Required results

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

28.05.02	**Test details – Slot assignment to FATDMA reserved slots**		
Test item	**Check**	**Remark**	**Result**
Send a message 20 from VDL Generator with slot offset and increment for slot reservation: Tx slot: 0, offset=73, no of slots: 5, increment: 70 Send a message 16 from VDL Generator assigning one or more of these reserved slots Tx slot: 0, offset=75, incr. = 5 (75slots)			
	Check that slots assigned by the msg 16 are used by the EUT		ok

Date	**Result**	**Status**
28.05.2002	Test ok	ok

4.6.5 16.6.5 Fixed allocated transmissions (FATDMA)

(M.1371 A1/3.3.6)

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. Record transmitted messages.

Required results

Confirm that EUT does not use slots allocated by msg 20 for own transmissions until timeout of 4 to 8 min.

28.05.02	Test details – Slot assignment to FATDMA reserved slots		
Test item	**Check**	**Remark**	**Result**
Send a message 20 from VDL Generator with slot offset and increment for slot reservation according to the description below			
Record VDL messages	Check that the reserved slots are not used by the EUT within a time-out of 4-8 minutes	All slots are used for new allocation 21.08.02 Retest: Slots are reserved now, but always on channel 2, independent of the channel on which msg 20 was transmitted 27.09.02 Retest: After transmission on channel A slots are reserved on channel A and on channel B. A transmission on channel A should affect only the slot selection on channel A, not on channel B! 24.10.02 Retest: see note 28.10.02 Retest: ok, time-out on channel A is forced to 0 to allocate free slots.	ok

Note:
At start of slot reservation the messages using slots reserved by the base station are immediately changed to free slots following frame, **without any allocation**. This is not ok. It is necessary to add an additional frame for announcement of the new slots.

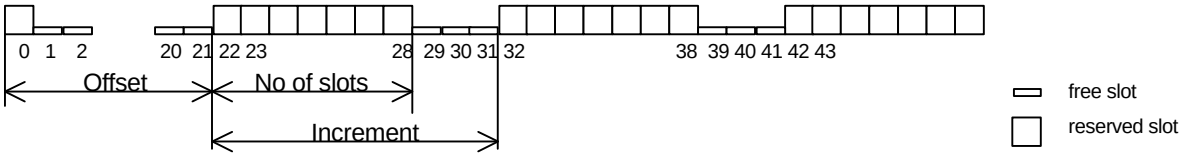
During the frame after start of reservation the position reports allocated to reserved slots should be forced to time-out 0 and allocate new, not reserved slots in the SI for the next frame. Then in the next frame only slots not reserved by the base station are in use.

On the other channel (B) at regular time-out slots which are reserved on channel A are not used. This is ok because slots which are reserved on the other channel by a base station get the lowest priority for selection of candidate slots(case 8 in Technical clarification of 1371, 4.4.1), and there is a sufficient number of free slots.

Test scenario: Msg 20 transmission by test system.
Msg 20 reserves slots which should not be used by mobile stations.
Msg 20 parameters:

- Msg 20 is transmitted in slot 0 in each frame
- Offset number 1: 22
- Time out 1: 1
- Number of slots: 7
- Increment: 10

FATDMA reservation



4.7 16.7 Message Formats

(M.1371 A1/3.3.7)

4.7.1 16.7.1 Received messages

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Apply messages according to Table 7 to the VDL. Record messages output by the PI of EUT.

Required results

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

A table for each of the 22 messaged has to be checked. At the end a table with an overview of all messages has to be filled.
The field contents of PI output are checked using the AIS monitor program

11.02.02	**Test details – Content of msg 1,2,3 Position report**		
Test item	**Check**	**Remark**	**Result**
Transmit a message 1,2 or 3 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Message id	Check the field content		Ok
Repeat indicator	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
Navigational status	Check the field content		Ok
Rate of Turn	Check the field content		Ok
SOG	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
COG	Check the field content		Ok
True heading	Check the field content		Ok
Time stamp	Check the field content		Ok
RAIM flag	Check the field content		Ok
Communication state	Check the field content		ok

	The communication state is checked in 4.6.2 16.6.2 Autonomous scheduled transmissions (SOTDMA)		

11.02.02	Test details – Content of msg 4 Base station report		
Test item	**Check**	**Remark**	**Result**
Transmit a msg 4 from VDL generator. Check the field content of the fields listed under Test item.			
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
Communication state	Check the field content		ok
	The communication state is checked in 4.6.2 16.6.2 Autonomous scheduled transmissions (SOTDMA)		

07.02.02	Test details – Content of msg 5 Static data		
Test item	**Check**	**Remark**	**Result**
Transmit a message 5 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Message ID	Check the field content		ok
MMSI	Check the field content		Ok
AIS version indicator	Check the field content		Ok
IMO number	Check the field content		Ok
Call sign	Check the field content		Ok
Name of ship	Check the field content		Ok
Type of ship and cargo type	Check the field content		Ok
Reference point A,B,C,D	Check the field content		Ok
Type of EPFS	Check the field content		Ok
ETA	Check the field content		Ok
Maximum present static draught	Check the field content		Ok
Destination	Check the field content		Ok
DTE flag	Check the field content		Ok

20/03/02	Test details – Content of msg 6 Addressed binary message		
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.			
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

20/03/02	**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.			
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
Destination ID 2 (MMSI)	Check the field content		Ok
Sequence number 2	Check the field content		Ok
Destination ID 3 (MMSI)	Check the field content		Ok
Sequence number 3	Check the field content		Ok
Destination ID 4 (MMSI)	Check the field content		Ok
Sequence number 4	Check the field content		Ok
		10.05.2002: Call is not received if own MMSI is ID 4. For ID 1-3 ok 21.08.02 Retest: ok, msg is received	ok

20/03/02	**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.			
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

20/03/02	**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.			
Message id	Check the field content		ok
Repeat indicator	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
Altitude			Ok
SOG	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
COG	Check the field content		Ok
Time stamp	Check the field content		Ok
DTE flag	Check the field content		Ok
RAIM flag	Check the field content		Ok
Communication state			
Sync state	Check the field content		Ok
Slot time-out	Check the field content		Ok
Submessage: received stations	Check the field content		Ok
Submessage: Slot number	Check the field content		Ok
Submessage: UTC	Check the field content		Ok
Submessage: Slot offset	Check the field content		Ok

20/03/02	**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.			
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Destination ID 1 (MMSI)	Check the field content		Ok
		Msg10 also on PI if not addressed to own station 21.08.02 Retest: No PI output if not addressed	ok
Msg11 response	Check for response with msg 11 if EUT is addressed		ok
Msg11 response	No reponse if addressed to other station		ok

20/03/02	**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.			
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

20/03/02	**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.			
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
Safety related text	Check the field content		Ok
Transmit a message 12 from other AIS transponder or VDL generator addressed to other AIS. Message shall not be on PI.			
Msg12 to other AIS	Check PI , no VDM		Ok

20/03/02	**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.			
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
Destination ID 2 (MMSI)	Check the field content		Ok
Sequence number 2	Check the field content		Ok
Destination ID 3 (MMSI)	Check the field content		Ok
Sequence number 3	Check the field content		Ok
Destination ID 4 (MMSI)	Check the field content		Ok
Sequence number 4	Check the field content		ok

		Msg13 is output on PI if not addressed to own station; should only be output if own station addressed 21.08.02 Retest: no output if not addressed	ok

20/03/02	**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.			
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Safety related text	Check the field content		Ok

20/03/02	**Test details – Content of msg 15 Interrogation**		
Test item	**Check**	**Remark**	**Result**
Transmit a message 13 from other AIS transponder or VDL generator . Response on this msg is tested under .			
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		Ok
Message ID 1.2	Check the field content		Ok
Slot offset 1.2	Check the field content		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		Ok
		Msg13 is output on PI if not addressed to own station; should only be output if own station addressed 21.08.02 Retest: no output if not addressed	ok

20/03/02	**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.			
Message ID	Check the field content		Ok

Source ID (MMSI)	Check the field content		Ok
Destination ID A (MMSI)	Check the field content		Ok
Offset A	Check the field content		Ok
Increment A	Check the field content		Ok
Destination ID B (MMSI)	Check the field content		Ok
Offset B	Check the field content		Ok
Increment B	Check the field content		Ok
		Msg13 is output on PI if not addressed to own station; should only be output if own station addressed 21.08.02 Retest: no output if not addressed	ok

20/03/02	**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.			
Message id	Check the field content	17.4.02	Ok
Skource ID (MMSI)	Check the field content	17.4.02	Ok
Longitude	Check the field content	17.4.02	Ok
Latitude	Check the field content	17.4.02	Ok
Binary correction data	Check the field content	17.4.02	Ok

20/03/02	**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.			
Message id	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
SOG	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
COG	Check the field content		Ok
True Heading	Check the field content		Ok
Time stamp	Check the field content		Ok
RAIM flag	Check the field content		Ok
CommState selector	Check the field content		Ok
Communication state - Selector = 0 (SOTDMA)			
Sync state	Check the field content		Ok
Slot time-out	Check the field content		Ok
Submessage: received stations	Check the field content		Ok

Submessage: Slot number	Check the field content		Ok
Submessage: UTC	Check the field content		Ok
Submessage: Slot offset	Check the field content		Ok
Communication state - Selector = 1 (ITDMA)			
Sync state	Check the field content		Ok
Slot increment	Check the field content		Ok
Number of slots	Check the field content		Ok
Keep flag	Check the field content		Ok

20/03/02	**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.			
Message id	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
SOG	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
COG	Check the field content		Ok
True Heading	Check the field content		Ok
Time stamp	Check the field content		Ok
Name of ship	Check the field content		Ok
Type of ship and carge	Check the field content		Ok
Dimension of ship/Refpoint A,B,C,D	Check the field content		Ok
Type of EPFD	Check the field content		Ok
RAIM flag	Check the field content		Ok
DTE flag	Check the field content		Ok

20/03/02	**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.			
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Offset number 1	Check the field content		Ok
Number of slots 1	Check the field content		Ok
Time-out 1	Check the field content		Ok
Increment 1	Check the field content		Ok

Offset number 2	Check the field content		Ok
Number of slots 2	Check the field content		Ok
Time-out 2	Check the field content		Ok
Increment 2	Check the field content		Ok
Offset number 3	Check the field content		Ok
Number of slots 3	Check the field content		Ok
Time-out 3	Check the field content		Ok
Increment 3	Check the field content		Ok
Offset number 4	Check the field content		Ok
Number of slots 4	Check the field content		Ok
Time-out 4	Check the field content		Ok
Increment 4	Check the field content		Ok

20/03/02	**Test details – Content of msg 21 ATON report**		
Test item	**Check**	**Remark**	**Result**
Transmit a msg 18 from VDL generator. Check the field content of the fields listed under Test item.			
Message id	Check the field content		ok
User ID (MMSI)	Check the field content		Ok
Type of aids to navigation	Check the field content		Ok
Name of aids to navigation	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
Dimension of ship/Refpoint A,B,C,D	Check the field content		Ok
Type of EPFD	Check the field content		Ok
Time stamp	Check the field content		Ok
Off position indicator	Check the field content		Ok
RAIM flag	Check the field content		Ok
Virtual/Pseudo AtoN flag	Check the field content		Ok
Assigned mode flag	Check the field content		Ok
Name of AtoN extension	Check the field content		ok

20/03/02	**Test details – Content of msg 22 Channel management**		
Test item	**Check**	**Remark**	**Result**
Transmit a msg 22 from VDL generator. Check the field content of the fields listed under Test item.			
Message id	Check the field content		Ok
User ID (MMSI)	Check the field content		Ok
Channel A	Check the field content		Ok

Channel B	Check the field content		Ok
Tx/Rx mode	Check the field content		Ok
Power flag	Check the field content		Ok
Area addressed			
Longitude of NE corner	Check the field content		Ok
Latitude of NE corner	Check the field content		Ok
Longitude of SW corner	Check the field content		Ok
Latitude of SW corner	Check the field content		Ok
Addressed or broadcast flag	Check that flag = 0		Ok
Selective addressed			
Station ID 1 (MMSI)	Check the field content		
Station ID 2 (MMSI)	Check the field content		
Addressed or broadcast flag	Check that flag = 1		
Channel A bandwidth	Check the field content		Ok
Channel B bandwidth	Check the field content		Ok
Transitional zone	Check the field content		Ok

Message content result overview

The PI output results are an overview of the above tables of the various received messages. Response results can be derived from other tests as mentioned in the "response result" column

Message type	PI out Yes/no	PI output Result	Response required (in addition to PI output)	Response result
Msg1,2,3	yes	ok	No	
Msg 4	yes	ok	No	
Msg 5	yes	ok	No	
Msg 6	yes	ok	Tx of ackn. msg 7	(6.1.2)
Msg 7	yes	ok	ABK output, no further repetitions	(2.1.4.1)
Msg 8	yes	ok	No	
Msg 9	yes		No	
Msg 10	yes	ok	Tx of msg 11 UTC/date response	
Msg 11	yes		No	
Msg 12	yes	ok	Tx of ackn. msg 13, Display on MKD	(6.2)
Msg 13	yes	ok	ABK output, no further repetitions	(2.1.4.1)
Msg 14	yes	ok	Display on MKD	(2.10.1)
Msg 15	yes	ok	Tx of requested message 3, 5	(6.3)
Msg 16	yes	ok	Change of TDMA mode, position report using msg 2	(4.6.4)
Msg 17	yes	ok	Internal GNSS receiver shall switch to differential mode	
Msg 18	yes	ok	No	
Msg 19	yes	ok	No	

Msg 20	yes	ok	Has to avoid using reserved slots	4.6.5
Msg 21	yes		no	
Msg 22	yes	ok	Addition of new area to the regional area table	5.2

Date	Result	Status
15.05.2002 21.08.02	Msg 7 is not output on PI if own MMSI is ID 4. For ID 1 – 3 ok Retest: ok, msg 7 is output if ID 4	 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.

