NORWEGIAN ACCREDITATION
TEST 031

COMLAB
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EMC, Radio and Telecommunications

Nemko Comlab AS

Office address: Gåsevikveien 8, Kjeller
Postal address: P.O.Box 96, N-2027 Kjeller
Telephone: +47 64 84 57 00
Facsimile: +47 64 84 57 05
E-mail: post@comlab.no
http://www.comlab.no
Enterprise no: NO 984 592 418 MVA

Pages	:	33
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Test report : 02/141/9

Item tested : Seatex AIS 100 Transponder

Equipment type : AIS Transponder

Client : Norbit AS

Tested according to :

IEC 61993-2
(2001-12)

Date of issue : 2002.09.23

Authorised by :

Kjell G. Haga
Managing Director

Knut R. Hanssen
for Geir Antonsen
Technical Supervisor

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name :	Nemko Comlab AS
Address :	Gåsevikveien 8, P.O.Box 96 N-2027 Kjeller, Norway
Telephone :	+47 64 84 57 00
Fax :	+47 64 84 57 05
E-mail :	Post@comlab.no
Managing Director :	Kjell G. Haga

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1.2 Client Information

Name :	Norbit AS
Address :	Stiklestadveien, N-7041 Trondheim Postboks 1852, Lade N-7440 Trondheim
Telephone :	+ 47 73 98 25 50
Fax :	+ 47 73 98 25 51

Contact:

Name :	Per Jørgen Weisethhaunet
E-mail :	pjw@norbit.no

1.3 Manufacturer

Name :	Kongsberg Seatex A/S
Address :	Pirsenteret N-7642 Trondheim
Telephone :	+47 73 54 55 00
Fax :	+47 73 51 50 20

2 TEST INFORMATION

2.1 Test Item

Name : Ais Transponder

Model/version : Tx part # 31046-1, Rx part # 31047-3.

Serial number : Tx s.no. 36, Rx s.no. 96 (TDMA), 97 (TDMA 2), and 98 (DSC).

Software identity and version : Version 2.0, and 2.0c, for s.no.97.
Version 2.0c improves bit-synchronisation, which improves the co-channel rejection, (primarely) at 25 kHz channel spacing. This software also improves the sensitivity a little (tested at 25 kHz channel spacing and norm. test conditions). The other measurements are performed with Version 2.0.

Remarks / Description of test item

The receiver measurements are performed on s.no. 97 and 98.
The TDMA receiver measurements are performed with a number of 1000 packets.
For the DSC measurements a number of 100 packets was used.
The client supplied a special test software installed in a PC. This software was absolute essential in order to carry out the measurements.
A special test unit was also suppled. This utility equipment was primarely used as a generator for the " wanted signal". See photo in annex 4 page 14.

The reference for transmitter "on/off " function is a 5 V TTL control level, named TXON (TX-board).

The EUT was powered by a 24 VDC power supply.

The test item is earlier measured according to IEC 61993-2 FDIS @ IEC (E), test report 02/141/5.

In this test report, 02/141/9, new measurements are included. This is performed to fulfil the difference between the former IEC standard, and the latest edition (2001-12). The clauses of interest are 15.3.4, 15.3.5, 15.3.6, 15.3.7. All the annexes are the same in the two test reports.

2.2 Test Environment

2.2.1 Normal Test Conditions

The values are the limits registered during the test period

Temperature: 19.9 – 22.9 °C

Relative humidity: 27 –64.9 %

2.3 Test Period

Test item received date : 13.05.02, 09.09.02

Test period : from 13.05.02 to 21.08.02, (including earlier versions)

from 09.09.02 to 12.09.02
New measurements; in order to fulfil the measurement methods in the latest edition of IEC 61993-2 (2001-12).

2.4 Standards and Regulations

IEC 61993-2
First edition (2001-12)

2.5 Test Engineer

Knut Risting Hanssen

2.6 Additional Information

2.6.1 Test Methods

2.6.2 Selection Criteria

Selected tests have been performed on client's request

2.6.3 Test Equipment

List of used test equipment, see page no. 33.

