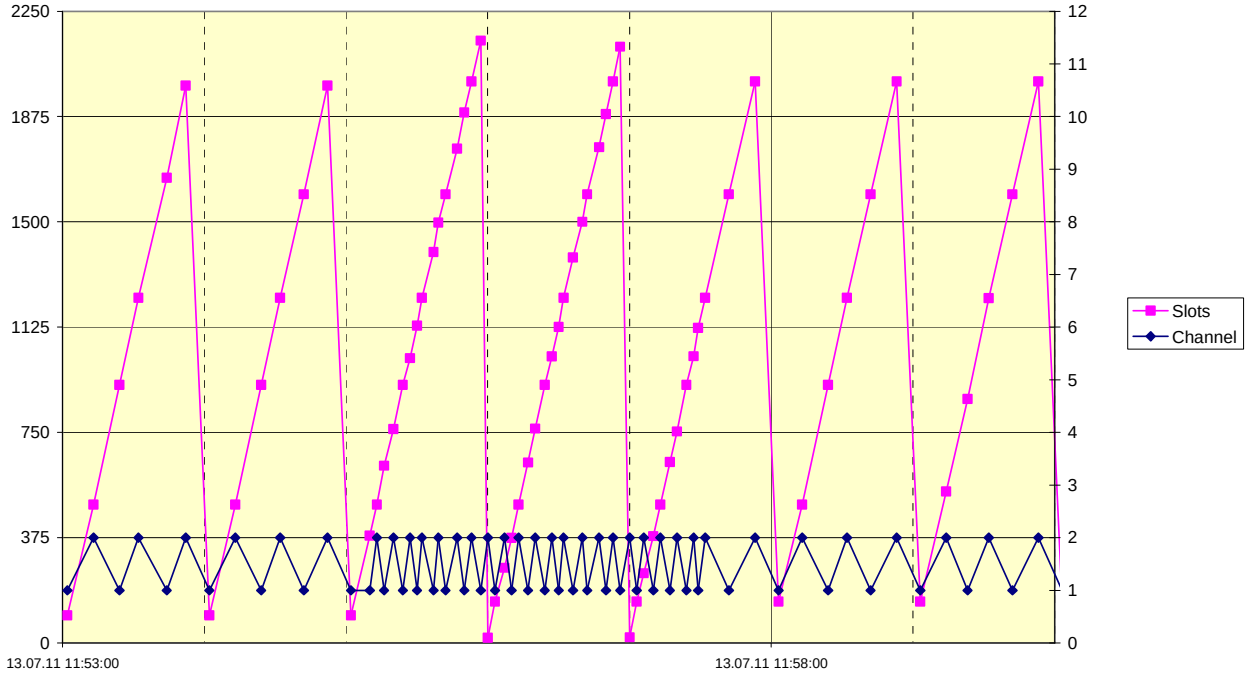




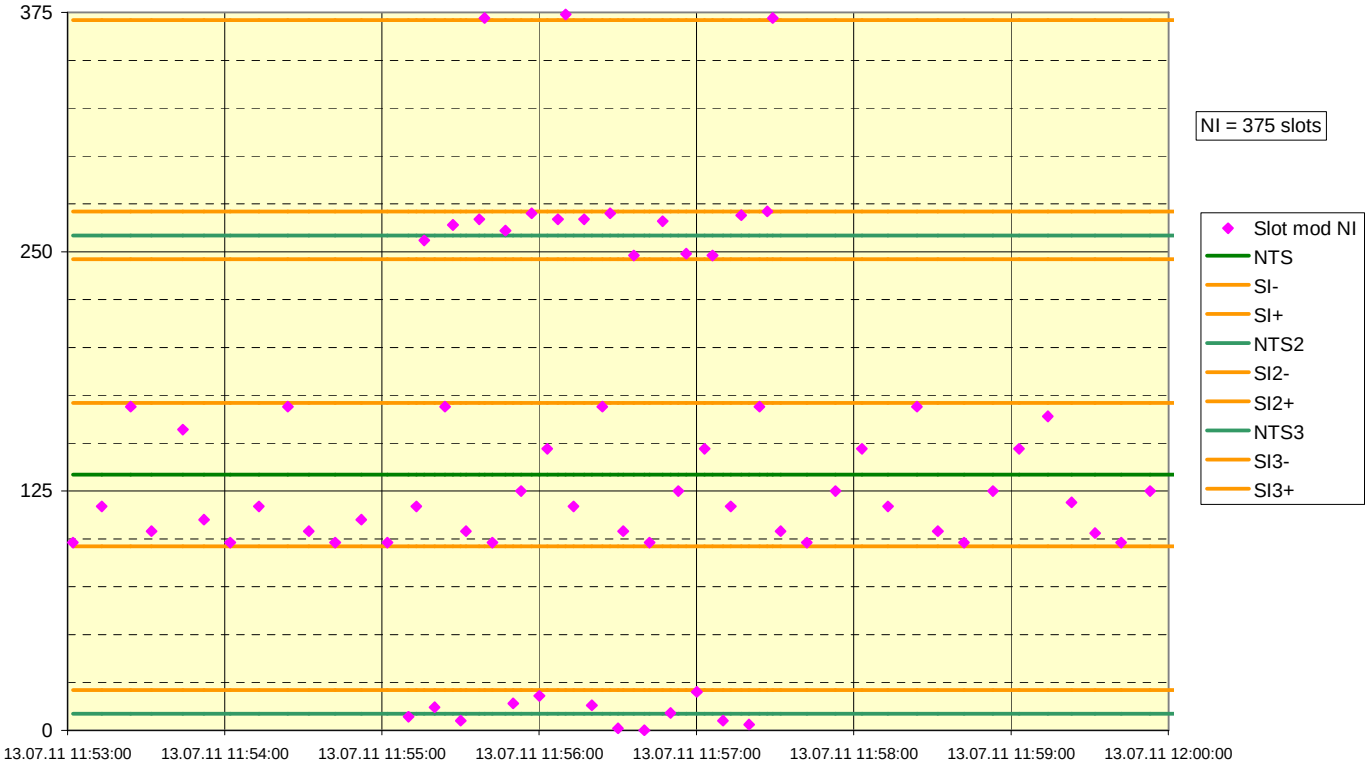
C.1.3 Reporting rate by heading change, 10 kn