11.02.02	**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			

11.02.02	**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.			

07.02.02	**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.			
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

07.02.02	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.			
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
Destination ID 2 (MMSI)	Omitted		
Sequence number 2	Omitted		
Destination ID 3 (MMSI)	Omitted		
Sequence number 3	Omitted		
Destination ID 4 (MMSI)	Omitted		
Sequence number 4	Omitted		

07.02.02	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.			
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

15.4.02	Test details – Content of msg 10 UTC and date inquiry		
Test item	**Check**	**Remark**	**Result**
activate transmission of msg 10 if implemented (not required)			
msg 10	Check the field content	not implemented	ok

11.02.02	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.			
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

07.02.02	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.			
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
Safety related text	Check text = “TEST”		Ok

07.02.02	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.			

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
Destination ID 2 (MMSI)	Omitted		
Sequence number 2	Omitted		
Destination ID 3 (MMSI)	Omitted		
Sequence number 3	Omitted		
Destination ID 4 (MMSI)	Omitted		
Sequence number 4	Omitted		

07.02.02	**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.			
Message ID	Check the field content		Ok
Source ID (MMSI)	Check the field content		Ok
Safety related text	Check text = “TEST”		Ok

07.02.02	**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.			
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

Date	**Result**	**Status**

16.05.2002	Content of all transmitted messages ok	ok

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.

	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		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		ok
Comm state	Check that the slots of each channel are allocated on the same channel		ok

Date	**Result**	**Status**
30.05.02	Test ok	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*

22.08.02	**Test details – 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. 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

MKD display defined area	Check that the defined area is correctly displayed on MKD	Only one message can by entered by VDL message. The following message overwrites the previous message. Test can only be done by entering one area by VDL msg and one by ACA sentence on PI 22.08.02 Retest: does still not store 2 area settings by msg 22 27.09.02 Retest: ok, 2 regions are stored	ok
ACA output	Check that ACA output indicate the settings of R1 and R2	The actually entered new area is output as ACA sentence on PI port No ACA output on request by ECAIQ,ACA sentence 27.09.02 Retest: no ACA output. 30.09.02 Retest: ACA output on request by ECAIQ,ACA sentence	Ok ok
Item 1:	Check that channels AIS1 and AIS2 are in use		ok
Item 2: Move position into transitional area of region 2	Check that EUT keeps old channels for 1 min. timing out the transmissions of AIS2		ok
	Check that channel AIS 1 and A2 are used		ok
	Check that reporting rate is doubled		ok
Item 3: Move position into region 2	Check that EUT keeps transtional channels for 1 min. timing out the transmissions of AIS 1		ok
	Check that channel A2 and B2 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 4: Move position into transitional area between region 1 and 2	Check that channels A2 and A1 are used		Ok
	Check that reporting rate is doubled		Ok
Item 5: Move position into region 1	Check that channels A1 and B1 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Move position into transitional area of region 1	Check that channels A1 and AIS1 are used		Ok

	Check that reporting rate is doubled		Ok
Move position out of the transitional zone of region 1	Check that channels AIS1 and AIS2 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok

Date	Result	Status
22.08.02 27.09.02	Entering of 2 different regions by msg 22 does not work. The second area setting overwrites the first setting instead of adding a second area setting 2 different regions by msg 22 are stored now	 ok
22.08.02	After entering the second area setting manually the operation moving from east to west through the 2 adjacent areas is ok	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.

22.08.02	**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			
MKD display defined area	Check that the defined area is correctly displayed on MKD or output on PI in ACA sentence on request	Display on MKD	ok
Item 1:	Check that channels AIS1 and AIS2 are in use		Ok
Item 2: Move position into transitional area of region 2	Check that EUT keeps old channels for 1 min. timing out the transmissions of AIS2		Ok
	Check that channel AIS 1 and A2 are used		Ok
	Check that reporting rate is doubled		Ok

Item 3: Move position into region 2	Check that EUT keeps transitional channels for 1 min. timing out the transmissions of AIS 1		ok
	Check that channel A2 and B2 are used		ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Item 4: Move position into transitional area between region 1 and 2	Check that channels A2 and A1 are used		Ok
	Check that reporting rate is doubled		Ok
Item 5: Move position into region 1	Check that channels A1 and B1 are used		Ok
	Check that reporting rate is changed back to normal reporting rate		Ok
Move position into transitional area of region 1	Check that channels A1 and AIS1 are used		Ok
	Check that reporting rate is doubled		Ok
Move position out of the transitional zone of region 1	Check that channels AIS1 and AIS2 are used	Remark: at 2 min out of area 1 an ACA sentence was output indicating default channels, but A1/AIS1 and double reporting rate was kept. At 5 min out of area 1 it was changed to default as required.	ok
	Check that reporting rate is changed back to normal reporting rate		ok

Date	Result	Status
22.08.02	At the outer border of the 2 areas the transitional zone outside the area seems to be about 5 nm. The transitional zone between area 1 and 2 and the transitional zone at the outer border, but inside the area are 1 nm In case of 2 adjacent areas with different transitional zones the transitional zones the zones extend from the border into the 2 areas according to the different transitional zones (ok) It seems that the high sea is handled like an area with transitional zone of 5 nm. So in case of an area with a transitional zone of 1 nm it extends 1 nm into the area and 5 nm (trans. Zone of high see) out of	Acc

	the area.	

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.

22.08.02	**Test details – Power setting by msg 22**		
Test item	**Check**	**Remark**	**Result**
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

	Test details – Power setting by ACA		
Test item	**Check**	**Remark**	**Result**
Apply the following message at PI: File name = AIACA_region_in.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
Transmitt the same ACA sentence, but power setting to 0 = high power			
Power high	Check that EUT reverts to high power		Ok

22.08.02	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		Ok
Set power level back to high power.			
Power high	Check that EUT reverts to high power		Ok

Date	Result	Status
22.08.02	Test ok	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).

24.10.02	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	Msg 12 is transmitted first	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.

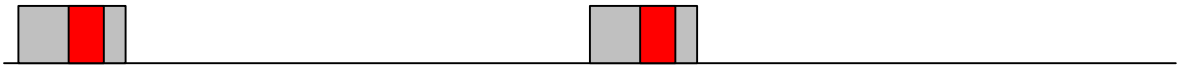
Required results

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 2 blocks of 60 targets in consecutive slot are transmitted. One block is transmitted at the beginning of the frame and one at the middle.
The EUT is set to 2 s reporting rate. So the 1st and the 15th selection interval is covered by these transmissions of the same targets.



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

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

- The even numbered targets have a low distance,
- the odd numbered targets have a high distance to the EUT

In addition 4 slots within the selection intervals are reserve by a message 20.

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 selection interval 1 and 15 at time-out have to be checked.

26.08.02	**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	Even and odd numbered slots are used: Ch. 1: 44, 46, 42, 46, 51, 46, 51, 46 Ch. 2: 38, 46, 51, 44, 46, 51, 42, 24.10.02 Retest: only odd ID numbers are used. In some cases even numbers are used. In this case the target has not been received in the previous slot, and regarding the time-out the slot is free for use.	ok
	Check that a the slot of a target is not used twice in a frame	Slots are used sometimes twice in a frame 24.10.02 Retest: It is ok that the slot of the same target is used twice in a frame if the time-out of the first use of the slot has already been decreased to 0. In this case the slot is free and not subject of slot reuse, and the target can be again subject of slot reuse for a new selection.	ok
Reserved Slot	Check that slots reserved by msg 20 are not used	Not checked	----

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 initialization, 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.

23.08.02	**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 ACA • 1 area including own position	Check that area 1...7 are displayed on MKD		ok
• 7 areas not overlapping, not including own position File name: AIACA_8_regions_17_7_1.sst	Check that all 8 areas are output on PI after request by sentence xxAIQ,ACA	No output of ACA	Acc
a) Send a 9. msg 22 to the EUT	Check that the first area is deleted		Ok
	Check that the EUT returns to the default operating 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

Check of erasure: 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

Date	Result	Status
23.08.02	Test ok	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.

	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 Change the settings of the area of a)	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.	Lat and lon < 20 nm and > 200 nm are refused Invalid channel is refused	ok
	Check, that the EUT accepts a complete and valid 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
	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		Ok
e) Area setting by VDL Send DSC message 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 DSC message		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

Date	Result	Status
23.08.02	Test ok	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.

23.08.02	Test details – Test of addressed telecommand		
Test item	**Check**	**Remark**	**Result**
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
Send an addressed DSC msg to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it		Ok
Send an addressed msg 22 to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it		Ok
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
Move the EUT out of the regional operating area defined by the previous addressed telecommand	Check, that the EUT reverts to default		ok

Date	Result	Status
22.08.02	Test ok	ok

5.7.4 17.7.4 Test for invalid regional operating areas (three regional operating 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.

23.08.02	**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		Ok
b) Move own position to the first 2 areas	Check, that the EUT uses the operational settings of these areas		Ok

Date	**Result**	**Status**
23.08.02	Test ok	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**
23.08.02	No Self-Certification required.	ok

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.

23.08.02	**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	Rate assignment command is executed 27.09.02 Retest: ok, assignment is ignored	ok
Slot assignment command in a transitional zone	Check that an slot assignment command is ignored in a transitional zone	Slot assignment command is executed as a rate assignment with an reporting rate according to the requested slot increment 27.09.02 Retest: ok, assignment is ignored	ok

Date	Result	Status
23.08.02 27.09.02	Rate and slot assignment are executed as a rate assignment Retest: ok, assignment 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.

28.05.02	**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	Rx on A -> Tx on A Rx on B -> Tx on B Channel seems to be alternating between A and B	Acc
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

28.05.02	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	Rx on A -> Tx on A Rx on B -> Tx on B Channel seems to be alternating between A and B	Acc
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

28.05.02	Test details - 4 addressed binary messages 6		
Test item	**Check**	**Remark**	**Result**
Transmit an set of 4 addressed binary messages 6 by sending 4 ABM sentences to the PI. Transmission channel is 1. PI sentence: File AIABM_4_bin.sst: A response is automatically transmitted by the addressed transponder ID 1008			
VDO output of EUT	Check that the 4 messages are transmitted directly without waiting for ackn.		ok
Channel	Check Tx on channel A and B as indicated in the ABM sentence		ok
Message sequence number	Check that sequence number in VDL msg = Sequential message identifier of ABM sentences		ok
RX of request	Check that message is received by addressed transponder (VDM)		ok
Received by VDL Analyser	Check msg on VDL analyser		ok
TX of ackn. msg 7 (VDO)	Check that ackn msg 7 is transmitted by addressed transponder (VDO)		ok
RX of msg 7 (VDM)	Check that the ackn. msg 7 is received by EUT (VDM)		ok
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,000001008,A,7,3,0 $AIABK,000001008,B,7,0,0 $AIABK,000001008,A,7,1,0 $AIABK,000001008,B,7,2,0 Message type should be 6, the type of the ABM sentence 21.08.02 Retest: msg type in ABK is now 6	ok

Date	Result	Status
28.05.02 21.08.02	The message type in the ABK acknowledgement of message 6 should be 6, not 7 (message type of the ackn message) Retest: msg type in ABK is now 6	 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.