TEST REPORT SUMMARY

2.7 Abbreviations

P Passed, the equipment fulfils the requirement

F Failed, the equipment does not fulfil the requirement

NA Not applicable, the requirement is not applicable for this type of the equipment

NT Not tested, the test is not performed even though the requirement is relevant

2.8 Test Summary

Transmitter parameters

Frequency error	(P)
Carrier power H (conducted)	(P)
Carrier power L (conducted)	(P)
Modulation Spectrum 25 kHz mode	(P)
Modulation Spectrum 12.5 kHz mode	(P)
Transmitter Attack Time	(P)
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DSC Transmissions

Frequency error of the DSC Signal	(P)
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TDMA Receivers

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2.9 Other Comments

3 TEST RESULTS

3.1 Transmitter Measurements

IEC 61993-2, Cl.15.1.1

3.1.1 Frequency Error

Power level at which the measurement has been performed:2 W

Test Conditions		Frequency Error kHz			
		156.025 MHz	157.4125 MHz	160.6375 MHz	162.025MHz
T_{nom}	V_{nom}(24.0 V)	0.118	0.312	0.122	0.122
T_{min}(-15 °C)	V_{min}(21.6 V)	0.058	0.014	0.014	0.034
	V_{max}(31.2 V)	0.058	0.014	0.014	0.034
T_{max}(+55 °C)	V_{min}(21.6 V)	0.278	0.386 *	0.382 *	0.255
	V_{max}(31.2 V)	0.278	0.326 *	0.406 *	0.250
Maximum frequency error (kHz)		0.278	0.386	0.406	0.255
Measurement uncertainty		**≤ ± 50 Hz**			

*The frequency difference between min. and max. voltage is not caused by voltage change, but frequency drift versus time.

Limits:

Normal Test Conditions	Extreme Test Conditions
± 0,5 kHz	± 1 kHz

Test Equipment Used: 16, 208, 1194, 1218, 1337

IEC 61993-2, Cl.15.1.2

3.1.2 Carrier Power

Rated output power level (maximum): 2W, (33 dBm)

Test Conditions		Transmitter Power dBm		
		156.025 MHz	159.025 MHz	162.025 MHz
T_{nom}	V_{nom}(24.0 V)	32.94	32.32	32.38
T_{min}(-15 °C)	V_{min}(21.6 V)	33.23	32.81	31.76
	V_{max}(31.2 V)	33.23	32.81	31.76
T_{max}(+55 °C)	V_{min}(21.6 V)	32.93	32.89	32.78
	V_{max}(31.2 V)	32.93	32.89	32.78
Variation in output power under normal test conditions (dB)		0.06	0.68	0.62
Variation in output power under extreme test conditions (dB)		0.77	0.19	1.24
Measurement uncertainty		**≤ ± 0.7 dB**		

Limits:

Under normal test conditions	± 1.5 dB
Under extreme test conditions	+ 2.0 dB - 3.0 dB

Test Equipment Used: 16, 142, 208, 1194, 1218, 1337, 1338

3.1.3 Carrier Power

Rated output power level (maximum): 12.5W, (41 dBm)

Test Conditions		Transmitter Power dBm		
		156.025 MHz	**159.025 MHz**	**162.025 MHz**
T_{nom}	V_{nom}(24.0 V)	40.81	40.82	40.72
T_{min}(-15 °C)	V_{min}(21.6 V)	40.64	40.61	40.49
	V_{max}(31.2 V)	40.69	40.61	40.49
T_{max}(+55 °C)	V_{min}(21.6 V)	41.23	41.11	41.00
	V_{max}(31.2 V)	41.23	41.11	41.00
Variation in output power under normal test conditions (dB)		0.19	0.18	0.28
Variation in output power under extreme test conditions (dB)		0.36	0.39	0.51
Measurement uncertainty		**≤ ± 0.7 dB**		

Limits:

Under normal test conditions	± 1.5 dB
Under extreme test conditions	+ 2.0 dB - 3.0 dB

Test Equipment Used: 16, 142, 208, 1194, 1218, 1337, 1338

IEC 61993-2, Cl.15.1.3

3.1.4 Modulation Spectrum 25kHz channel mode

See annex no.: **1, pages 1 to 4 for TDMA, (H/L power with test signals 2 and 3)**
1, pages 5 to 6 for DSC, (H/L power with test signal 1)