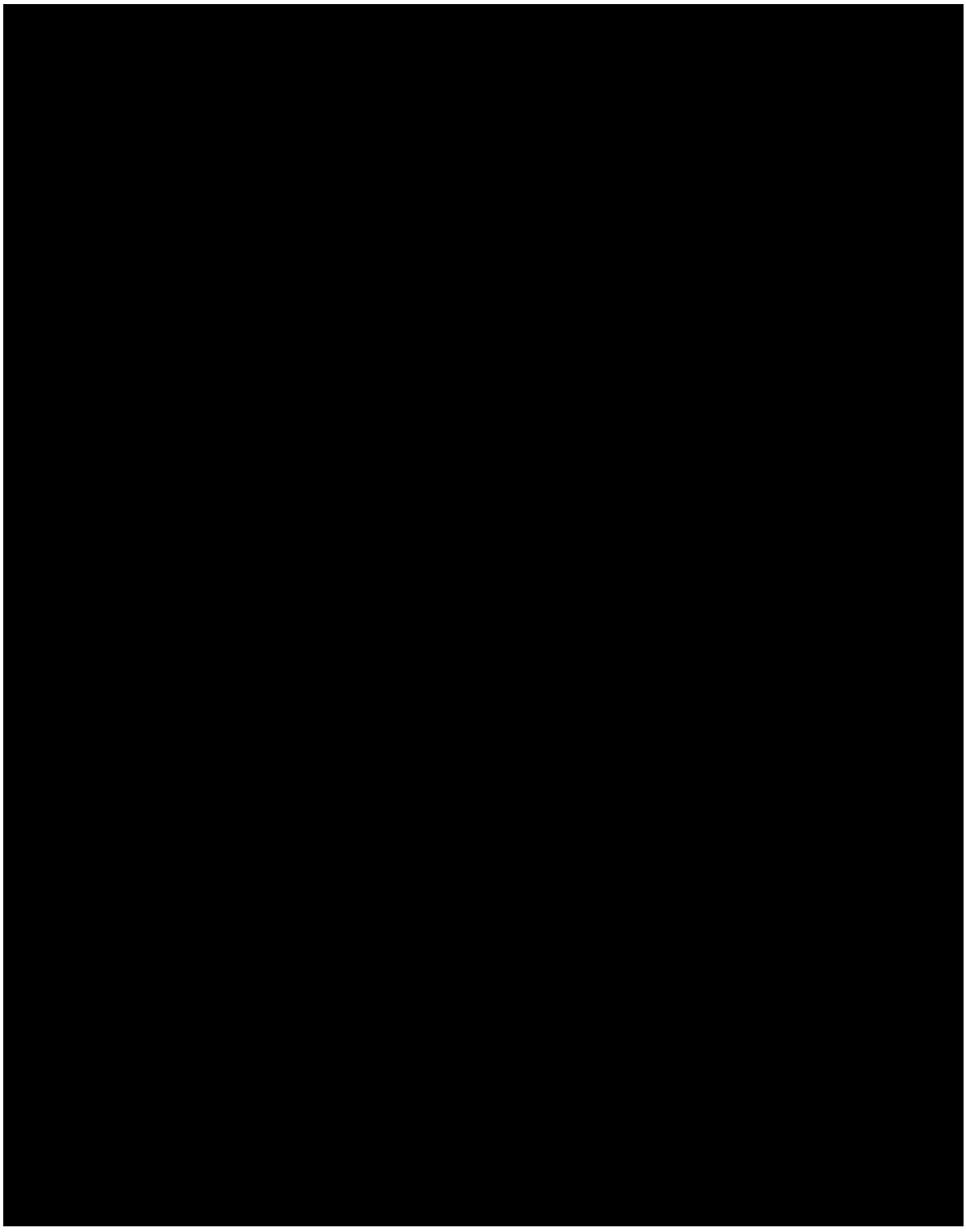
2011-07-13 Ba - Jotron TR-8000 - Test 14.4.1 Reporting interval by heading change, basic interval = 10s



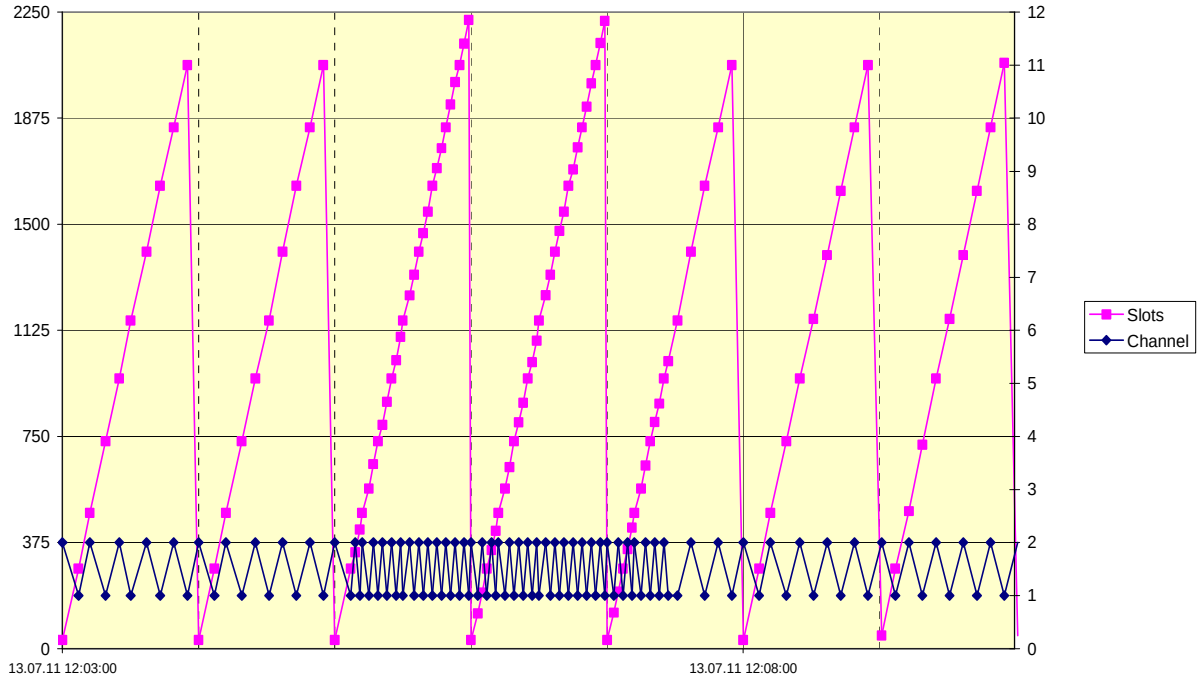
2011-07-13 Ba - Jotron TR-8000 - Test 14.4.1 Reporting interval by heading change, basic interval = 10s



