

Test Report

From

NEMKO EMC-Lab.

EMC Test Report For

Product.....: *Emergency Transmitter*
Manufacturer.....: *Jotron Electronics AS*
Model.....: *Tron 40s*
NEMKO Reference.....: *199626200*
Regulations.....: *See below*

Standards	Results (Pass/Fail)
EN 50081-2:1993	Pass
EN 50082-2:1995	Pass

Tested by : *Arne Holhjem*

Verified by : *Kjell Bergh*

Test dates :

Issue date :

Test House :

Arne Holhjem

Kjell Bergh

96-06-26

96-07-03

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The results in this report apply only to the sample(s) tested.

EQUIPMENT UNDER TEST (EuT)

1 Client Information

Company Name *Jotron Electronics AS*

Company Address *P.O. Box 85
3280 Tjodalyng
NORWAY*

Phone/Fax

Contact Name *Leif Hansen*

2 Identification of EuT

Equipment *Emergency Transmitter*

Manufacturer *Jotron Electronics AS*

Model Name/Number *Tron 40s*

Serial Number *Unnumbered*

Country of Manufacture *Norway*

Date of Receipt *96-06-26*

3 Technical data of EuT

Voltage *14.4 V DC*

Power

Class *I*

4 Remarks

N/A means: This apparatus is operated with build in battery.

OPERATION OF EuT DURING TEST

1 Operating Environment

Power supplied to the testobject during test : 14.4 V DC lithiumbattery
EuT was grounded during test

All tests and measurements were performed in a shielded enclosure.

2 Operating Modes

EuT was tested according to the specifications given by the manufacturer, and exercised in the most unfavourable manner.

3 Support Equipment

No support equipment necessary.

Test Report according to EN 50081-2

SECTION 1 REPORT SUMMARY**1.1 Test specifications**

Basic Standard	Comment	Results (Pass/Fail)
EN 55011 Class A	Conducted Emission 0,15-30 MHz	N/A
EN 55011 Class A	Radiated Emission 30-1000 MHz	Pass

1.2 Result

EuT complies with the requirements of EN 55011 and EN 60945. Emergency transmitter is tested in A position. Transmitter is not activated: No Radiated Emission was obtained 30...1000mhz, and in the mobil maritime frequency band 156-162MHz.

1.3 Measurement Uncertainties

For Conducted Emission measurement : 1.9 dB

For Radiated Emission measurement : 3.0 dB

1.4 Test Equipment Used

Full details of test equipment used, can be found in Appendix 1.

SECTION 2 RADIATED EMISSION

2.1 Radiated Emission Measurement

Port : *Enclosure*
 Basic Standard : *EN 55011 : 1991*
 Limits : *Class A*
 Distance : *30 m*

Freq. [MHz]	Meter [dBuV]	Correct. [dB]	Field [dBuV/m]	Margin [dBuV/m]	Polarity [H/V]	Height [cm]	Azimuth [Deg]	Result (Pass / Fail)
30-230 Mhz (Limit = 30 dBuV/m)								
122.6	68.0	7.7	75.7	45.7	H	139	127	Pass
122.6	97.1	7.7	104.8	74.8	V	110	1	Pass
230-1000 Mhz (Limit=37 dBuV/m)								
245.1	54.4	12.9	67.3	30.3	V	101	82	Pass
367.6	30.8	17.7	48.5	11.5	V	103	47	Pass
490.2	31.0	20.4	51.4	14.4	V	308	4	Pass
612.8	32.8	22.8	55.6	18.6	V	186	73	Pass
735.3	27.9	25.2	53.1	16.1	V	201	47	Pass
857.8	37.4	28.3	65.7	28.7	V	128	198	Pass
980.4	25.7	29.1	54.8	17.8	V	263	262	Pass

Comment

If no frequencies are specified in the above table, no measureable frequencies were found.
 Emergency transmitter is tested in position transmit. In standby mode no frequency was observed.

Test equipment used

N.B. See Appendix 1 for full details of test equipment

Result

Measurements complies with the given specifications.

Test Report according to EN 50082-2 : 1995

SECTION 1 REPORT SUMMARY

1.1 Test specifications

Basic Standard	Comment	Port	Results (Pass/Fail)
ENV 50140	RF EM Field 80-1000 MHz AM	Enclosure	Pass
	RF EM Field 900±5 MHz PM	Enclosure	Pass
ENV 50141	RF Voltage 0.15-80 MHz AM	Signal lines/Data busses	N/A
		Process control lines	N/A
		DC lines	N/A
		AC lines	N/A
		Earth	N/A
IEC 61000-4-4	Fast Transients/Burst	Signal lines/Data busses	N/A
		Process control lines	N/A
		DC lines	N/A
		AC lines	N/A
EN 61000-4-2	ElectroStatic Discharge	Enclosure	Pass
EN 61000-4-8	50 Hz Magnetic Field	Enclosure	N/A

1.2 Result

EuT complies with the requirements of EN 50082-2

1.3 Level Uncertainties

For ESD Test (Voltage)	: 5 %
For ESD Test (Rise Time)	: 6 %
For Radiated EM Field test	: # V/m
For RF Voltage test	: # V
For 50 Hz Magnetic Field test	: # A/m
For Transient/Burst test (Voltage)	: 10 %
For Transient/Burst test (Rise Time)	: 30 %
For Transient/Burst test (Frequency)	: 10 %

1.4 Test Equipment Used

Full details of test equipment used, can be found in Appendix 1 and 2.