Test Equipment Used: 16, 208, 1194, 1337

IEC 61993-2, Cl.15.1.4

3.1.5 Modulation Spectrum 12.5kHz channel mode

See annex no.: **1, pages 7 to 10, TDMA, (H/L power with test signals 2 and 3)**

Test Equipment Used: 16, 208, 1194, 1337

IEC 61993-2, Cl.15.1.5

3.1.6 Transmitter Attack Time

Power level at which the measurement has been performed: 2W

Time Characteristics	159.025 MHz
Time relative to the power rise (ms)	0.626
Time relative to the frequency behaviour (ms)	< 0.3
Maximum of these times,	0.626
Measurement uncertainty	≤ ± 5 %

See annex no.: **2, pages 1 and 3.**

Limits Clause 15.1.5

The transmitter attack time shall not exceed:	1 ms

Test Equipment Used: 16, 208, 1066, 1079, 1194, 1239, 1337

Power level at which the measurement has been performed: 12.5W

Time Characteristics	159.025 MHz
Time relative to the power rise (ms)	0.425
Time relative to the frequency behaviour (ms)	< 0.3
Maximum of these times,	0.425
Measurement uncertainty	≤ ± 5 %

See annex no.: **3, pages 1 and 3.**

Limits Clause 15.1.5

The transmitter attack time shall not exceed:	1 ms

Test Equipment Used: 16, 208, 1066, 1079, 1194, 1239, 1337

IEC 61993-2, Cl.15.1.6

3.1.7 Transmitter Release Time

Power level at which the measurement has been performed: 2W

Time Characteristics	159.025 MHz
Time relative to the power decrease (ms)	0.766
Measurement uncertainty	**≤ ± 5 %**

See annex no.: **2, page 2.**

Limits Clause 15.1.6

The transmitter release time shall not exceed:	1 ms

Test Equipment Used: 16, 208, 1066, 1079, 1194, 1337

Power level at which the measurement has been performed: 12.5W

Time Characteristics	159.025 MHz
Time relative to the power decrease (ms)	0.760
Measurement uncertainty	**≤ ± 5 %**

See annex no.: **3, page 2.**

Limits Clause 15.1.6

The transmitter release time shall not exceed:	1 ms

Test Equipment Used: 16, 208, 1066, 1079, 1194, 1337

3.2 DSC Transmissions

IEC 61993-2, Cl.15.2.1

3.2.1 Frequency error of the DSC Signal

Power level at which the measurement has been performed: 2 W

Test Conditions		Frequency Error Hz	
		B (2100Hz)	Y (1300Hz)
T_{nom}	V_{nom}(24.0 V)	0.3	0.2
T_{min}(-15 °C)	V_{min}(21.6 V)	0.2	0.1
	V_{max}(31.2 V)	0.2	0.1
T_{max}(+55 °C)	V_{min}(21.6 V)	0.3	0.2
	V_{max}(31.2 V)	0.3	0.2
Maximum frequency error (Hz)		0.3	0.2
Measurement uncertainty		**≤ ± 0.5 Hz**	

Limits:

Normal Test Conditions	Extreme Test Conditions
± 1.0%	± 1.0%

Test Equipment Used: 16, 208, 1013, 1066, 1194

IEC 61993-2, Cl.15.2.2

3.2.2 Modulation Rate

Measured Baud rate	Limit
Bits/sec 1200.0114 (+9.5 ppm)	1200 ± 30 ppm
Measurement uncertainty	**≤ ± 10 ppm**

Measured on printed circuit board with a frequency counter.

Test Equipment Used: 19, 1013, TB

3.3 TDMA Receivers

IEC 61993-2, Cl.15.3.1

3.3.1 Sensitivity – 25kHz Operation

Test Conditions		Receiver Sensitivity dBm	
		156,025MHz	162,025MHz
T_{nom}	V_{nom}(24.0 V)	-108.3 (-109.9)**	-108.3 (-110.2)**
T_{min}(-15°C)	V_{min}(21.6 V)	< -107*	< -107*
	V_{max}(31.2 V)	< -107*	< -107*
T_{max}(+55 °C)	V_{min}(21.6 V)	< -106.5*	< -106.5*
	V_{max}(31.2 V)	< -106.5*	< -106.5*
Measurement uncertainty		**≤ ± 1.5 dB**	
Test criterium		PER =20%	

* PER < 20 %
** Results in brackets are measured with software: Version 2.0c.