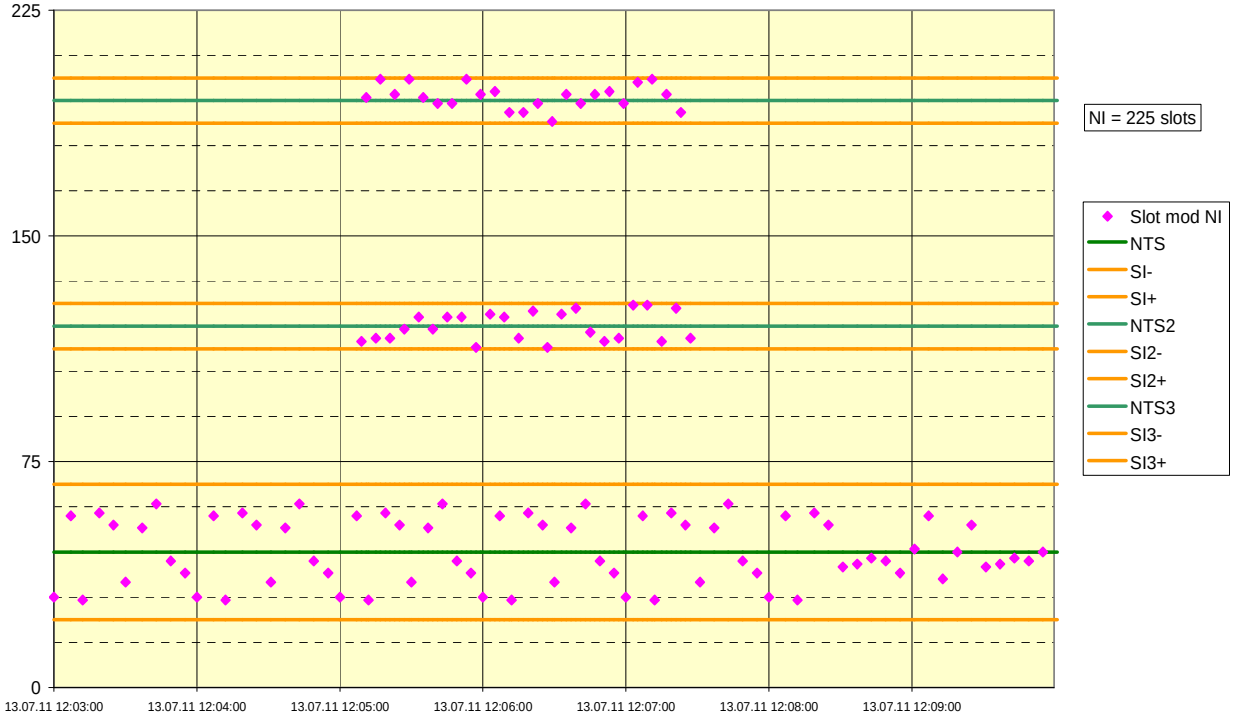
C.1.4 Reporting rate by heading change, 15 kn



2011-06-29 Ba - Jotron TR-8000 - Test 14.4.1 Reporting interval by heading change, basic interval = 6s