28.05.02	**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		ok
Transmission of acknowledgement msg 7	Check transmission of ackn. by VDO output of EUT	2 msg 6 on the same channel are acknowledged in 1 msg 7 (very good)	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

Date	Result	Status
28.05.02	Test ok	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**"**

28.05.02	**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		ok
Number of repetitions	Note and check the number or repetitions	4 transmissions (3 rep)	ok
Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	Time between transmissions is: 5,5,5 and 5,5,5	ok
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)	$AIABK,000001005,,6,2,1	ok
Message sequence numbers	Check message sequence numbers of transmissions and ABK		ok

28.05.02	**Test details - Addressed binary 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		ok
Number of repetitions	Note the number or repetitions	4 transmissions (3 rep)	ok
Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	Time between transmissions is: 5,5,5 and 5,5,5	ok
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)	$AIABK,000001005,,12,2,1	ok
Message sequence numbers	Check message sequence numbers of transmissions and ABK		ok

Date	Result	Status
28.5.02	Test ok	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

28.05.02	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		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

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

Date	Result	Status
28.05.02	Test ok	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.

28.05.02	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 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)		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	Slot offset = 100	Ok
Response channel	Check that the response is transmitted on the request channel		Ok

28.05.02	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 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	Slot offset = 100	Ok
Response channel	Check that the response is transmitted on the request channel		Ok

28.05.02	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 RUT			
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

28.05.02	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)		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

28.05.02	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 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 (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

Date	Result	Status
28.05.02	Test ok	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

28.05.02	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_bin_5.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		ok
Channel	Check Tx alternating channels A and B		ok
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,,,8,7,3 $AIABK,,,8,8,3 $AIABK,,,8,9,3 $AIABK,,,8,0,3 $AIABK,,,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

28.05.02	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_bin_5.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		ok
Channel	Check Tx alternating channels A and B		
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,,,14,6,3 $AIABK,,,14,7,3 $AIABK,,,14,8,3 $AIABK,,,14,9,3 $AIABK,,,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

Date	Result	Status
28.05.02	Test ok	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.

23.05.02	**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

Date	**Result**	**Status**
23.05.02	Test ok	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 is not a check of the documentation but a check of the interfaces by help of the documentation

26.08.02	**Test details - Check of manufacturers documentation**		
Test item	**Check**	**Remark**	**Result**
Approved sentences	Check approved sentences against IEC 61162	Check is done in the functional tests of the interfaces	----
Proprietary sentences	Check proprietary sentences against IEC 61162	No proprietary sentences	----
Usage of Fields	Check usage of fields	No information about usage of fields 08.10.02 Retest: ok	ok
Transmission intervals	Check transmission intervals	Not applicable	----
Hardware configuration	Check hardware configuration		
Output drive capability	Check output drive capability	Not found 08.10.02 Retest: No output drive capability found but type of output drive circuit is shown.	ok
Input load	Check input load	Not found 08.10.02 Retest: ok	ok
Electrical Isolation	Check electrical isolation	Not found 08.10.02 Retest: Documentation shows that there is no electrical isolation 24.10.02 Retest: Documentation is provided which shows the electrical isolation. The hardware has to be changed according to this documentation	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.

14.02.02	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	Not checked	
Input current	Check the input current against the IEC 61162-1 or IEC 61162-2	Not checked	

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

14.02.02	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			
VDL contents	Check that the VDL contents agree with in input data		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

Date	Result	Status
28.05.02	Test ok	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

10.04.02	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	No display of PA-Flag	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	No display of differential mode	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 = "-----"	The default value 91 ° is displayed. A display like "----" would be better 09.07.02 Retest: ok, "----" is displayed	Ok
	Check longitude = "-----"	The default value 181 ° is displayed. A display like "----" would be better 09.07.02 Retest: ok, "----" is displayed	ok
	Check PA-Flag = 0	No display of PA-Flag	Ok
Set status/mode to A,A Change for latitude the number of digits after decimal point from 2 to 6	Check that latitude on VDL is correct for all numbers		Ok
Set status/mode to A,A Change for longitude the number of digits after decimal point from 2 to 6	Check that longitude on VDL is correct for all numbers		Ok
No GBS sentence applied	Check that RAIM-Flag = 0		Ok

Enter Position input results in 2.3.1 "Information content of msg 1".

7.5.2 GGA sentence

10.04.02	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		Ok
	Check longitude		Ok
	Check PA-Flag = 0		Ok
Set mode = 2 (**differential**) Check on VDL	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set mode = 3 (GPS-PPS) Check on VDL	Short check data ok		Ok
	Check PA-Flag = 0 on VDL	PA-Flag = 1 Mode 3 is not a differential mode with high accuracy 16.4.02 changed	ok
Set mode =4 (RTK fixed) Check on VDL	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set mode =5 (RTK float Check on VDL	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set mode = 6 (dead reck.) Check on VDL	Short check default data	Last data of valid mode 16.4.02 changed invalid	ok
Set mode = 7 (manual) Check on VDL	Short check default data	Last data of valid mode 16.4.02 changed invalid	ok
Set mode = 8 (simulated) Check on VDL	Short check default data		Ok
Set mode = 0 (**no fix**) Check on VDL	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok

note: GGA and VTG need same (valid) status to be accepted (same sensor)

7.5.3 GNS sentence

10.04.02	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		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 = NA (no GPS/ autonomous GLONASS)	Short check data ok	Default value, Position is valid GLONASS position 16.4.02 changed, now accepted	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 = AD (autonomous GPS/ differential GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL	PA-Flag = 0 16.4.02 changed, now PA=1	ok
Set Mode = ND (no GPS/ differential GLONASS)	Short check data ok		Ok
	Check PA-Flag = 1 on VDL		Ok
Set Mode = **NN** (no GPS/ no GLONASS)	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok

7.5.4 RMC sentence

10.04.02	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		Ok
	Check longitude		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 **V,N** (invalid data) Check on VDL	Check latitude = 91º		Ok
	Check longitude = 181º		Ok
	Check PA-Flag = 0		Ok

7.5.5 DTM sentence

10.04.02	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		Ok
Set Datum = WGS 84	Check that data are valid		Ok
Set Datum = not WGS 84	Check that data are changed to default	Last valid data, should be default value; 19.4.02 changed, now -------	ok
Apply **GGA** sentence with DTM File name: ais2d_gga_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	Last valid data, should be default value; 19.4.02 changed, now -------	ok
Set Datum = WGS 84	To get valid data for further tests		Ok

7.5.6 GBS sentence

10.04.02	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			
	Check that RAIM-Flag = 1		Ok

Enter RAIM flag results in 2.3.1 “Information content of msg 1”.

7.5.7 VTG sentence

10.04.02	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 SOG		Ok
Check on VDL	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	During the switch over from A to D the SOG/COG values are set to default for about 10 s 09.07.02 Retest: ok	ok
Set mode to **N (**invalid)	Check SOG = 102.3 (default)		Ok
Check on VDL	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 E (estimated)	Short check SOG/COG default	Last valid data 09.07.02 Retest: ok	Ok
Set mode to M (manual)	Short check SOG/COG default	Last valid data 09.07.02 Retest: ok	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	Default value	Ok

Enter Speed results in 2.3.1 “Information content of msg 1”.

7.5.8 VBW sentence

10.04.02	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		Ok
	COG = calculated from SOG vector and heading	10.4.02 COG is taken from VTG sentence 18.4.02 COG is calculated from VBW and HDT, but only pos. values 19.4.02 changed, ok	ok
Check on VDO output of PI	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value	COG is taken from VTG sentence 19.4.02 see above	ok
Check on MKD	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value	COG is taken from VTG sentence 19.4.02 see above	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	09.07.02 Retest: ok	Ok
	COG from VTG	Is only relevant if COG is calculated from SOG vector and heading 09.07.02 Retest: ok	ok

note: 19.4.02 : priority of sensor sentences is VBW>RMC>VTG
will be changed to RMC>VTG>VBW
(both acceptable)

10.04.02	Test details – VBW log input without valid VTG sentence		
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			
Status of bottom track: **A** (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	10.4.02 Default value 18.4.02 calculated from VBW and HDT, but only pos. values 19.4.02 changed, ok	ok
Check on VDO output of PI	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value	Default value 19.4.02 see above	ok
Check on MKD	Check SOG = VDL SOG value		Ok
	Check COG = VDL COG value	Default value 19.4.02 see above	ok
Status of bottom track: **V** (invalid) Ahead and across speed not empty. Water speed valid ! Check on VDL	SOG = default		Ok
	COG = default	Is default value anyway (see above) 09.07.02 Retest: ok	Ok
Check on VDO output of PI	SOG = default		Ok
	COG = default	Is default value anyway (see above) 09.07.02 Retest: ok	Ok
Check on MKD	SOG = default		Ok
	COG = default	Is default value anyway (see above) 09.07.02 Retest: ok	Ok
Status of bottom track: A (valid) Ahead available, **across speed empty (**e.g. single axis log)	SOG from VBW	Default value. Using the log speed is also ok	Ok
	COG = default		OK
Status of bottom track: A (valid) Ahead and across speed available, **Heading invalid**	SOG from VBW		OK
	COG = default		OK

Remark: During this test the complete transmission and receiving function failed. After switching off and on the EUT the transmission and receiving function worked again.

19.4.02 this was not reproduced during tests 15.4. – 19.4.02

7.5.9 OSD sentence

10.04.02	Test details – OSD own ship data input		
Test item	**Check**	**Remark**	**Result**
Apply simulated OSD sentence to the sensor input File name is ais07_osd.sst			
Heading status = A (valid) Speed reference = B (bottom) Check on VDL	Check SOG from OSD	Not implemented, Not required Is implemented, is only evaluated if external position is available, needs retest.	ok
	Check COG from OSD		
	Check heading from OSD		
Check VDO output on PI	Check SOG from OSD		
	Check COG from OSD		
	Check heading from OSD		
Check Display on MKD	Check SOG from OSD		
	Check COG from OSD		
	Check heading from OSD		
Set speed reference to P (Positioning system)	Check SOG and COG from OSD		
Set speed reference to R Radar tracking	Check SOG and COG from OSD		
Set speed reference to W (Water speed)	Check SOG = default		
	Check COG = default		
	Check heading from OSD		
Set speed reference to M (Manual)	Check SOG = default		
	Check COG = default		
	Check heading from OSD		
Set speed reference to P (Positioning system)	Check SOG and COG = default		
Set speed reference to P (Positioning system) Set **heading status = V** (invalid)	Check SOG from OSD		
	Check COG from OSD		
	Check heading = default		
Change speed reference from N (kn) to K (km/h)	Check SOG value in VDL It has to be converted into knots		

7.5.10 HDT sentence

10.04.02	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		Ok
Change value to 359.9	Check that heading on VDL = 359 or 0, **not 360**	Value is 359	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		Ok

Enter Heading results in 2.3.1 “Information content of msg 1”.

7.5.11 ROT sentence

10.04.02	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		Ok
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)	Value = 177.2	Ok
	360 converted to 361.6 (90)		Ok
	720 converted to 708.7 (126)	On MKD the value 708 is displayed too	Ok
	-20 converted to 19.7 (-21)		Ok
	-720 converted to –708.7 (-126)	On MKD the value -708 is displayed too	Ok
Set ROT status = **V** (invalid)	Check that ROT = default on VDL (default = -731.4 = 511)		Ok
	Check that ROT = default on VDO		Ok
	Check that ROT = default on MKD		Ok
ROT status = A (valid) ROT value = 0.0 degr./min Set Talker = HE	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	Value = 8.7, see remark 2 18.4.02 changed 0	ok
	11 converted to 720	Value = 11.7 18.4.02 changed 720	ok
	- 9 converted to 0	Value = -8.7 18.4.02 changed 0	ok
	-11 converted to -720	Value = -11.7 17./18.4.02 changed -720	ok

Remark 1: On the MKD the original value of the ROT is displayed, not the quantified value which is sent via VDL (ok).

Remark: During this test the complete transmission and receiving function failed. After switching off and on the EUT the transmission and receiving function worked again.

19.4.02 this was not reproduced during tests 15.4. – 19.4.02

Enter ROT results in 2.3.1 “Information content of msg 1”.