Limits Clause 15.3.1

Normal test conditions	-107 dBm
Extreme test conditions	-101 dBm

Test Equipment Used: 16, 130, 208, 257, 1194, 1218, 1337

IEC 61993-2, Cl.15.3.2

3.3.2 Sensitivity – 12.5kHz Operation

Test Conditions		Receiver Sensitivity dBm	
		157,4125MHz	160,6375MHz
T_{nom}	V_{nom}(24.0 V)	-102.5	-102.0
T_{min}(-15 °C)	V_{min}(21.6 V)	< -102.5*	< -102*
	V_{max}(31.2 V)	< -102.5*	< -102*
T_{max}(+55 °C)	V_{min}(21.6 V)	< -99.5*	< -99.0*
	V_{max}(31.2 V)	< -99.5*	< -99.0*
Measurement uncertainty		**≤ ± 1.5 dB**	
Criterium		PER =20%	

* PER < 20 %

Limits Clause 15.3.2

Normal test conditions	-98 dBm
Extreme test conditions	-92 dBm

Test Equipment Used: 16, 130, 208, 257, 1194, 1218, 1337

IEC 61993-2, Cl.15.3.3

3.3.3 Error Behaviour at High Input Levels

Test Signal 2 159.025 MHz

Input to receiver	Number of Messages not Correctly Received at	
	- 7dBm	- 77dBm
	0.2 %	0.4 %
Variation in %	0.2	
Measurement uncertainty	**≤ ± 0.5 dB**	

Limit Clause 15.3.3

Variation between –7 dBm and –77 dBm	≤ 1%

Test Equipment Used: 16, 130, 208, 1337

Test Signal 3 159.025 MHz

Input to receiver	Number of Messages not Correctly Received at	
	- 7dBm	- 77dBm
	0.2 %	0.2 %
Variation in %	0.0	
Measurement uncertainty	**≤ ± 0.5 dB**	

Limit Clause 15.3.3

Variation between –7 dBm and –77 dBm	≤ 1%

Test Equipment Used: 16, 130, 208, 1337

IEC 61993-2, Cl.15.3.4

3.3.4 Co-Channel Rejection - 25kHz Operation

Frequency Of Unwanted Signal	Co-Channel Rejection Ratio dB		
	156.025 MHz	**159.025 MHz**	**162.025 MHz**
f + 3000Hz	-9.6 (19.9 %)	-9.5 (19.8 %)	-9.4 (15.1 %)
f	-9.5 (18.0 %)	-9.6 (19.5 %)	-9.4 (19.0 %)
f - 3000Hz	-9.9* (< 20%)	-9.9* (< 20%)	-9.8* (< 20%)
Measurement uncertainty	**≤ ± 1.0 dB**		

Values in brackets indicate PER in %.

* This results are the average of several measurement series. This is performed because of variations in the readings (a few prosent around the limit of the PER ; PER < 20 %).

Limits Clause 15.3.4

Channel Separation: 25kHz	-10dB<Limit<0dB (and >0)

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1337

IEC 61993-2, Cl.15.3.5

3.3.5 Co-Channel Rejection - 12.5kHz Operation

Frequency Of Unwanted Signal	Co-Channel Rejection Ratio dB	
	157.4125 MHz	160.6375 MHz
f + 1500Hz	-17.2 (18.5%)	-17.3 (19.1%)
f	-13.4 (19.8%)	-13.4 (18.3%)
f - 1500Hz	-17.2 (18.7%)	-17.1 (17.4%)
Measurement uncertainty	**≤ ± 1.0 dB**	

Values in brackets indicate PER in %.