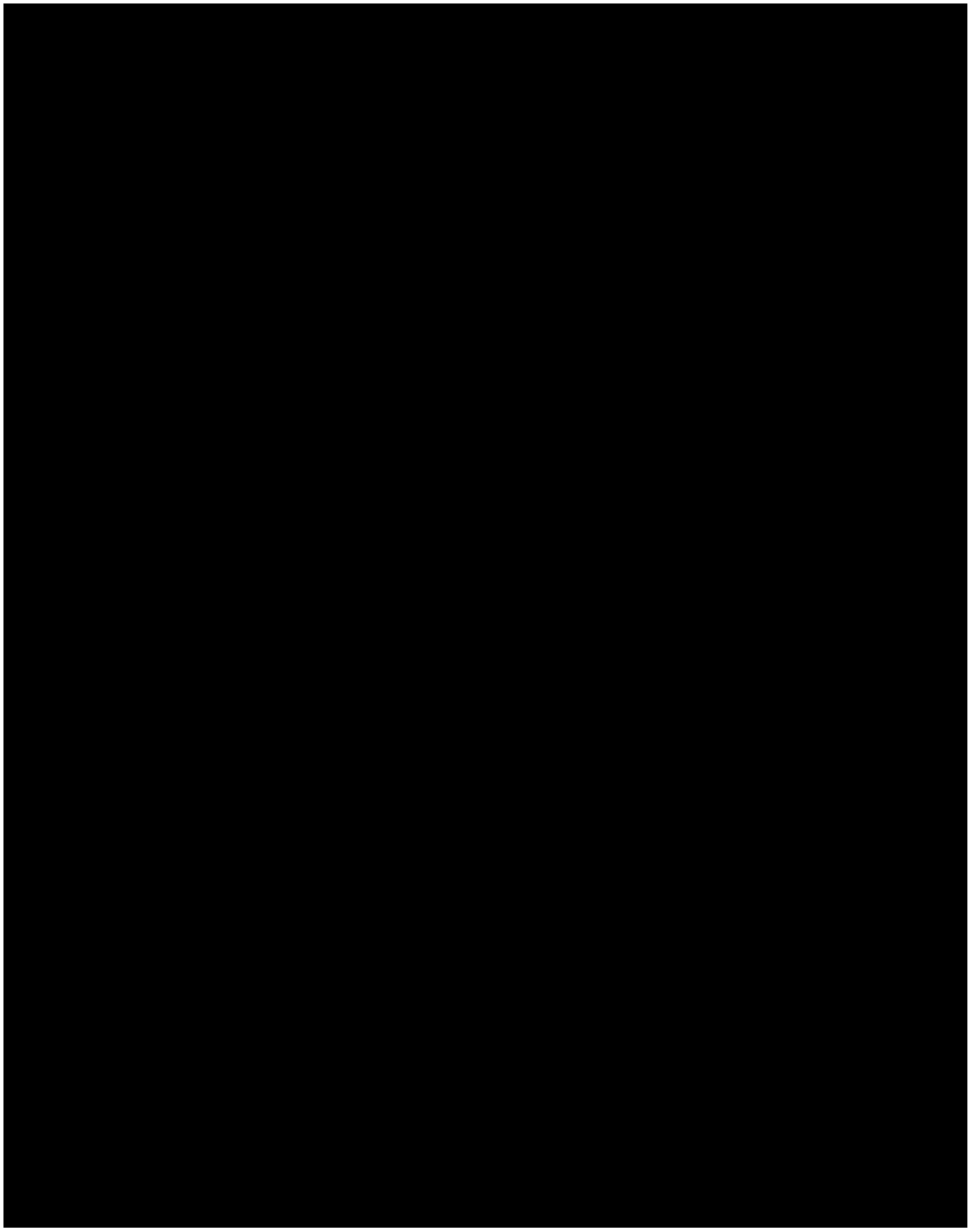


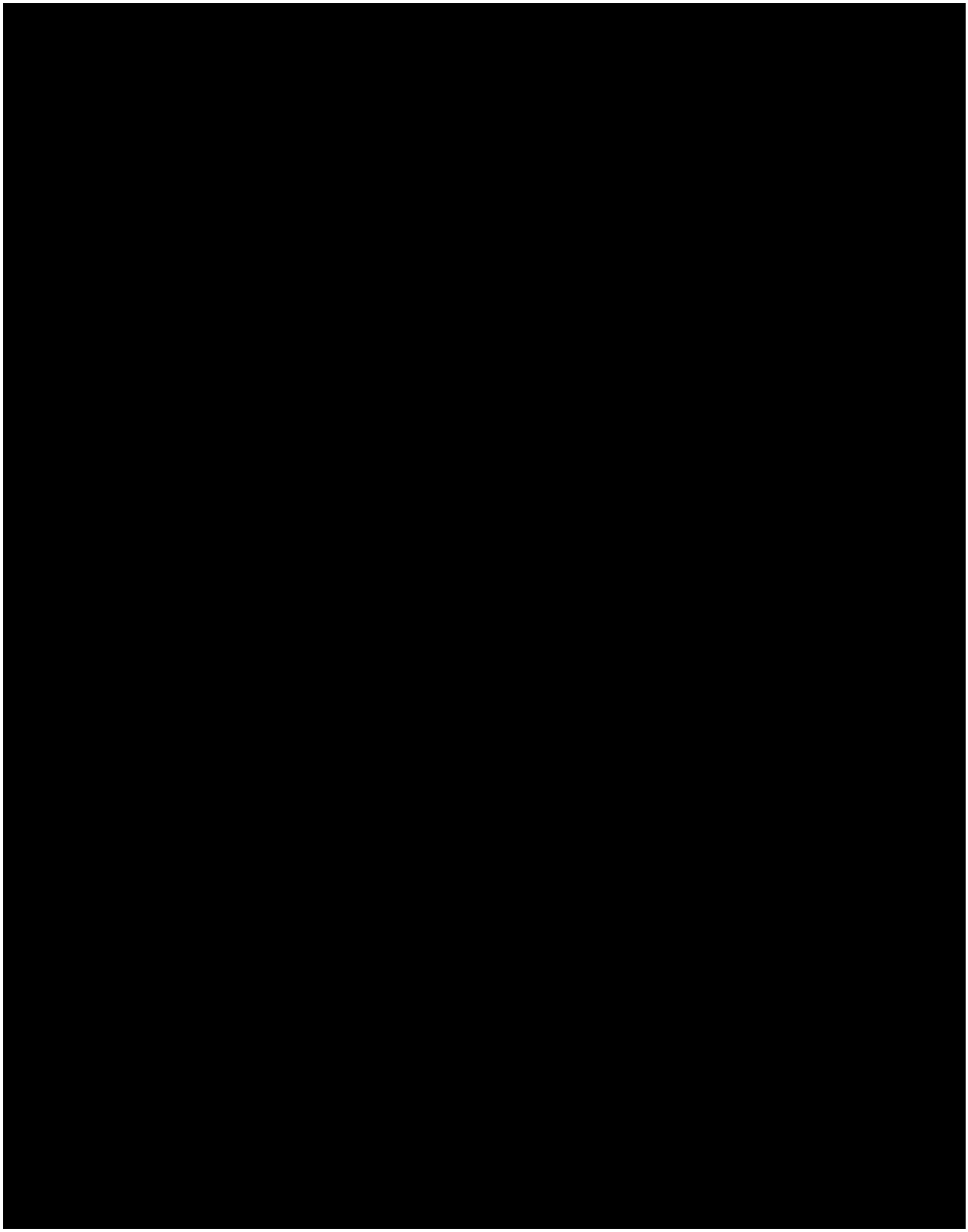
2011-06-29 Ba - Jotron TR-8000 - Test 14.4.1 Reporting interval by heading change, basic interval = 6s



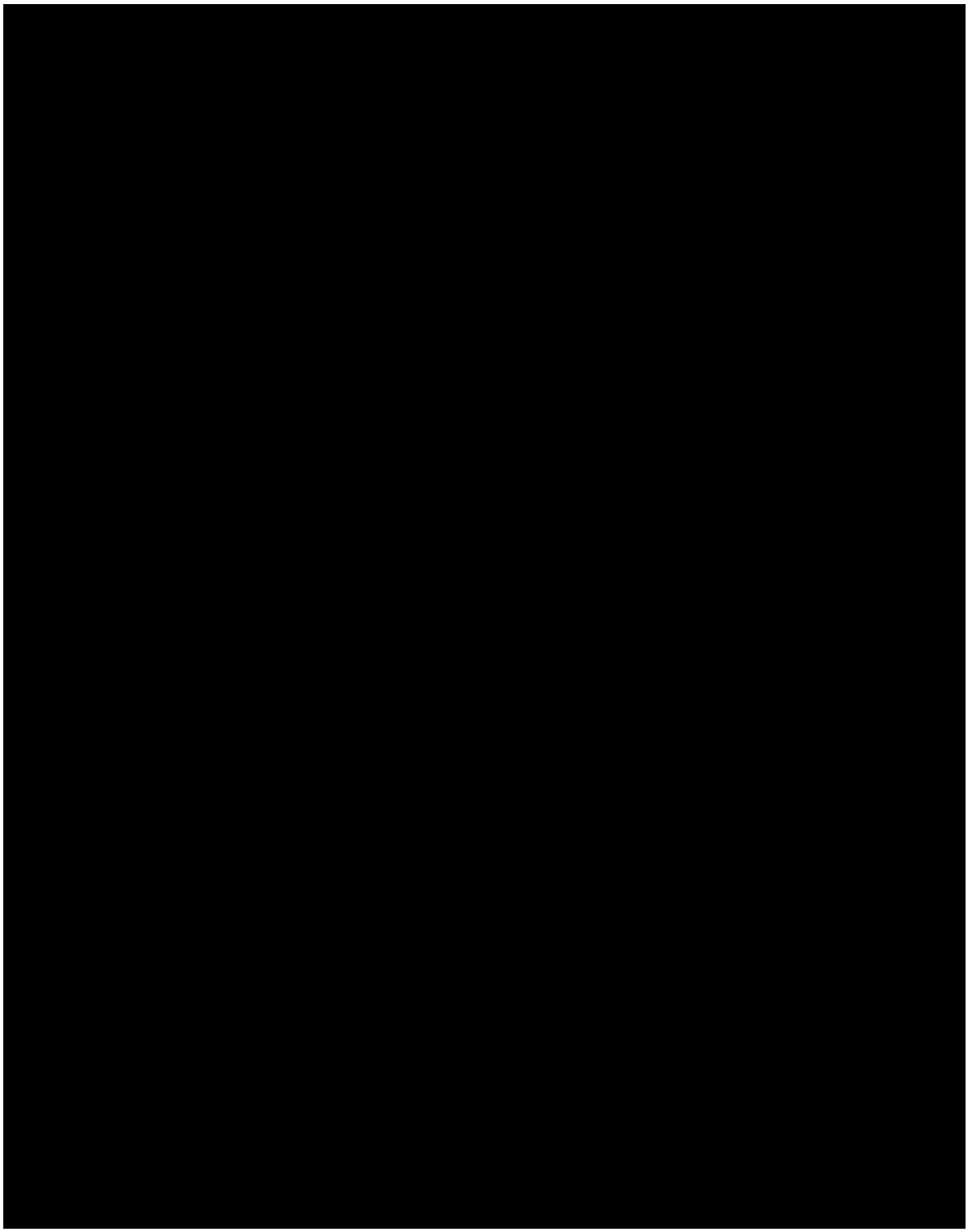
C.2 14.4.3 Autonomous rates at assignment