7.5.12 Additional Tests

10.04.02	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		Ok
	Check SOG/COG		Ok
	Check heading		Ok
	Check ROT		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		Ok
	Check SOG/COG		Ok
	Check heading		Ok
	Check ROT		Ok

7.5.13 Check of different inputs

10.04.02	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 = default		Ok
	Check SOG/COG = default		Ok
	Check heading = default		Ok
	Check ROT = default		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

Date	Result	Status
10.04.02 09.07.02	Mainly ok, but some failures in detail. See test details. Retest ok	 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.

Date	Format	Result	Status
28.05.02	**VDM**	See test details below	Ok
28.05.02	**VDO**	See test details below	Ok
	ALR	Test is done in 2.9 Alarms and indicators	
	ABK	Test is done in 2.1.4.1 and 6.1 Addressed operation and in 2.2 and 6.4 Broadcasts messages	
	ACA	Test is done in 5.3 Management of regional area settings	
	TXT	Test is done in 2.9 Alarms and indicators	

04.04.2002	**Test details - Message content of VDM messages**		
Test item	**Check**	**Remark**	**Result**
Transmit a position report from VDL analyser or another AIS transponder Check the following items on VDO output on PI compared with the transmitted values			
VDM Header	Check the total number of sentences = 1		Ok
	Check the sentence number = 1		Ok
	Check the Sequential message identifier = Null field		Ok
	Check the AIS channel = A, B		ok
	Check the number of fill bits = 0		Ok
Message ID	Check the message ID = 1		Ok
MMSI	Check MMSI		Ok
Navigational status	Check the navigational status		Ok
ROT	Check the rate of turn		Ok
SOG	Check the Speed over Ground		Ok
Position accuracy	Check the Position accuracy		Ok
Position Longitude	Check the Position Longitude		Ok
Position Latitude	Check the Position Latitude		Ok
COG	Check the COG		Ok
Heading	Check the Heading		Ok
Time stamp	Check the Time stamp		Ok
RAIM flag	Check the RAIM flag		Ok
Communication state in SOTDMA (msg 1)	Check the sync state		Ok
	Check the Slot time-out		Ok

	Check the received stations		Ok
	Check the slot number		Ok
	Check the UTC hour		Ok
	Check the Slot offset		Ok
Communication state in ITDMA (msg 3)	Check the sync state		Ok
	Check the Slot increment		Ok
	Check the number of slots		Ok
	Check the keep flag		Ok

04.04.2002	**Test details - Message content of VDO messages**		
Test item	**Check**	**Remark**	**Result**
Check the following items of msg 1,3 on VDO output on PI compared with the transmitted values of the own transmission according to the sensor input data			
Output rate	Check that the output rate = 1 s According to IEC 61993-2 §7.6.3.4 the output rate shall be 1 s	VDO only sent if msg transmitted 28.05.02 Retest: Output rate of VDO = 1s	ok
VDO Header	Check the total number of sentences = 1		Ok
	Check the sentence number = 1		Ok
	Check the Sequential message identifier = Null field		Ok
	Check the AIS channel = A, B if transmitted, else empty		Ok
	Check the number of fill bits = 0		Ok
Message ID	Check the message ID = 1		Ok
MMSI	Check MMSI		Ok
Navigational status	Check the navigational status		Ok
ROT	Check the rate of turn		Ok
SOG	Check the Speed over Ground		Ok
Position accuracy	Check the Position accuracy		Ok
Position Longitude	Check the Position Longitude		Ok
Position Latitude	Check the Position Latitude		Ok
COG	Check the COG		Ok
Heading	Check the Heading		Ok
Time stamp	Check the Time stamp		Ok
RAIM flag	Check the RAIM flag		Ok
Communication state in SOTDMA (msg 1)	Check the sync state		Ok
	Check the Slot timeout		Ok
	Check the received stations		Ok
	Check the slot number		Ok
	Check the UTC hour		Ok
	Check the Slot offset		Ok
Communication state in ITDMA	Check the sync state		Ok

(msg 3)	Check the Slot increment		Ok
	Check the number of slots (0 = 1 slot)		Ok
	Check the keep flag		Ok

Date	Result		Status
28.05.02	Test ok		ok
30.10.02	VDO output	If the internal GPS receiver is in use the VDO outputs without channel do not update the position. Only when the position report is transmitted the position data are updated 11.11.02 Retest: ok	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
24.10.02	Test ok	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.

Date	Format	Result	Status
22.05.02	**VSD**	See test details below	Ok
22.05.02	**SSD**	See test details below	Ok
	ABM	Test is done in 2.1.4.1 and 6.1 Addressed operation	
	BBM	Test is done in 2.2 and 6.4 Broadcasts messages	
	ACA	Test is done in 5.3 Management of regional area settings	
	ACK	Test is done in 2.9 Alarms and indicators	
	AIR	Test is done in 2.1.3.1 Interrogation	

14.12.01 - Test details – SSD sentence

22.05.02	**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		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
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		ok

22.05.02	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
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 call type 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	Has not been tested	---
Persons on board	Check if the persons on board are displayed on MKD Not required		Ok

Date	Result	Status
22.05.02	Test ok	ok

8 20 DSC functionality tests

(M.1371 A3)

8.1 20.1 General

(M.1371 A3/1)

(a) For the tests in this clause, set the EUT into autonomous mode using channels AIS1 and AIS2 with a reporting interval of 2 s (for method of measurement see also IEC 61993-1).

(b) Check with a sequence of valid calls consisting of a test signal number 1, a geographic call from ITU-R M.493, a test signal number 1, an individual call from ITU-R M.493 and a test signal number 1 that the EUT correctly receives and processes the three tests calls and its correct AIS operation is not affected by the interleaved calls.

(c) Check that the EUT does not respond to invalid calls - incorrect MMSI, position outside addressed geographic area, different course, or ship's type.

(d) Send to the EUT a standard test signal number 1 but with symbol numbers 104 and 03 followed by values 01 and 120 (Activate alternate system with group number 1 and sequence number 120). Check that the EUT does not respond.

21.03.02	**Test details – General DSC functions check**		
Test item	**Check**	**Remark**	**Result**
This is a first check that DSC transmission, reception and addressing is working in principle. Special addressing and data content checking is done in special tests			
Start DSC transmission of Test signal 1 (Position and name request) File name is "eut\Test_Signal_1.sst"	Check that the call is answered -> Contents are checked in a special test	MMSI coding is wrong: a 0 is added at beginning of 9digit MMSI, should be added at the end 16.4.02 changed see protocol	ok Rx with changed MMSI ok
Start DSC transmission of area addressed call (Position and name request) File name is "area_pos_name_rq.sst"	Check that the call is answered within 20 s Contents are checked in a special test		Ok

29.01.02	**Test details (b) – Sequence of 5 calls**		
Test item	**Check**	**Remark**	**Result**
Set reporting interval to 2 s and record VDL			
Start DSC transmission of test sentence File name is "\Sequence_20_1.sst" Delay between the calls is 3 s	Check that the three test signal 1 calls are acknowledged		Ok
	Check that the two M.493-calls are not acknowledged		Ok

	Check that the schedule of the AIS position reports is not changed by the transmission of the DSC calls	17.4.02 VDO and audible TX check ok; see protocol	ok
Increase the channel load so that there are no 20 free succeeding slots.	Check that no responses are transmitted by the EUT		

21.03.02	**Test details (c), (d) – Check of addressing**		
Test item	**Check**	**Remark**	**Result**
Start DSC transmission of Test signal 1 (Position and name request) File name is "eut\Test_Signal_1.sst" Change MMSI according to the test item			
With correct MMSI	Check that the call is answered		Ok
Change MMSI to not matching value	check that call is not answered		Ok
Start DSC transmission of area call (Position and name request) File name is "area_pos_name_rq.sst" Change position, course and type of ship according to the test item			
Position inside area	Check that the call is answered within 20 s		Ok
Change position to outside the area,	check that call is not answered		Ok
Position inside area again, add course matching the course of ship,	check that call is answered	No answer with correct course Maybe because of interpretation of course in 1/10 kn. 18.4.02 changed and window of +-2° applied	ok
Change course to a value differing > 2 degrees	Check that call is not answered		-----
Delete course, add matching type of ship	check that call is answered		ok
Change type of ship to All ships of this type	check that call is answered		ok
Change type of ship	Check that call is not answered		ok
Start DSC transmission of Selective call with command "Activate alternate system" File name is "eut\sel_act_alt_system.sst"			
Sel. Call with symbols: 104+03+01+120	Check that EUT does not transmit a response	19.4.02	ok
Sel. Call with symbols: 104+03+01+127	Check that EUT does not transmit a response	19.4.02	ok
all ships call 116 with EOS 117	Check that EUT does not transmit a response	19.4.02 did TX response 21.08.02 Retest: no response	ok

Date	Result	Status
21.03.02 19.4.02	Area addressing with course not ok. This may be caused by the interpretation of course in 1/10 kn. changed see above	ok
21.03.02 19.4.02	Wrong MMSI coding: A 0 is added at beginning of the 9 digit MMSI, should be added at the end according to ITU-R M changed see above.394	ok
19.4.02 21.08.02	EUT may not respond on all ships calls Retest: No response on all ships call	 ok

8.2 20.2 Regional area designation

(M.1371 A3/5)

Perform the test specified in 17.2 using the following DSC command:

Send to the EUT a standard test signal number 1 but with symbol numbers appropriate to the geographical regions and channels specified in the test. Note the transition boundary is 5nm in this test.

27.08..02	Test details – Regional area designation		
Test item	**Check**	**Remark**	**Result**
Send a selective region setting call File name “eut\sel_set_region.ss*t”	Check that an acknowledgement is received	No acknowledgement received, is not transmitted by EUT (Reporting rate 10 s, no other transponders on the air, EOS = RQ, Ack. of polling is ok) 27.09.02 Retest: Ackn. is transmitted, content is symbol 110 (message acknowledged)	ok
	Check that an ACA sentence is output at PI port		ok
	Check that new region is stored in the region list of the EUT		ok
	Check that transition zone is 5 nm		ok
Send a area addressed region setting call File name “area_set_region.sst”	Check that an acknowledgement is received	No acknowledgement received, is not transmitted by EUT 27.09.02 Retest: Ackn. is transmitted, content is symbol 110 (message acknowledged)	ok

	Check that an ACA sentence is output at PI port		Ok
	Check that new region is stored in the region list of the EUT	The new area setting is stored in the regional entries list, however it is not added to the list but the previous entry is overwritten and deleted 27.09.02 Retest: New area is added to the entry list	ok
Send a selective region setting call File name "all_ship_set_region.sst"	Check that an ACA sentence is output at PI port		ok
	Check that new region is stored in the region list of the EUT	The new area setting is stored in the regional entries list, however it is not added to the list but the previous entry is overwritten and deleted 27.09.02 Retest: New area is added to the entry list	ok
Send a selective call with channel setting in the area in use. File name"eut\sel_set_ais_channel.sst"	Check that an acknowledgement is received	No acknowledgement received, is not transmitted by EUT 27.09.02 Retest: Ackn. is transmitted, content is symbol 110 (message acknowledged)	ok
	Check that AIS channels are set according to the call content	ACA ok, Entry in area list has been changed	ok
	Check that new AIS channels are used for transmission and reception		ok

Date	Result	Status
14.03.02	Could not be tested because regional area function is not yet implemented	
27.08.02	Retest: no DSC acknowledgement, but area setting ok	
27.09.02	Retest: DSC acknowledgement with symbol 110	ok

8.3 20.3 Scheduling

(M.1371 A3/2)

Check that the time sequence of the TDMA messages is not changed when the EUT transmits a DSC signal.

Send a valid geographical call to the EUT. Check that the response is transmitted after a random delay distributed over the range of 0 to 20 s and subject to the restrictions of ITU-R M.1371 A3/2.2..

Send a valid geographical call to the EUT followed by a signal consisting of test signal 1 with a signal level of -107 dBm at the receiver input of 25 s duration. Check that the response is not transmitted.