Limits Clause 15.3.5

Channel Separation: 12.5kHz	-18dB<Limit<0dB (and >0)

Test Equipment Used: 16,130, 208, 257, 1079, 1194, 1337

IEC 61993-2, Cl.15.3.6

3.3.6 Adjacent Channel Selectivity – 25kHz Operation

Test Conditions		Adjacent Channel Selectivity Ratio dB			
		156.025 MHz		162.025 MHz	
		+ 25 kHz	- 25 kHz	+ 25 kHz	- 25 kHz
T_{nom}	V_{nom}(24 V)	> 75*	> 75*	> 75*	> 74*
T_{min}(-15 °C)	V_{min}(21.6 V)	> 72*	> 71*	> 72*	> 71*
	V_{max}(31.2V)	> 72*	> 71*	> 72*	> 71*
T_{max}(+55 °C)	V_{min}(21.6 V)	> 74*	> 74*	> 74*	> 74*
	V_{max}(31.2 V)	> 74*	> 74*	> 74*	> 74*
Measurement uncertainty		≤ ± 2.5 dB			

* PER < 20 %

Limits Clause 15.3.6

Channel Separation	Normal Conditions	Extreme Conditions
25,0 kHz	70,0 dB	60,0 dB

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1218, 1337

IEC 61993-2, Cl.15.3.7

3.3.7 Adjacent Channel Selectivity – 12.5kHz Operation

Test Conditions		Adjacent Channel Selectivity Ratio dB			
		157.4125 MHz		160.6375 MHz	
		+ 12.5 kHz	- 12.5 kHz	+ 12.5 kHz	- 12.5 kHz
T_{nom}	V_{nom}(24 V)	> 56*	> 56*	> 57*	> 57*
T_{min}(-15 °C)	V_{min}(21.6 V)	> 54*	> 53*	> 54*	> 53*
	V_{max}(31.2V)	> 54*	> 53*	> 54*	> 53*
T_{max}(+55 °C)	V_{min}(21.6 V)	> 53*	> 58*	> 53*	> 58*
	V_{max}(31.2 V)	> 53*	> 58*	> 53*	> 58*
Measurement uncertainty		≤ ± 2.5 dB			

* PER < 20 %

Limits Clause 15.3.7

Channel Separation	Normal Conditions	Extreme Conditions
12,5 kHz	50,0 dB	50,0 dB

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1218, 1337

IEC 61993-2, Cl.15.3.8

3.3.8 Spurious Response Rejection

TDMA Receiver

Spurious Response Rejection	
159.025 MHz	
Frequency MHz	**Ratio dB**
169.514	76.5
Others (0.1 MHz – 2 GHz)	> 80
-	
Measurement uncertainty	**≤ ± 2.5 dB**

Limits Clause 15.3.8

Rejection ratio limit	70,0 dB

Test Equipment Used: 16, 130, 208, 257, 1066, 1079, 1194

IEC 61993-2, Cl.15.3.9

3.3.9 Intermodulation Response Rejection and Blocking

Test 1:

Measured value	Generator A	Generator B	Generator C	Generator D
1 %. (1.3 %)	156.025	156.525	157.025	161.750
1.7 %. (0.9 %)	156.025	155.525	155.025	150.300
Measurement uncertainty		**≤ ± 2 dB**		

Measured with standard test signal 2 and (3).

Limits Clause 15.3.9

The packet error rate, with the outputs of signal generators B, C and D switched on, shall be 20% or less.

Test Equipment Used: 3, 16, 130, 208, 289, 1002, 1079, 1134, 1337

Test 2:

Measured value	Generator A	Generator B	Generator C	Generator D
1.9 %. (1.9 %)	162.025	162.525	163.025	167.750
1.6 % (1.7 %)	162.025	161.525	161.025	156.300
Measurement uncertainty		**≤ ± 2.0 dB**		

Measured with standard test signal 2 and (3).

Limits Clause 15.3.9

The packet error rate, with the outputs of signal generators B, C and D switched on, shall be 20% or less.

Test Equipment Used: 3, 16, 130, 208, 289, 1002, 1079, 1134, 1337

IEC 61993-2, Cl.15.3.10

3.3.10 Transmit to Receive Switching Time

MHz	Measurement results	Required results
156.025	-107.3 dBm (14.4%) -108.3 dBm (21.4%)	-107dBm , PER ≤ 20%
162.025	-107.3 dBm (10.8%) -108.3 dBm (22.2%)	-107dBm , PER ≤ 20%
Measurement uncertainty		**≤ ± 1.5 dB**