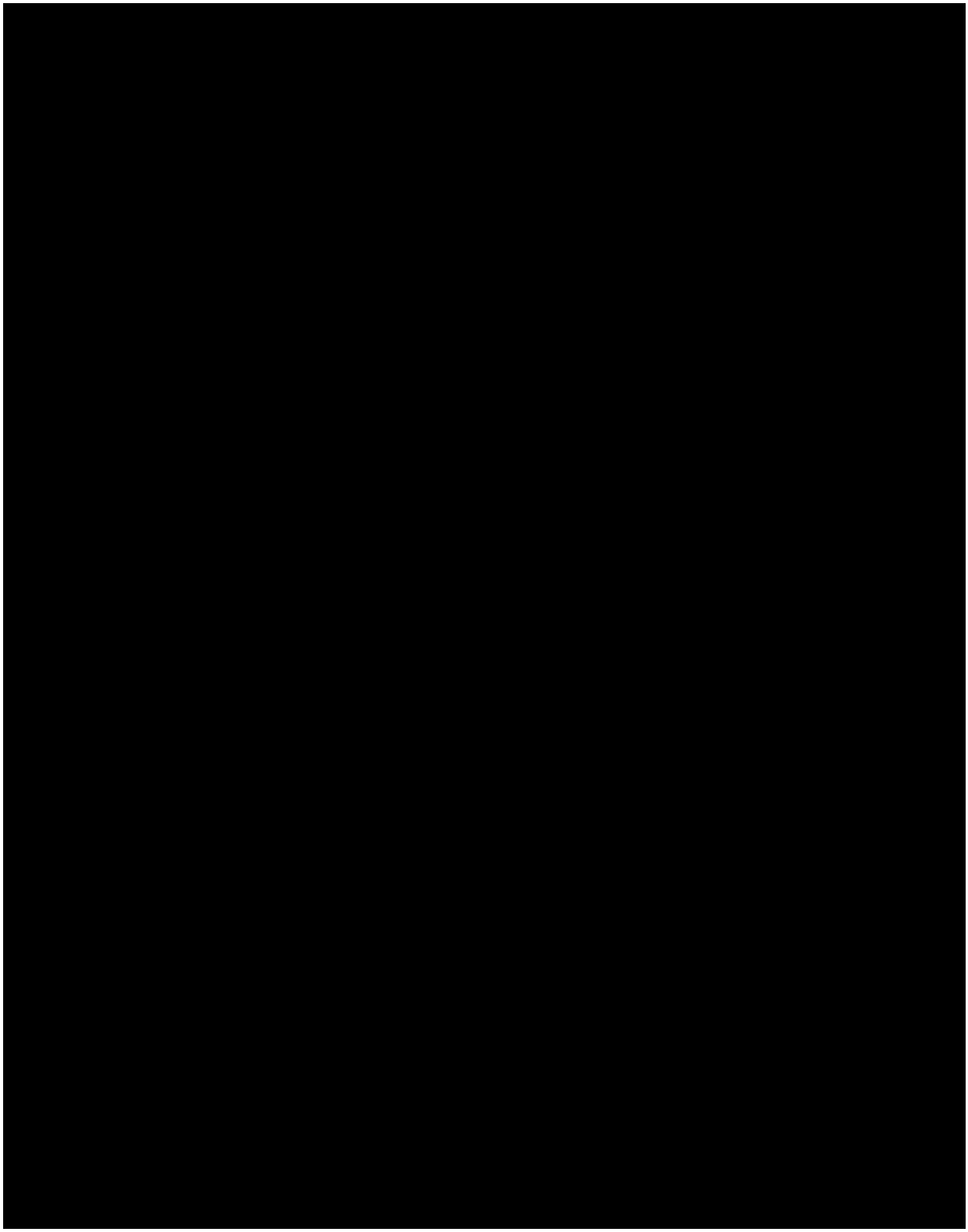
C.2.1 Speed change in slot assignment



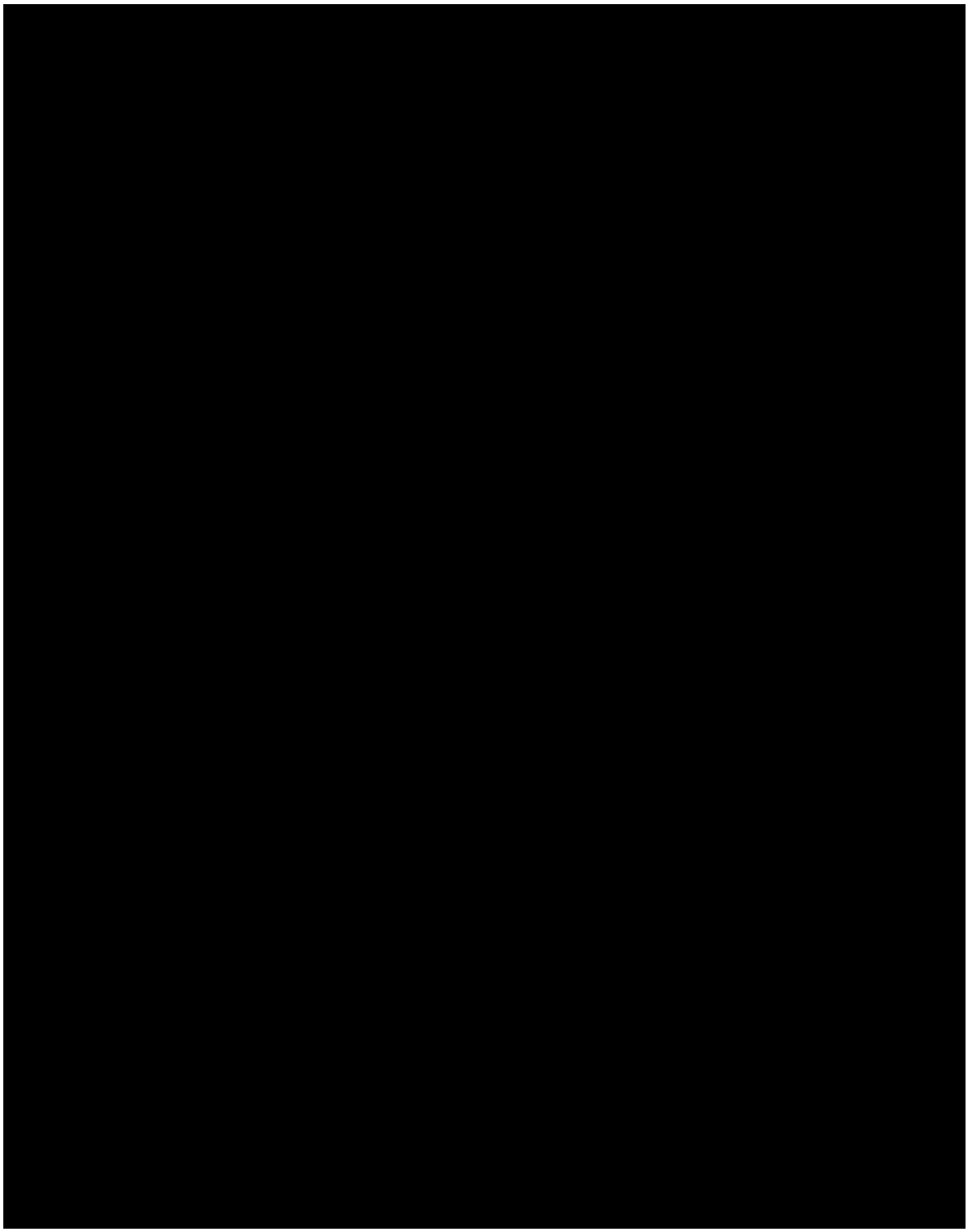


C.2.2 Speed change in rate assignment