29.01.02	**Test details – Scheduling**		
Test item	**Check**	**Remark**	**Result**
Set reporting interval to 2 s and record VDL			
Start DSC transmission of test signal 1 File name: "eut\test_signal_1.sst" Delay between calls is 3 s	Check that the schedule of the AIS position reports is not changed by the transmission of the DSC calls	18.4.02 see protocols	ok
Send area addressed calls with a rate of 30 s for about 30 min. File name is "area_pos_name_rq.sst"	Record the transmissions and responses with time stamp and enter delay times in a prepared Excel sheet. Add diagram and check times	Answer is always transmitted directly, without random delay 19.4.02 changed, random	ok
Start DSC transmission Test sequence 20.3 (Area call + 25 s test signal 1) File name: "test_sequence_20_3.sst"	Check that EUT does not transmit a response	19.4.02 see protocol	ok

Date	**Result**	**Status**
14.03.02 19.4.02	Answer to area addressed call is always transmitted directly, without random delay Changed, ok now	 ok

8.4 20.4 Polling

(M.1371 A3/3)

(a) *Check that the EUT is capable of receiving, processing and automatically transmitting a response to the following calls from ITU-R M.825: 101 (command to duplex-channel), 102, 103, 108, 109, 111, 112, and 116. The sequence of calls consisting of test signals number 1 and valid geographic calls shall demonstrate the capability of the EUT to operate on single frequency channels as well as on two frequency channels.*

(b) *Verify through this test, that ships maritime mobile service identify (MMSI), ship name, ships length and type of ship is programmed into the EUT.*

(c) *Send a standard test signal number 1 with additional symbols number 109 and 116 and check that the reply messages 100, 119 and 120 are programmed automatically.*

(d) Check that when information is not available to respond to a command the transmitted response is followed by the symbol 126.

(e) Send a standard test signal number 1 with additional symbol 101 followed by channel number 87. Repeat the test with channel number 88 and with symbol 104 and 00 followed by channel number 2087 and 2088. Check in all cases that the response is made on channel 70.

(f) Send a DSI sentence to CH 4 and CH 5 (see annex D) with an individual station address and with command sets 103 (report your position) and 111 (report ship name). Check that the EUT does not transmit a DSC message.

(g) Set the RF output power of the EUT high / low using the appropriate DSC command. Check that the output power is set accordingly.

21.03.02	**Test details (a),(b),(c) – Information polling**		
Test item	**Check**	**Remark**	**Result**
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Set channel (101+xx)	Check that direct answer on channel xx		Ok
	Check if following answers on channel xx		Ok
Request automatic position report (102+xx)	Check automatic reporting rate		Ok
Send message with 102+00	Check that the automatic position report is finished		Ok
End of automatic position report at missing ackn. Request again automatic position report (102+xx)	Check that the 2nd and following position reports are transmitted with EOS = RQ (117)	EOS = BQ (122), should be RQ (117) 21.08.02 Retest: EOS = RQ now	ok
	Check that the automatic position report is finished after 5 transmissions (without ackn. by base station)		ok
Request position (103)	Check position in response		Ok
	Check time		Ok
	Check type of ship	Type of ship is not included	Ok
Request length of ship (108) (6C)	Check length of ship (124)		Ok
Request course (109)	Check course (119)	Course is in 1/10 degrees, not in degrees as required 18.4.02 changed	ok
Request ships name (111)	Check name (115)		Ok
Request ackn. (112)	Check ackn. (110)	Is acknowledged with 122+73 (7Ah+49h), not with 110 as required 18.4.02 changed 110,122	ok
Request speed (116)	Check speed (120)		Ok
(C) Request test signal 1 (pos, name request) + 109 + 116	Check automatic response submitting name, position,		Ok

(6F 67 6D 74))	course and speed		
Send test signal 1 (101+72) (set DSC channel to a simplex channel) + Geographically addressed call. File: sel_check_channel.sst	Check that the communication on selected simplex channel is working		Ok
Send test signal 1 (101+60) (set DSC channel to a duplex channel) + Geographically addressed call.	Check that the communication on selected duplex channel is working	Transmission on Coast station frequency of the channel (Ch 60, 160.625 kHz) 21.08.02 Retest: Transmission now on ships frequency (156.025 kHz)	ok

21.03.02	**Test details (d) – polling, information not available**		
Test item	**Check**	**Remark**	**Result**
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst" Change request symbols according to the test item.			
Request position (103)	Check position in response	1x 126, should be 100+126	
Request length of ship (108)	Check length of ship (124)	124+00+00, should be 124+126	
Request course (109)	Check course (119)	1x126, should be 119+126	
Request ships name (111)	Check name (115)	115, should be 115+126	
Request speed (116)	Check speed (120)	1x126, should be 120+126	
		18.4.02 all positions above changed and retested ok	ok

21.03.02	**Test details (e) – Use of AIS channels for DSC**		
Test item	**Check**	**Remark**	**Result**
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Set channel (101+87) (65 57)	Check that response is transmitted on channel 70		Ok
Set channel (101+88) (65 58)	Check that response is transmitted on channel 70		Ok
Set channel (104+00+2087) (68 00 14 57)	Check that response is transmitted on channel 70	No response on ch. 70, see note No response on ch 2087	ok
Set channel (104+00+2088) (68 00 14 58)	Check that response is transmitted on channel 70	No response on ch. 70, see note No response on ch 2088	ok

note: This is a non regular operation by base station. As base station expects response on another channel, "no response" on ch.70 is accepted.

	Test details (f) – DSI sentence check		
Test item	**Check**	**Remark**	**Result**
Apply DSI sentence to the PI interface. File name is ais_dsi.sst			
ON CH4 = PI interface	Check that the EUT does not transmit a DSC message.		
ON CH5 = Pilot port	Check that the EUT does not transmit a DSC message.		

21.08.02	**Test details (g) – Power setting check**		
Test item	**Check**	**Remark**	**Result**
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Ad symbols to set power = 2 watt (low power) (Symbols 104+ 01+ 02)	Check that response is transmitted with low power	Transmits response with high power 27.09.02 Retest: ok, transmission with low power	ok
Ad symbols to set power = 12.5 watt (high power) (Symbols 104+ 01+ 12)	Check that response is transmitted with high power	Transmits response with high power	ok

Date	**Result**	**Status**
21.03.02 21.08.02 27.09.02	See test details Retest: Errors of previous tests ok now, but power setting of DSC response is not ok Retest: Transmission is according to the DSC command	 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*

22.08.02	**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		ok
Display on MKD	Check that the request is displayed on MKD	Displayed, but too short 22.08.02 Retest: Request is displayed until <ENT> or 30 s spelling “recive” should be replaced by the correct word "receive”	Ok rec
	Check that replay status is displayed on MKD	Displayed, but too short 22.08.02 Retest: Status is not displayed on MKD, but different displays for automatically answered and manual request.	acc
PI output	Check that LR interrogation and response is output on PI	no PI output 22.08.02 Retest: Response is output on PI (auto and manual mode). Request is not output	acc

Contents of LRF response	Check output of LRF sentence	LRF is output	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.)	In the LRF output there is only one “2” indicating info status. There must be one status character for each requested information, in this case 10 times a "2” for 10 requested information items 27.09.02 Retest: ok, all status values available	ok
Contents of LR1 response	Check output of LR1 sentence		Ok
	Check that sequence number = request = LRF		Ok
	Check own MMSI		Ok
	Check MMSI of requestor = request		Ok
	Check ship’s name		Ok
	Check Call sign		Ok
	Check IMO number	Empty field, no IMO number entered in transponder	ok
Contents of LR2 response	Check output of LR2 sentence		ok
	Check that sequence number = request = LRF		Ok
	Check MMSI of responder		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		Ok
	Check destination		Ok
	Check ETA		Ok
	Check draught		Ok
	Check ship/cargo		Ok
	Check length of ship		Ok
	Check breadth of ship		Ok
	Check ship type		Ok
	Check persons		Ok

22.08.02	Test details – LR automatic response, selected data		
Test item	**Check**	**Remark**	**Result**
Set EUT to automatic response. Apply an addressed request to the LR port of EUT requesting selected information File name: LRI_LRF_MMSI_all.sst, modified by deleting not requested information			
Request A Name Call sign IMO number	Check that only LF and LR1 is transmitted	LR2 and LR3 are also output with empty fields: Recommendation, not to output LR2 and LR3 to minimise interface load 27.09.02 Retest: ok, only requested sentences are output	ok
	Check that function request field = request		ok
	Check that function reply status field matches request and data availability		ok
	Check that the requested fields are not empty		ok
Request A,E,F Name Call sign IMO number COG SOG	Check that only LF and LR1 and LR2 is transmitted	LR3 is also output 27.09.02 Retest: ok, only requested sentences are output	Ok
	Check that function request field = request		Ok
	Check that function reply status field matches request and data availability	Only one “2”, should be “222” 27.09.02 Retest: ok, status values of all requested information available	Ok
	Check that requested fields are provided		Ok
	Check that only requested fields are not empty		Ok
Request C,E,F Position COG SOG	Check that only LF and LR2 are transmitted	LR1 and LR3 are also output 27.09.02 Retest: ok, only requested sentences are output	ok
	Check that function request field = request		Ok
	Check that function reply status field matches request and data availability	Only one “2”, should be “222” 27.09.02 Retest: ok, status values of all requested information available	ok
	Check that requested fields are provided		ok
	Check that only requested fields are not empty		ok

Request P,W Ship/cargo Persons	Check that only LF and LR3 is transmitted	LR1 and LR2 are also output 27.09.02 Retest: ok, only requested sentences are output	ok
	Check that function request field = request		ok
	Check that function reply status field matches request and data availability	Only one "2", should be "22" 27.09.02 Retest: ok, status values of all requested information available	ok
	Check that requested fields are provided		ok
	Check that only requested fields are not empty		ok

19.4.02	**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	19.4.02	ok
	Check that response is transmitted after manual confirmation on MKD	19.4.02	ok

19.4.02	**Test details – Confirmation via PI**		
Test item	**Check**	**Remark**	**Result**
Set EUT to external response if implemented (not required). 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	19.4.02 not implemented	ok
	Check that response is transmitted after external confirmation via PI	19.4.02 not implemented	ok

note: if not confirmed, no transmission is performed (could be response with data=unavailable); ok

Date	Result	Status
22.08.02 27.09.02	Function reply status: no status for each requested information Retest: Function reply status is now supplied for all requested information	 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.

22.08.02	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		Ok
	Check that the request and response status is displayed on MKD	Request is displayed on MKD	Ok
	Check that the request and response is output on PI	Only response is output on PI	???
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

22.08.02	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	Request is displayed and an acoustic alarm is output	ok
	Check that response is transmitted on confirmation on MKD		ok
	Check that the request and response is output on PI	The request is not output on PI. So an external confirmation is not possible The response is output.	acc
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

Date	Result	Status
22.08.02	Test ok	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.*

22.08.02	**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		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		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

Date	**Result**	**Status**
22.08.02	Test ok	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		

for a description of pos. 1-4 see below

A.1.1 VDL analyser / generator

The VDL analyser/generator:

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

A.1.2 Target simulator

The target simulator consists of a standard PC with

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

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

A.1.3 Presentation Interface Monitor

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

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

For that purpose it includes the functions:

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

A.1.4 DSC Testbox

The DSC test box includes:

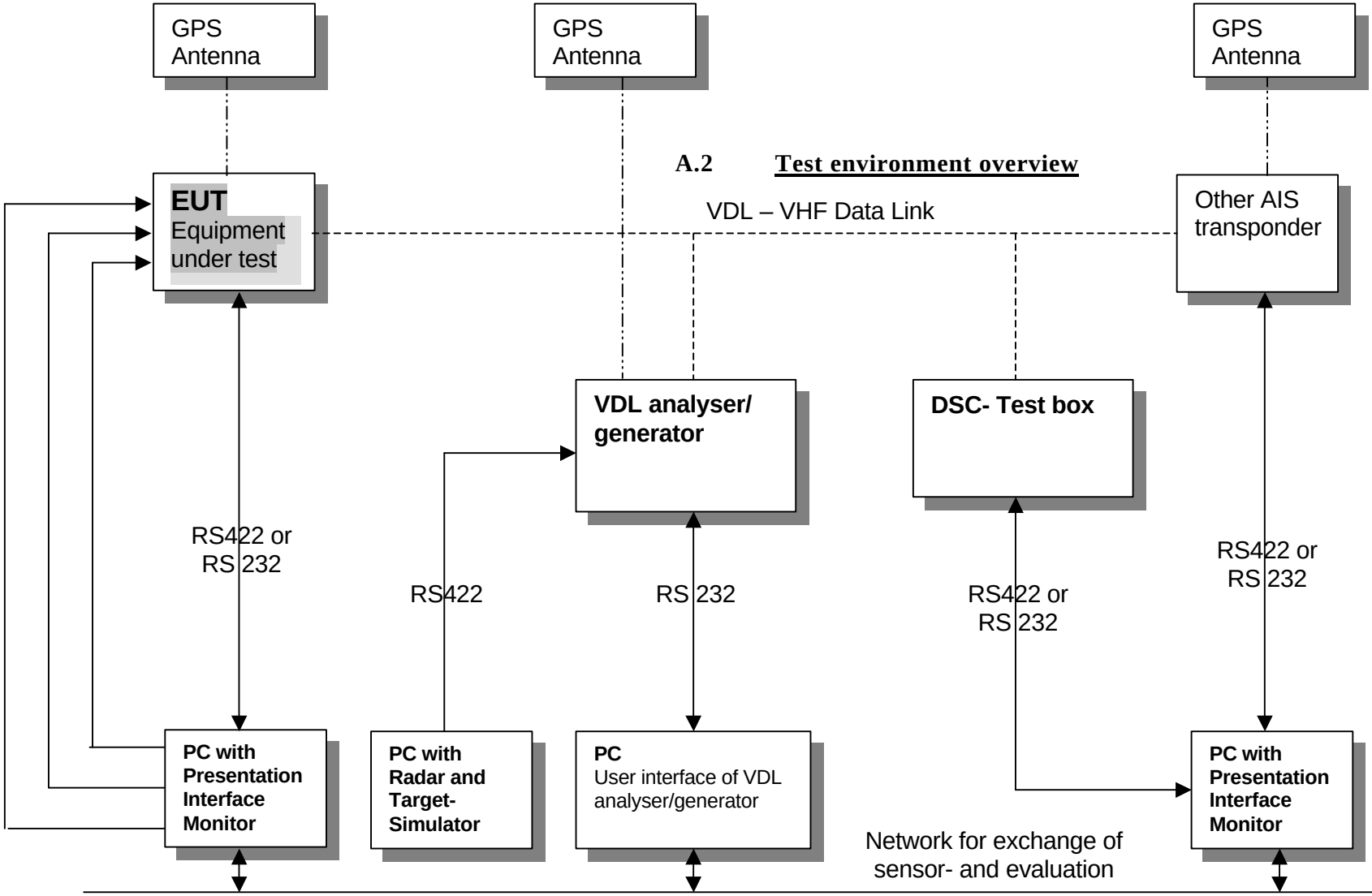
- A standard VHF DSC controller DEBEG 3817 with open interface
- A standard VHF radiotelephone DEBEG 6348

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

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

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

A.2 Test environment overview



Annex B IEC 61162 test sentences

B.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

`$GPDTM,999,,,,,,,P90`
`$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.1.1 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.1.2 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,4,1,6,2,8,06P045678901234567890123456789012345678 9,0`
`!AIBBM,4,2,6,2,8,012345678901234567890123456789012345678 9,0`
`!AIBBM,4,3,6,2,8,012345678901234567890123456789012345678 9,0`
`!AIBBM,4,4,6,2,8,012345678901234567890123456789012345678 901,4`	

AIBBM_multi_bin_long.sst	Longer than 5 slots binary broadcast message

!AIBBM,4,1,6,2,8,06P045678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,2,6,2,8,012345678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,3,6,2,8,012345678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,4,6,2,8,012345678901234567890123456789012345678901234567890123,0	
AIBBM_multi_bin_1.sst	Longer than 5 slots binary broadcast message, all bits 1
!AIBBM,4,1,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,2,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,3,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,4,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0	
AIBBM_ABM_17_5.sst	Set of 2 long messages 8 and 12 for message priority test
!AIBBM,4,1,6,2,8,06P045678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,2,6,2,8,012345678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,3,6,2,8,012345678901234567890123456789012345678901234567890123456789,0 !AIBBM,4,4,6,2,8,012345678901234567890123456789012345678901234567890123456789,0 !AIABM,4,1,2,000001005,1,12,012345678901234567890123456789012345678901234567890123456789,0 !AIABM,4,2,2,000001005,1,12,012345678901234567890123456789012345678901234567890123456789,0 !AIABM,4,3,2,000001005,1,12,012345678901234567890123456789012345678901234567890123456789,0 !AIABM,4,4,2,000001005,1,12,012345678901234567890123456789012345678901234567890123456789,0	
Dsi.sst	DSI sentence to check that DSI are not transmitted
$AIDSI,1,1,2210393930,,,,03,,11,,	
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,,	

B.1.3 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.1.4 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.1.5 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 specifiere which included only ones. The DSC coding and addition of redundance (3 bit symbol redundance 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

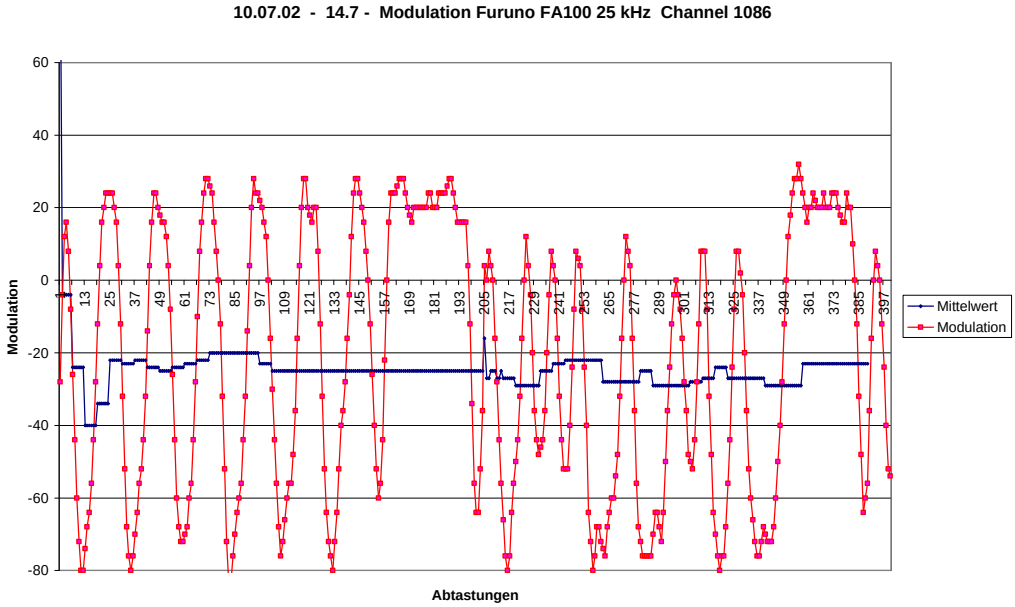
DSC Sentences	
File name	Description
Sentences	

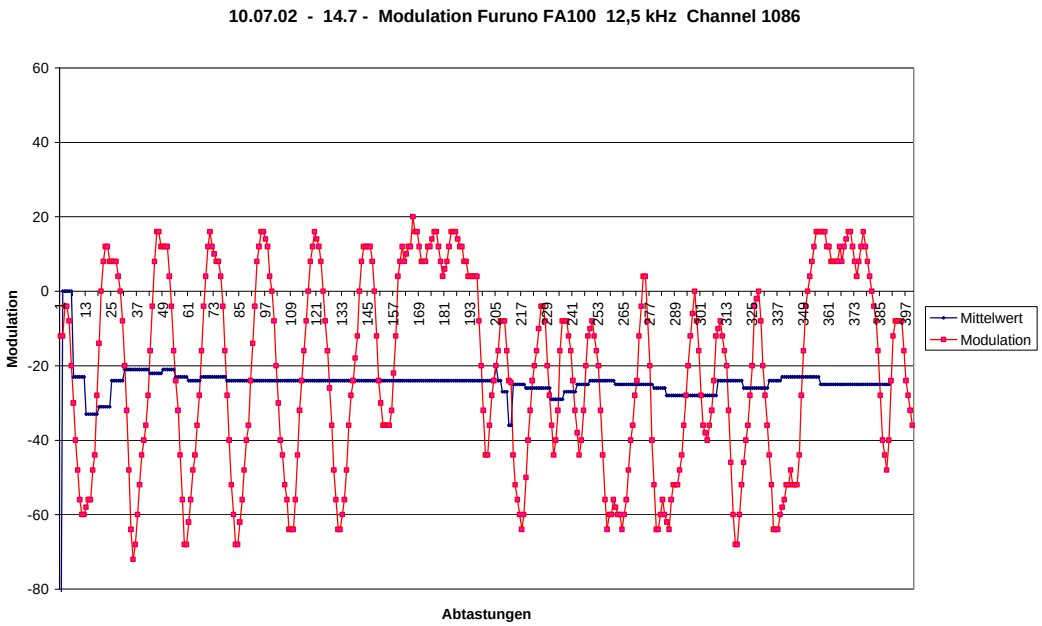
Test_Signal_1.sst	Standard test signal no 1, selective position and name request.
$PDEBT,CCDSC,T,0001460078000001005067150A27271E676F75FF	
area_pos_name_rq.sst	Position and name request addressed to an area, standard position inside
$PDEBT,CCDSC,T,0001460067052800000091E003C003C0067150A27271E676F75FF	
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,000146006700030014F1E003C003C0067150A27271E676F75FF	
sel_set_region.sst	Selective regional setting by DSC, standard pos. outside, channel 61
$PDEBT,CCDSC,T,0001460078000001005067150A27271E68090A3D00680A143D00680C053C00011400680D053200010A0075FF	
sel_set_region_in.sst	Selective regional setting, standard position inside, channel 72, 73, 12.5 kHz
$PDEBT,CCDSC,T,0001460078000001005067150A27271E680900480A680A00490A680C05280001030680D051E00005D0075FF	
sel_set_region_17_7_2.sst	Selective regional setting for test 17.7.2
$PDEBT,CCDSC,T,0001460078000001005067150A27271E6809145200680A0A5200680C051E00012800680D051400011E0075FF	
sel_set_region_17_2.sst	2 regional settings for DSC test according to 17_2
$PDEBT,CCDSC,T,0001460078000001005067150A27271E6809145200680A0A5200680C051E00012800680D051400011E0075FF $PDEBT,CCDSC,T,0001460078000001005067150A27271E6809145100680A0A5100680C05140001280068 0D050A00011E0075FF	
sel_set_ais_channel_ch65.sst	Setting AIS channel to 65
$PDEBT,CCDSC,T,0001460078000001005067150A27271E68090A4100680A14410075FF	
area_set_region.sst	Area addressed regional setting, standard position inside address, but not inside area, Ch 60
$PDEBT,CCDSC,T,0001460067052800000091E003C003C0067150A27271E68090A3C00680A143C00680C051400005A00680D050A0000500075FF	
all_ship_set_region.sst	All ship call with regional setting
$PDEBT,CCDSC,T,000146007467150A27271E68090A3E00680A143E00680C052800011400680D051E00010A007FFF	
all_ship_set_channel.sst	All ship call setting DSC channel
$PDEBT,CCDSC,T,000146007467150A27271E65467FFF	