Test Equipment Used: 16, 130, 208, 1194

3.4 DSC Receiver

IEC 61993-2, Cl.15.4.1

3.4.1 Maximum Sensitivity

Test Conditions		Receiver Sensivity dBm		
		156.525 MHz	156.525 MHz + 1.5 kHz	156.525 MHz - 1.5 kHz
T_{nom}	V_{nom} (24.0 V)	< -108*	< -108*	< -109*
T_{min} (-15 °C)	V_{min} (21.6 V)	< -107*	< -106*	< -104*
	V_{max} (31.2 V)	< -107*	< -106*	< -104*
T_{max} (+55 °C)	V_{min} (21.6 V)	< -106*	< -105*	< -104* (1)
	V_{max} (31.2 V)	< -106*	< -105*	< -104*
Measurement uncertainty		**≤ ± 1.5 dB**		
Test criterium		BER $=10^{-2}$		

* BER < $5.8*10^{-4}$ (No loss of packets)
(1) Example : with a level at –107.5 dBm, the BER is 0.36% ($0.36*10^{-2}$) with 10 lost packets.

Limits Clause 15.4.1

Normal test conditions	≤ - 107dBm
Extreme test conditions	≤ - 101dBm

Test Equipment Used: 16, 130, 208, 257, 1194, 1218, 1337

IEC 61993-2, Cl.15.4.2

3.4.2 Error Behaviour at High Input Levels

Test Signal 1

Measured value	$< 1*10^{-5}$
Measurement uncertainty	$\leq \pm 0.5$ dB

Limit Clause 15.4.2

BER	$\leq 10^{-2}$

Test Equipment Used: 16, 130, 208, 1337

IEC 61993-2, Cl.15.4.3

3.4.3 Co-Channel Rejection

Frequency Of Unwanted Signal	Co-Channel Rejection Ratio dB
f + 3000Hz	-10 (0.021%) 0*, -7 (0.051%) 8*
f	-10 (0.019%) 0*, -7 (0.070%) 3*
f - 3000Hz	-10 (0.005%) 0* -7 (0.035%) 7*
Measurement uncertainty	**≤ ± 1.0 dB**

* Lost packets

Limits Clause 15.4.3

Channel Separation: 25kHz	-10dB <Limit< 0dB (and >0)
BER	$\leq 10^{-2}$

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1337

IEC 61993-2, Cl.15.4.4

3.4.4 Adjacent Channel Selectivity

Test Conditions		Adjacent Channel Selectivity Ratio dB	
		156.525 MHz	
		+ 25 kHz	- 25 kHz
T_{nom}	V_{nom}(24.0 V)	> 74*	> 74*
T_{min}(-15 °C)	V_{min}(21.6 V)	> 73*	> 72*
	V_{max}(31.2 V)	> 73*	> 72*
T_{max}(+55 °C)	V_{min}(21.6 V)	> 67*	> 67*
	V_{max}(31.2 V)	> 67*	> 67*
Measurement uncertainty		≤ ± 2.5 dB	
Test criterium		BER ≤ 10^{-2}	

* BER < $2*10^{-5}$ (No loss of packets)

Limits Clause 15.4.4

Channel Separation	Normal Conditions	Extreme Conditions
25,0 kHz	70,0 dB	60,0 dB

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1218, 1337

IEC 61993-2, Cl.15.4.5

3.4.5 Spurious Response Rejection

DSC Receiver

Spurious Response Rejection	
156.525 MHz	
Frequency MHz	**Ratio dB**
0.1 MHz – 2 GHz	> 80.5
-	-
Measurement uncertainty	**≤ ± 2.5 dB**

Limits Clause 15.4.5

Rejection ratio limit	70,0 dB
BER	$\leq 10^{-2}$

Test Equipment Used: 16, 130, 208, 257, 1066, 1079, 1194, 1337

IEC 61993-2, Cl.15.4.6

3.4.6 Intermodulation Response Rejection

Frequency Increments Of Unwanted Signals	Intermodulation Response Rejection Ratio dB
	156.525 MHz
-50 / -100 kHz	> 75 ($2*10^{-6}$)
+50 / +100 kHz	> 75 ($2*10^{-6}$)
Measurement uncertainty	**≤ ± 2.0 dB**

Limits Clause 15.4.6.