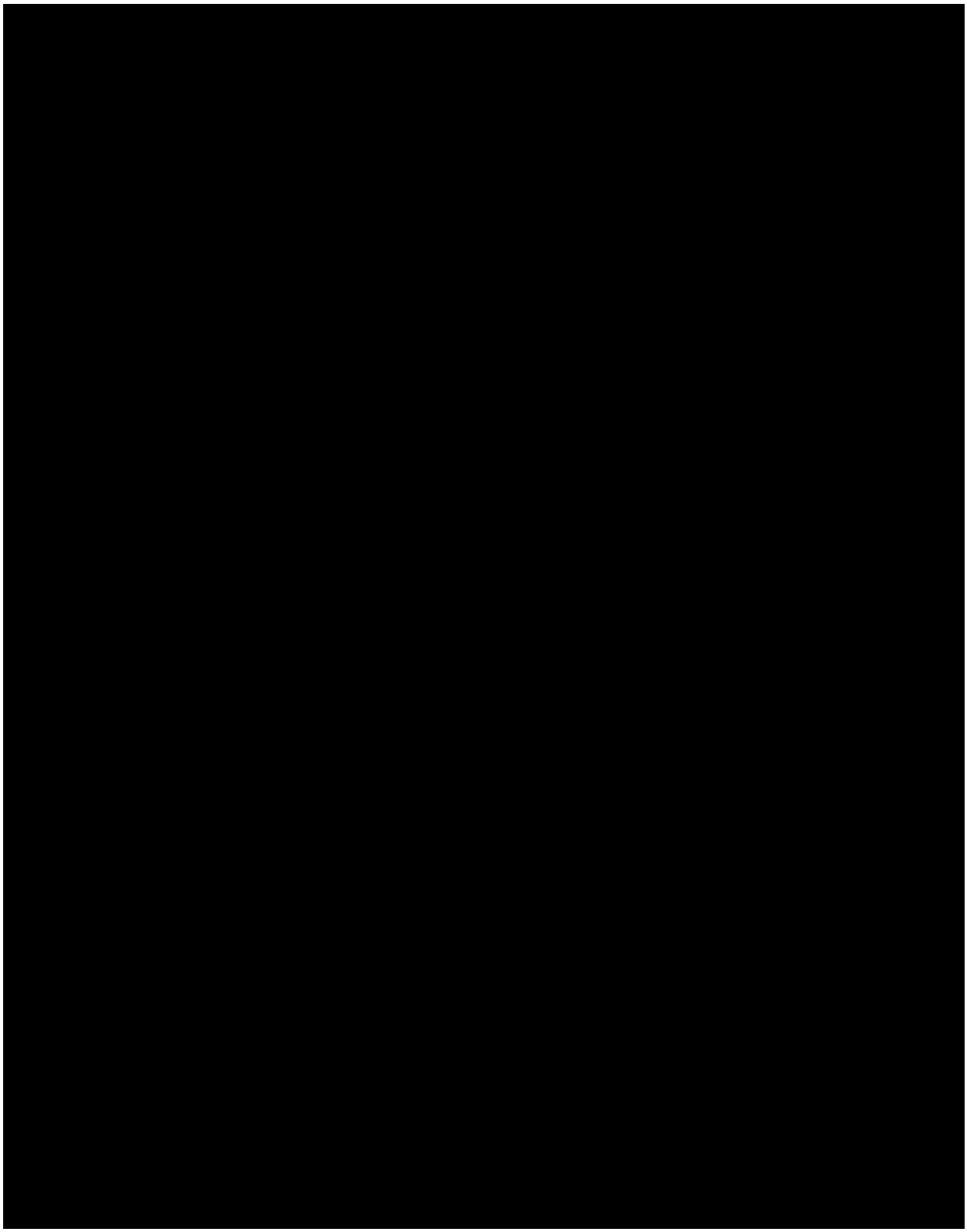




C.2.3 Heading change in slot assignment

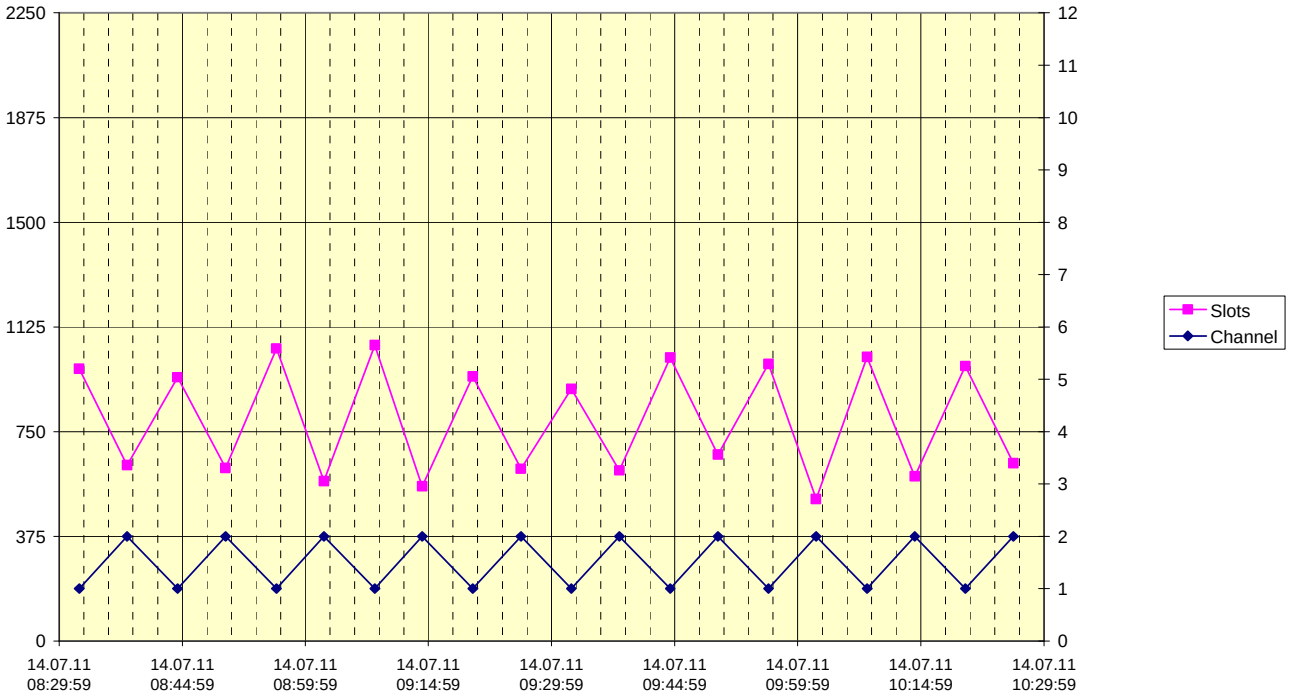


C.2.4 Heading change in rate assignment

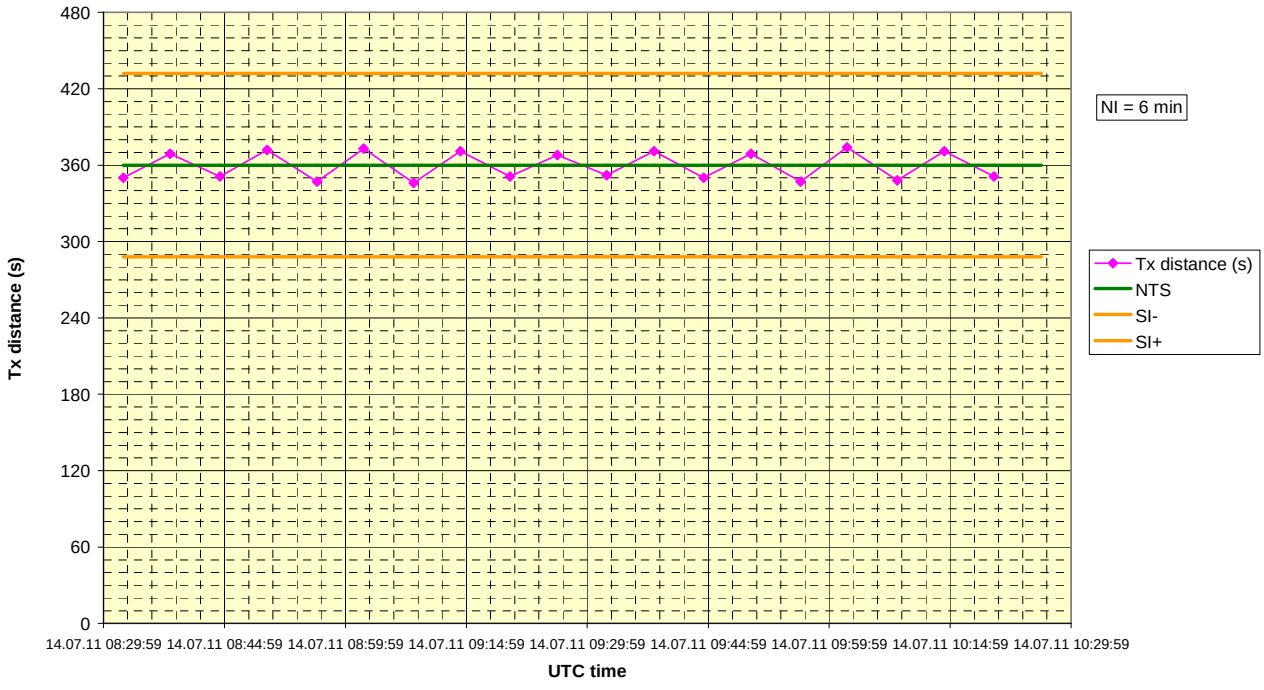