Annex C test diagrams

C.1 GMSK modulation 12.5 and 25 kHz bandwidth

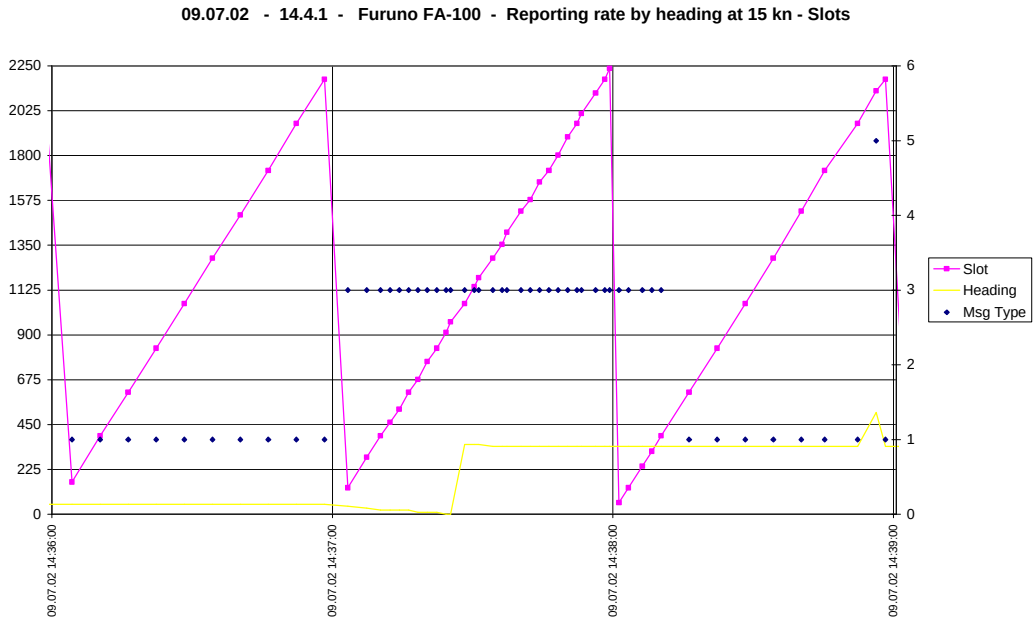
see test clause 2.7



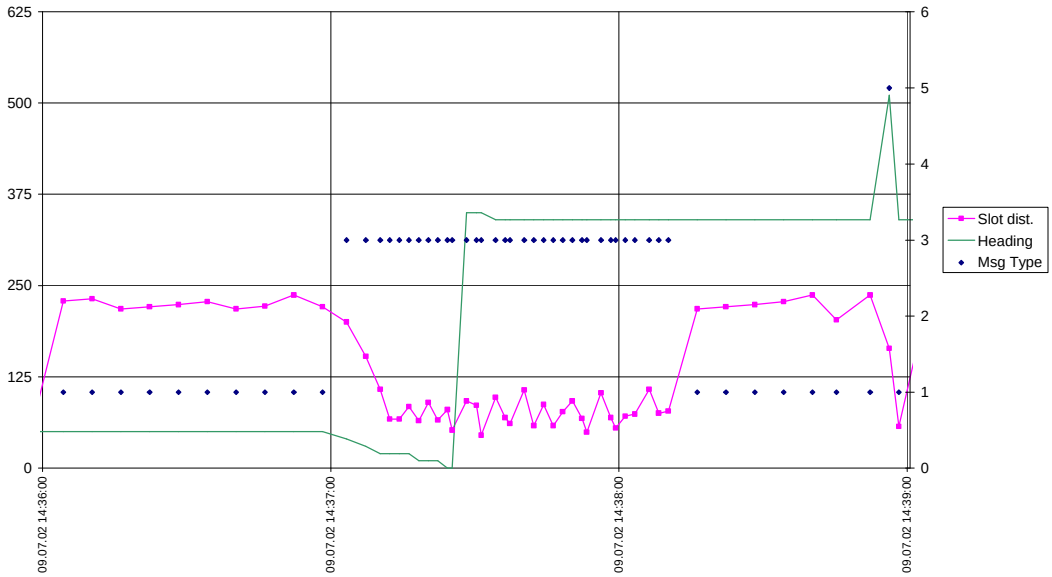


C.2 Reporting rate by course change

see test clause 2.4.1, 4.6.4



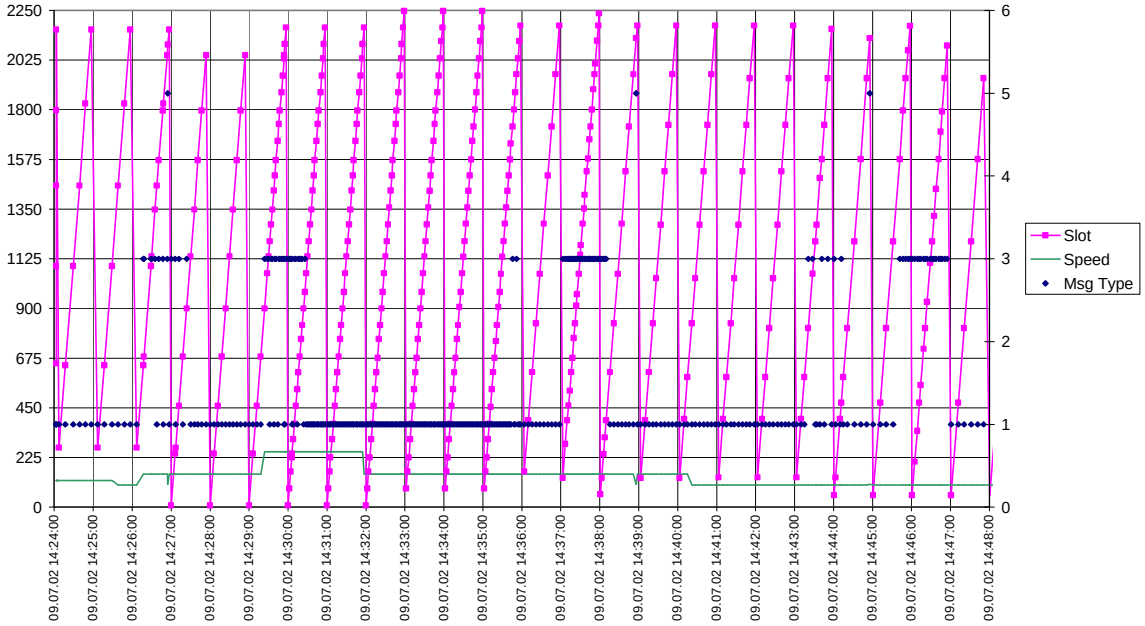
09.07.02 - 14.4.1 - Furuno FA-100 - Reporting rate by heading at 15 kn - Slot offset



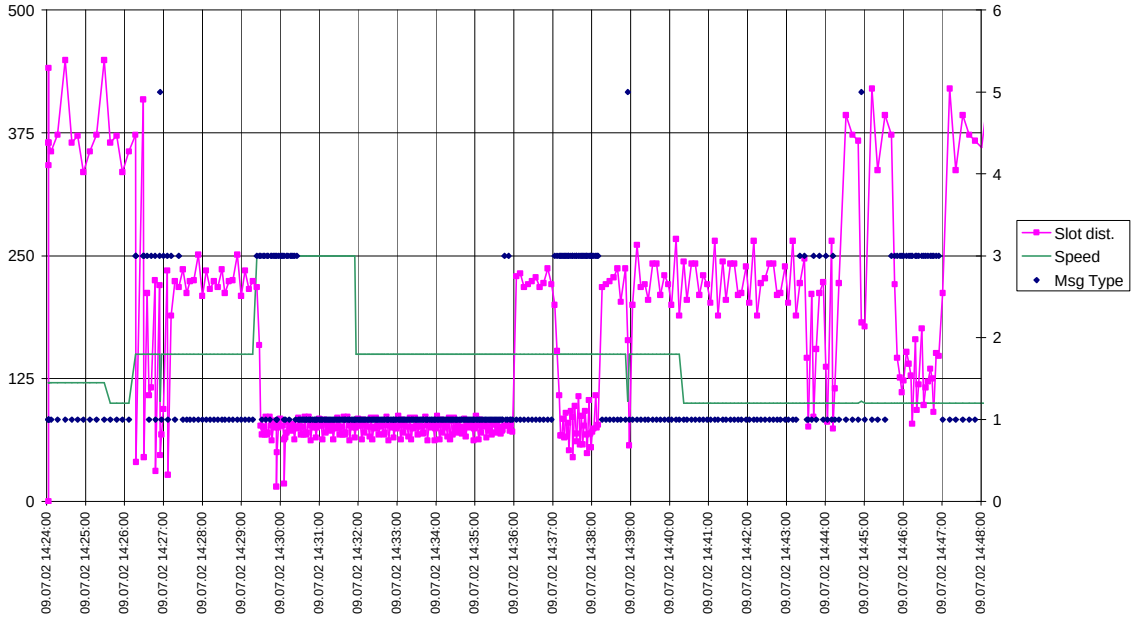
C.3 Reporting rate by speed

see test clause 2.4.1

09.07.02 - 14.4.1 - Furuno FA-100 - Reporting rate by speed - Slots



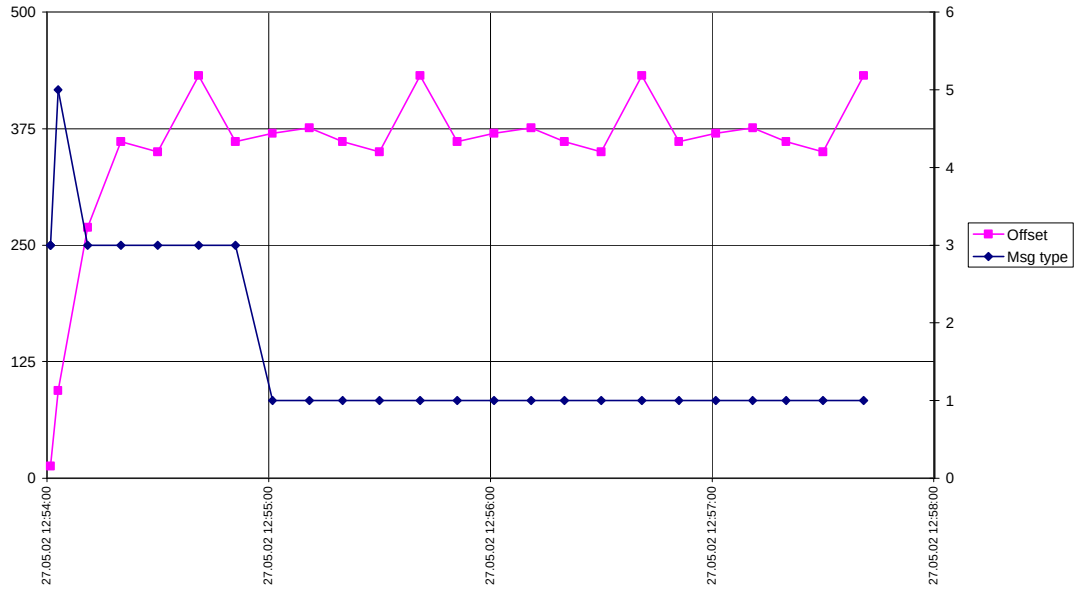
09.07.02 - 14.4.1 - Furuno FA-100 - Reporting rate by speed - Slot offset