The intermodulation response rejection ratio	> 65.0dB
BER	$\leq 10^{-2}$

Test Equipment Used: 16, 130, 208, 289, 1002, 1079, 1134, 1337

IEC 61993-2, Cl.15.4.7

3.4.7 Blocking or Desensitisation

Frequency Of Wanted Signal	Blocking Or Desensitisation Ratio dB
	156.525 MHz
f - 1 MHz	> 90 ($2*10^{-5}$)
f - 2 MHz	> 90 (< $1'10^{-5}$)
f - 5 MHz	> 90 (< $1'10^{-5}$)
f - 10 MHz	> 90 (< $1'10^{-5}$)
f + 1 MHz	> 90 (< $1'10^{-5}$)
f + 2 MHz	> 90 (< $1'10^{-5}$)
f + 5 MHz	> 90 (< $1'10^{-5}$)
f + 10 MHz	> 90 ($2*10^{-5}$)
Measurement uncertainty	**≤ ± 2.5 dB**

Limits Clause 15.4.7

The blocking ratio	≥ 84.0dB
BER	≤ 10^{-2}

Test Equipment Used: 16, 130, 208, 257, 1079, 1194, 1218, 1337

IEC 61993-2, Cl.15.5.1

3.5 Conducted Spurious Emissions Conveyed to the Antenna

3.5.1 Spurious Emissions from the Receiver

Spurious Emissions		
159.025 MHz (TDMA), 156.525 MHz (DSC)		
Frequency MHz	Bandwith kHz	Level dBm
0.15 - 2000	Max.100	< -70
Measurement uncertainty		**≤ ± 1.1 dB**

Bandwidth (kHz) refers to the bandwidth of the measuring spectrum analyzer.
A peak detector are used.

Limits Clause 15.5.1

	Frequency Range	Limits
Conducted	150 KHz to 1 GHz	2 nW (-57,0 dBm)
	1 GHz to 2 GHz	20nW (-47,0 dBm)

Test Equipment Used: 16, 208, 1079, 1337

IEC 61993-2, Cl.15.5.2

3.5.2 Spurious Emissions from the Transmitter

Spurious Emissions		
159.025 MHz		
Frequency MHz	Bandwith kHz	Level dBm
318.050	10	-37.1*
Others 0.15 - 2000	-	< limit –10 dB
Measurement uncertainty		**≤ ± 1.1 dB**

* With 12.5 W output power. With 2 W output power, all < limit – 10 dB.
Bandwidth (kHz) refers to the bandwidth of the spectrum analyzer.
A peak detector are used.

Limits Clause 15.5.2

	Frequency Range	Limits
Conducted	150 KHz to 1 GHz	0,25 µW (-36,0 dBm)
	1 GHz to 2 GHz	1 µW (-30,0 dBm)

Test Equipment Used: 16, 208, 1169, 1170, 1079, 1337

4 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify identification of the test equipment and ancillaries used, all item used are identified by the testhouse on each page of the test report. All numbers are referenced to the list given below.

C	No	Instrument/Ancillary	Manufacturer	Type
LR	1194	Attenuator	Narda	768-30
LR	1134	Attenuator	Suhner	6820.17.A
LR	130	Attenuator Adjustable	R&S	DPU
LR	1218	Climate Chamber	Vötsch	HC4057
LR	1013	Counter Freq	HP	HP5385A
LR	1169	Filter Band Pass	Trilithic	5VF250/500
LR	1170	Filter Band Pass	Trilithic	5VF500/1000
LR	1079	Generator, AF/../UHF	R&S	SMHU56
LR	1002	Generator, AF/../UHF	R&S	SMPC
LR	3	Generator, MF/../UHF	HP	HP8640B
LR	257	Hybrid	Anzaz	H-9
LR	289	Hybrid	Anzaz	DS-4-4
LR	208	Multimeter, Digital	Fluke	77
LR	1239	Oscilloscope	Fluke	PM3392A
LR	16	Power Supply	Oltronix	B32-10R
LR	19	Power Supply	Oltronix	B32-10R
LR	1338	Probe, RF	HP	HP8481H
LR	1066	Radiocomm Analyzer	R&S	CMTA 54
LR	1337	Spectrum Analyzer	R&S	FSEK 1088,3494,30
LR	142	Wattmeter, RF, Wideband	HP	HP435B
	A	AIS Transponder Test Board	Norbit	