C.3 14.4.4 Static data reporting interval

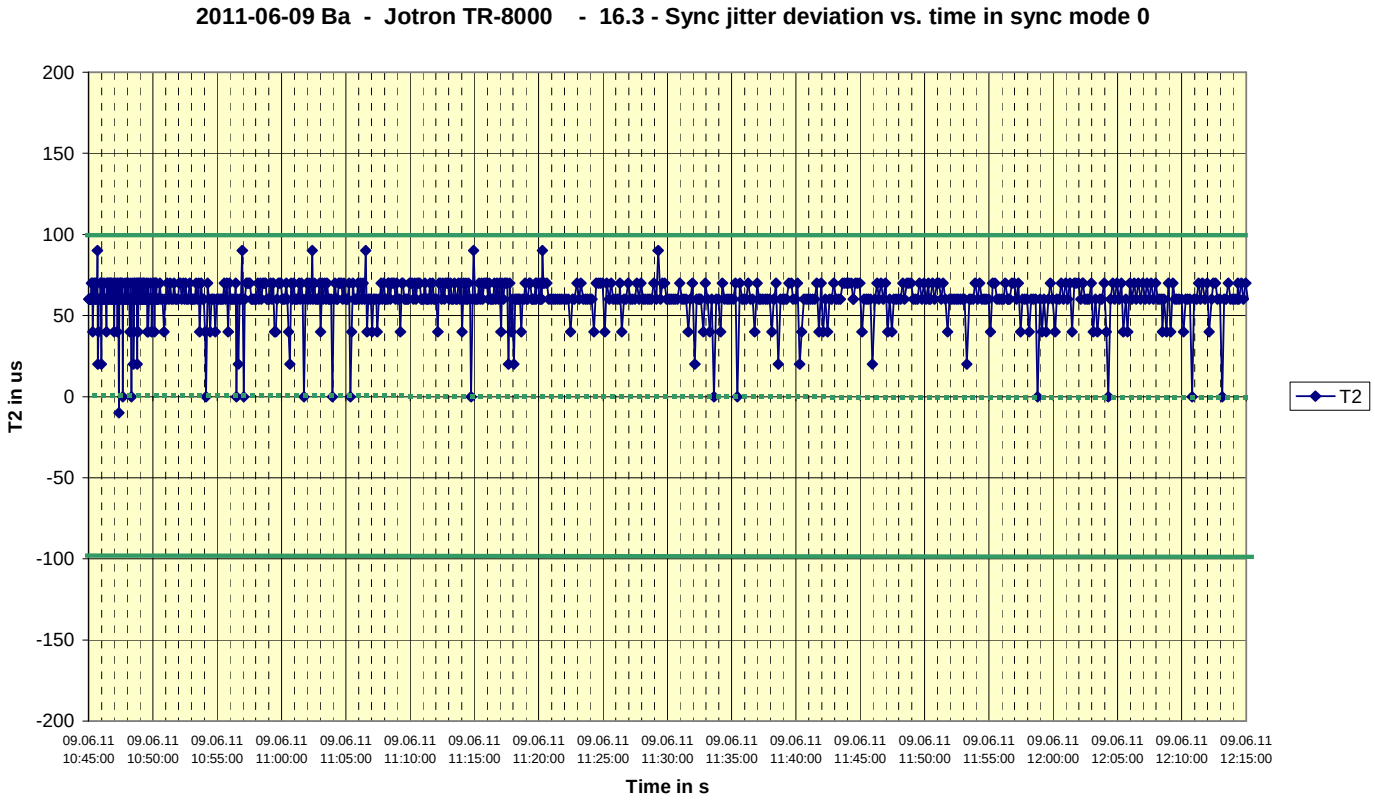
2011-07-14 Ba - Jotron TR-8000 - Test 14.4.4 Static data reporting interval