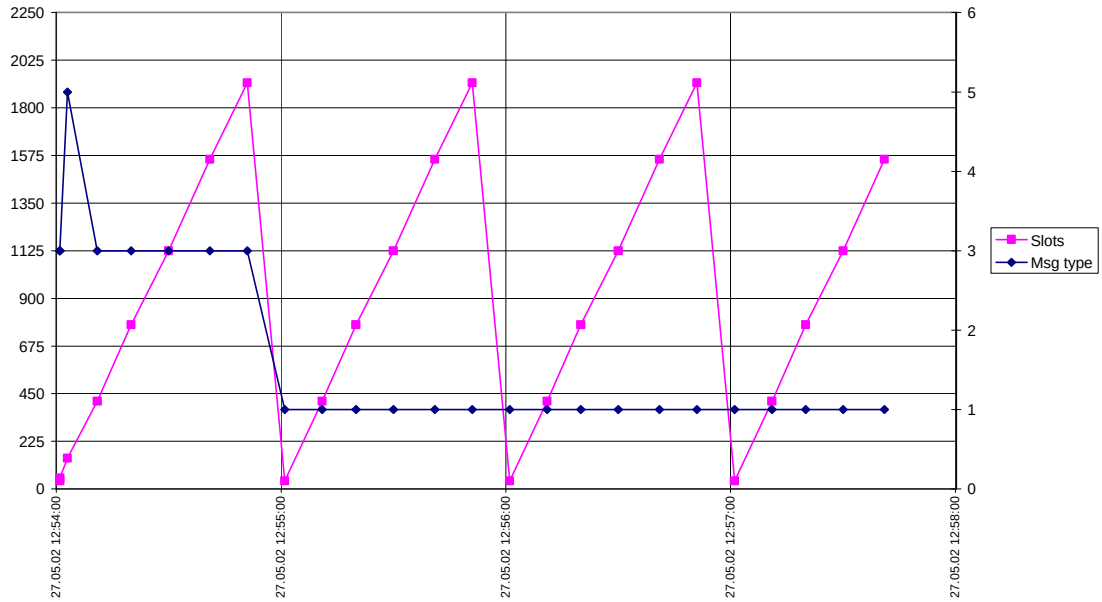
C.4 Network entry phase

see test clause 4.6.1

Furuno FA-100 - Slot offset at Network entry - 27.05.02



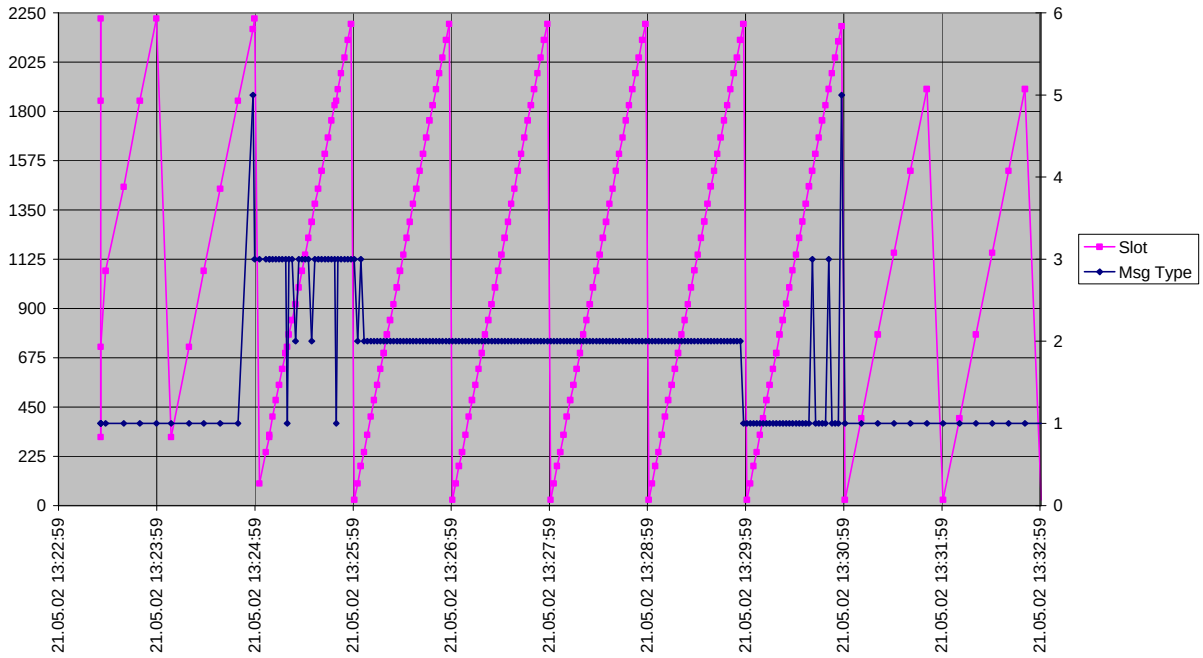
Furuno FA-100 - Slot allocation at Network entry



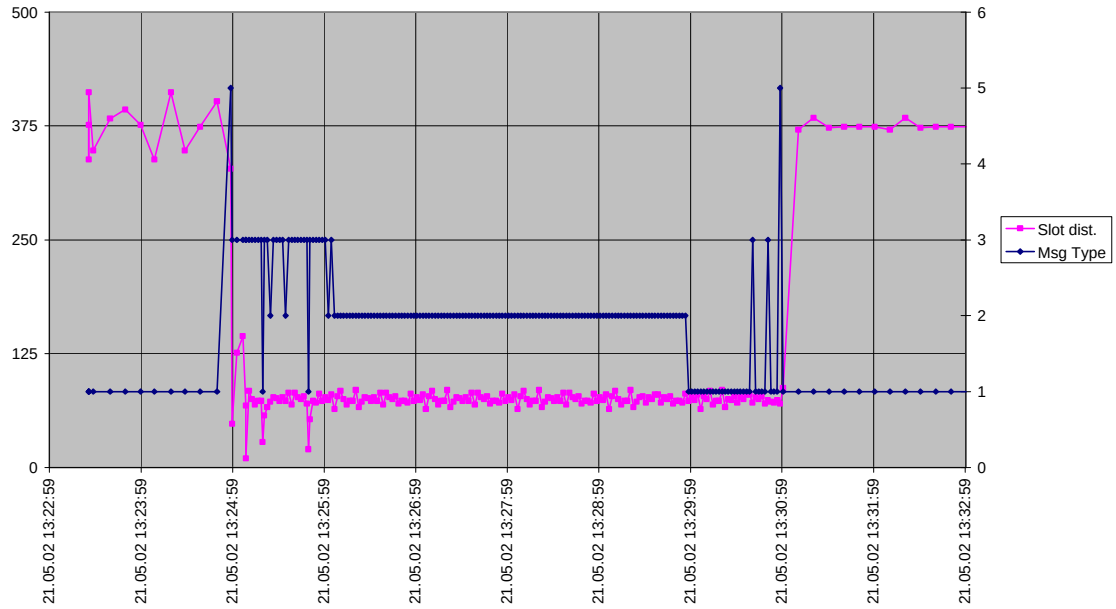
C.5 Assigned mode / report rate

see test clause 4.6.4

Furuno FA-100 Rate Assignement



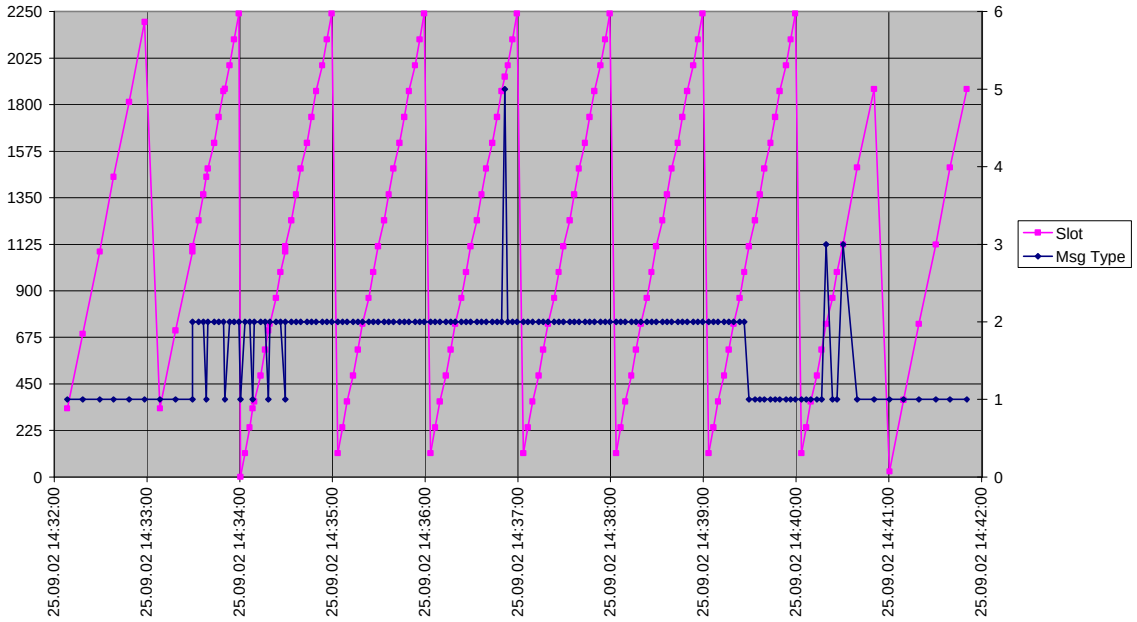
Furuno FA-100 Rate assignment - Slot offset



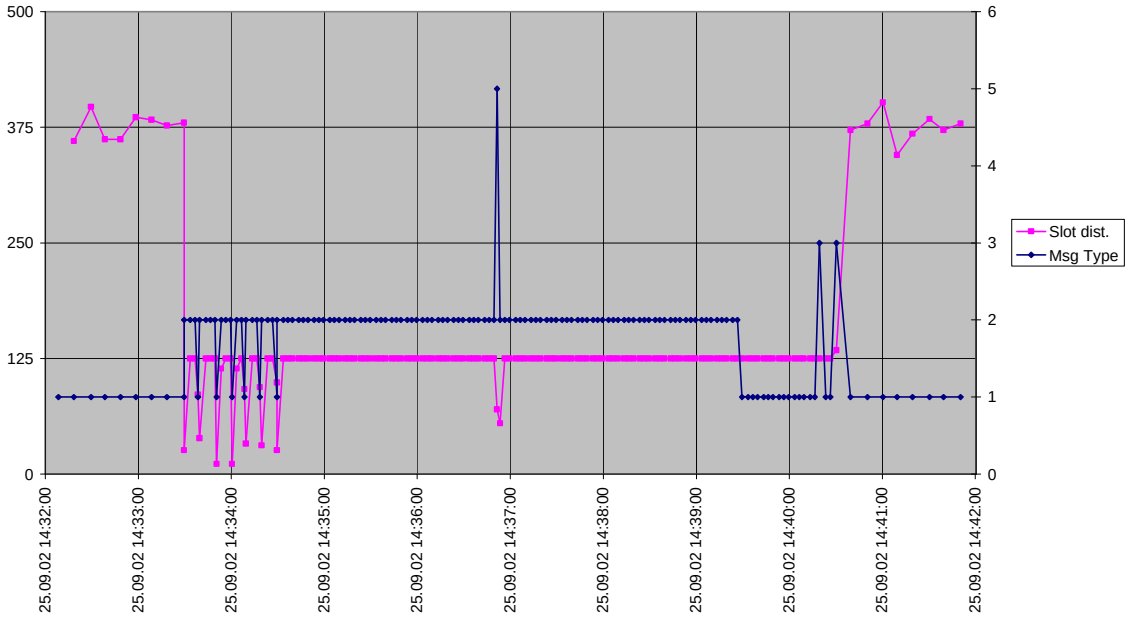
C.6 Assigned mode / slot assignment

(test clause 4.6.4 16.6.4 Assigned operation)

Furuno FA-100 Slot Assignment - Slots

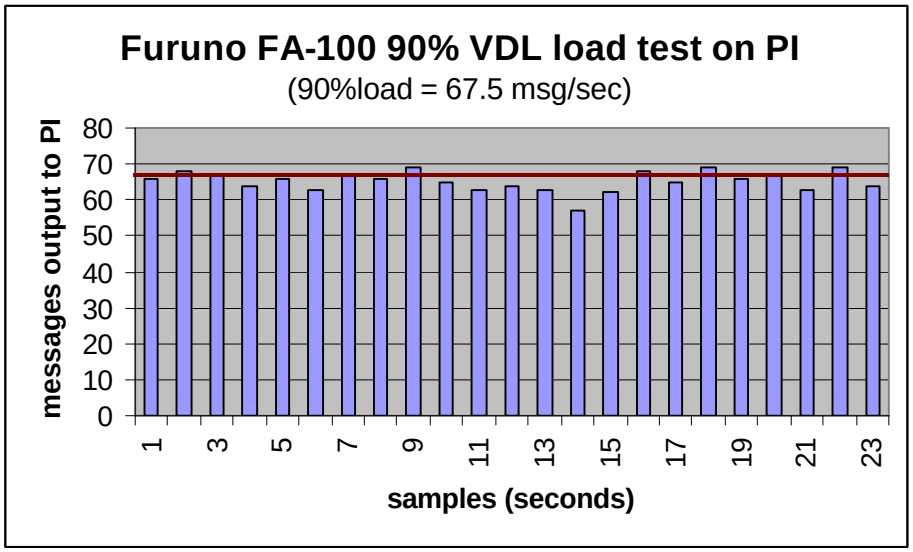


Furuno FA-100 Slot assignment - Slot offset



C.7 PI output under high channel load

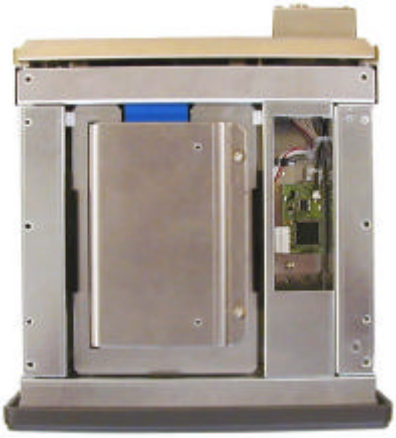
(test clause 7.7)



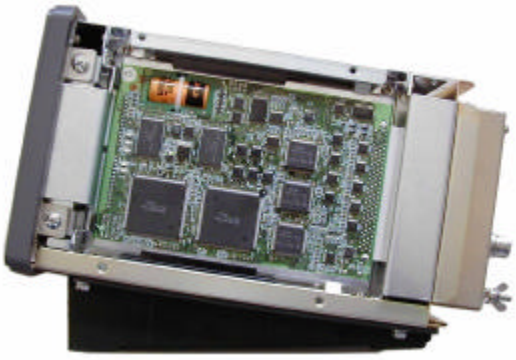
Annex D Photos of equipment under test

Picture 1: Front view

Picture 2: Rear view / label



Picture 3: Top view



Picture 5: Left view