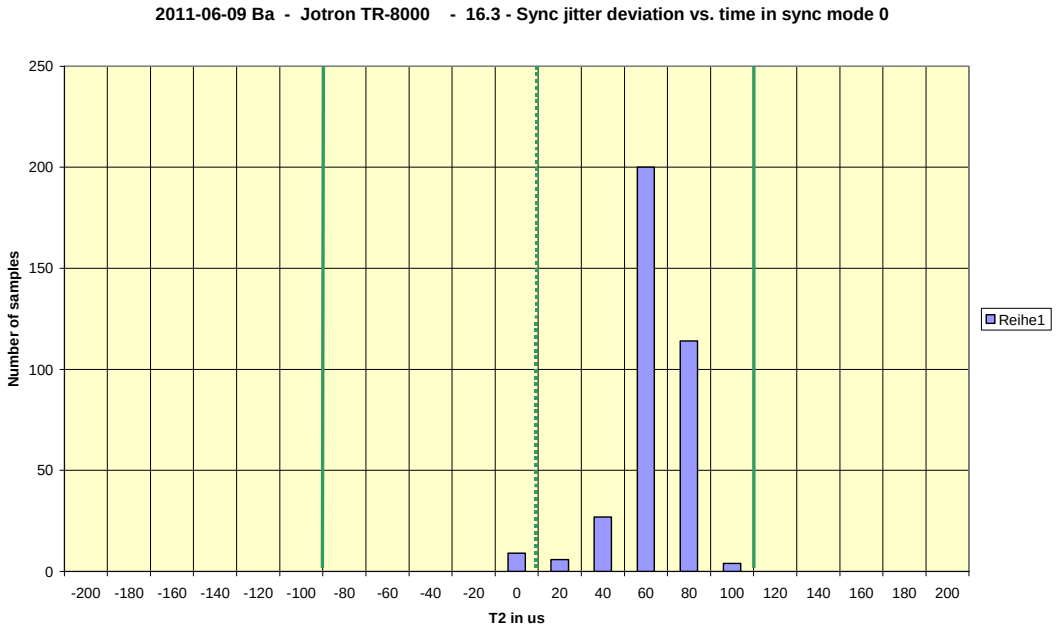


2011-07-14 Ba - Jotron TR-8000 - Test 14.4.4 Static data reporting interval

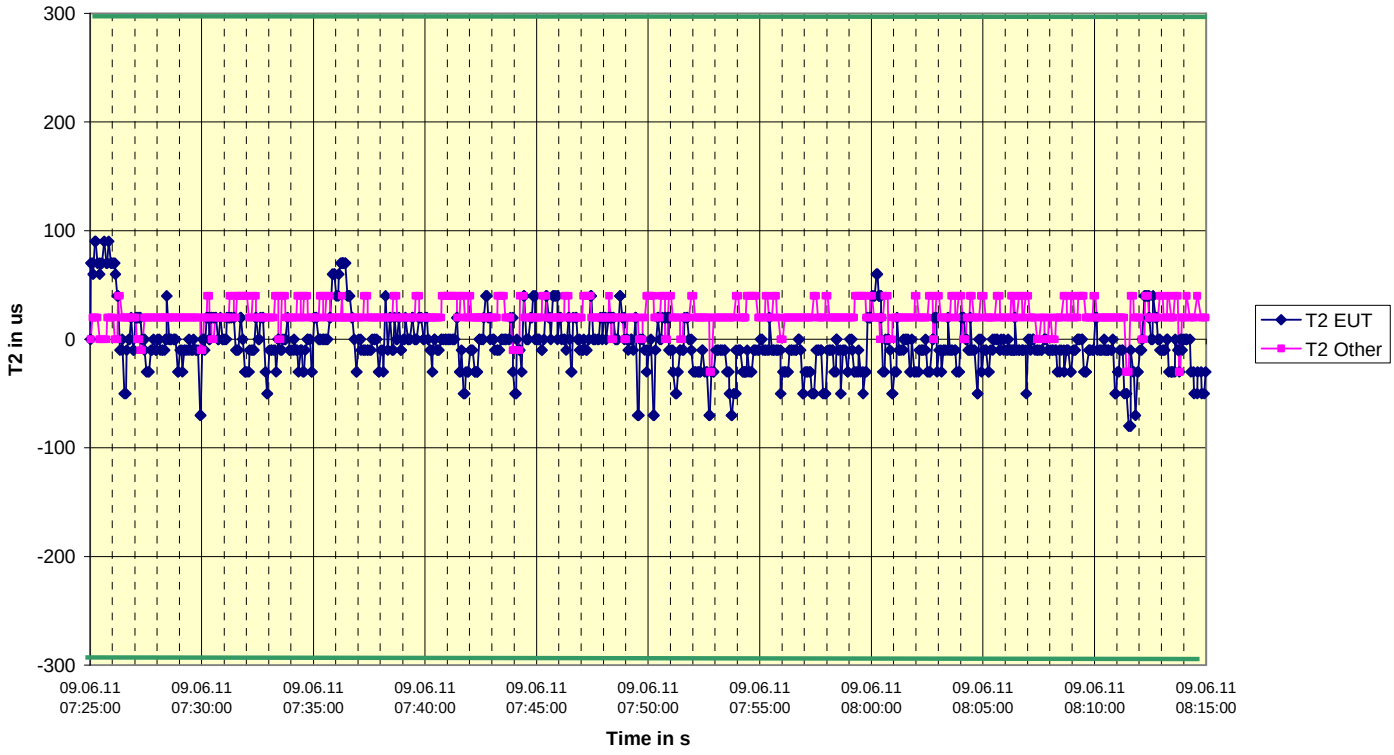


C.4 16.3 Synchronisation jitter

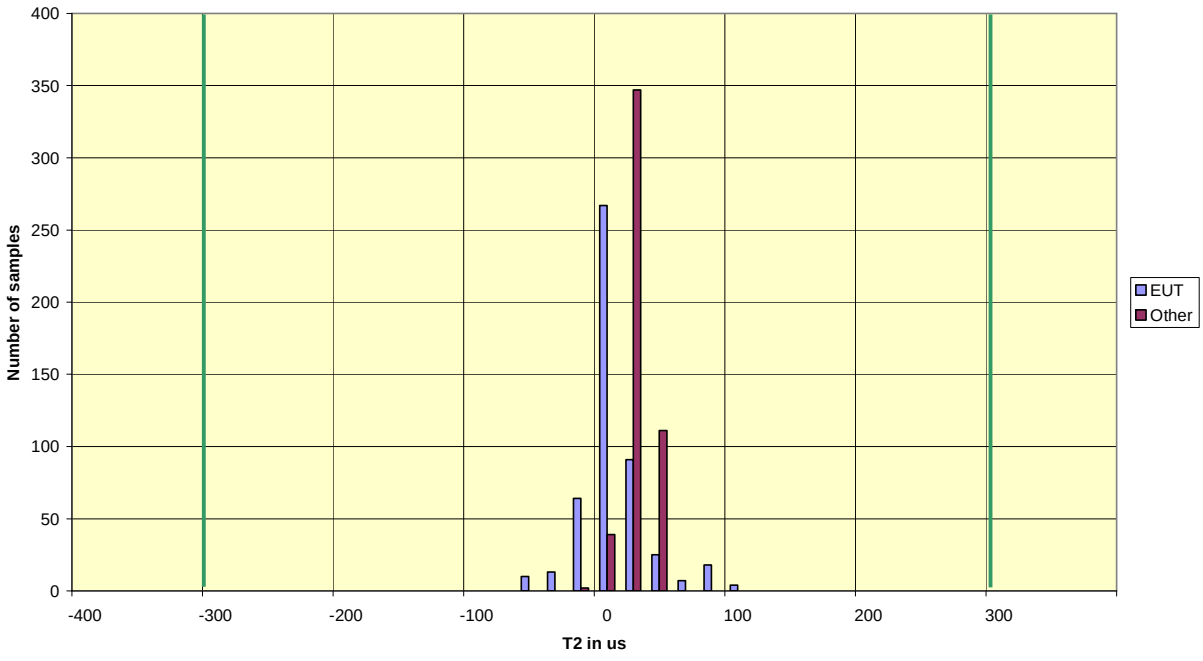




2011-06-09 Ba - Jotron TR-8000 - 16.3 - Sync jitter deviation vs. time in sync mode 1



2011-06-09 Ba - Jotron TR-8000 - 16.3 - Sync jitter deviation vs. time in sync mode 1



C.5 16.6.1 Network entry phase