SECTION 2 ELECTROSTATIC DISCHARGE

2.1 Electrostatic Discharge (ESD) Immunity Test

Port : *Enclosure*
Basic Standard : *EN 61000-4-2*
Requirements : *4/8 kV*
Performance Criteria : *B*

Temperature/Humidity: 22 °C/45%

Test Procedure

The electrostatic discharges were applied as follows :

Point	Voltage	Coupling	Result (Pass/Fail)
Topp,-side-button	± 8 kV	Air Discharge	Pass
<>	± 4 kV	Contact	Pass

Performance

No operation errors were detected during or after the discharges.

Test equipment used

N.B. See Appendix 2 for full details of test equipment

Result

Performance of EuT complies with the manufacturer specifications.

SECTION 3 RADIATED EM FIELD 80-1000 MHZ

3.1 Radiated Electromagnetic Field Immunity Test

Port : *Enclosure*
Basic Standard : *ENV 50140*
Requirements : *10 V/m + 80% AM, 1 kHz*
Performance Criteria : *A*

Test Procedure

Frequency range : 80 MHz - 1000 MHz.
Step : 800 kHz
Step time : 2 Sec.

Range	Field	Modulation	Pol.	Pos	Result (Pass/Fail)
80-200 MHz	>10 V/m	80% AM, 1kHz	H	0°	Pass
<>	<>	<>	V	0°	Pass
<>	<>	<>	H	180°	Pass
<>	<>	<>	V	180°	Pass
200-1000 MHz	<>	<>	H	0°	Pass
<>	<>	<>	V	0°	Pass
<>	<>	<>	H	180°	Pass
<>	<>	<>	V	180°	Pass

Tested in transmit and standby mode.

Performance

No operation errors were detected during or after the exposure.

Test equipment used

N.B. See Appendix 2 for full details of test equipment

Result

Performance of EuT complies with the manufacturer specifications.

SECTION 4 RADIATED EM FIELD 900 ± 5 MHz

4.1 Radiated Electromagnetic Field Immunity Test

Port : *Enclosure*
Basic Standard : *ENV 50140*
Requirements : *10 V/m*
Performance Criteria : *A*

Test Procedure

Frequency range : 900 ± 5 MHz
Step : 10
Step time : 3 Sec.

Range	Field	Modulation	Pol.	Pos	Result (Pass/Fail)
900 ± 5 MHz	>10 V/m	PM (50% d.c., 200 Hz)	H	0°	Pass
<>	<>	<>	V	0°	Pass
<>	<>	<>	II	180°	Pass
<>	<>	<>	V	180°	Pass

Performance

No operation errors were detected during or after the exposure.

Test equipment used

N.B. See Appendix 2 for full details of test equipment

Result

Performance of EuT complies with the manufacturer specifications.

APPENDIX 1 TEST EQUIPMENT USED (Emission)

	Instruments	Manufacturer	Model	N-No.
	Conducted Emission			
	Test Receiver 9 kHz-30 MHz	Rohde&Schwarz	ESHS 30	N-3529
	Test Receiver 9 kHz-30 MHz	Rhode&Schwarz	ESH-3	N-2337
	Artificial Mains Network (LISN)	Rhode&Schwarz	ESH-2 Z5	N-3558
	Artificial Mains Network (LISN)	Rohde&Schwarz	ESH-3 Z5	N-2337.2
	Pulse Limiter	Rohde&Schwarz	ESH 3-Z2	N-2337.3
	Pulse Limiter	Rhode&Schwarz	ESH 3-Z2	N-3493
	Antenna Terminal Emission			
	RF Generator 0.1 MHz - 1 GHz	Philips	PM 5390S	N-3447
	Color TV Pattern Generator	Philips	PM 5415 TN	N-3455
	Radiated Emission 3-30 m (<1 GHz)			
	EMI Test Receiver 20-1300 MHz	Rohde&Schwarz	ESVP	N-3457
	Spectrum Monitor	Rohde&Schwarz	EZM	N-3441
	Spectrum Analyzer 9 kHz-2.6 GHz	Advantest	R3261A	N-3458
	BiConical Antenna 20-300 MHz	Rhode&Schwarz	HUF-Z2	N-3467
	LogPeriodic Antenna 200-1000 MHz	EMCO	3146	N-3468
	BiConiLog Antenna 26-1100 MHz	EMCO	3143	N-3448
	Radiated Emission 3-30m (1-22 GHz)			
x	Quasi-Peak Adapter	Hewlett-Packard	35650A	N-3443
x	RF Preselector	Hewlett-Packard	85685A	N-3444
x	Spectrum Analyzer 1-22 GHz	Hewlett-Packard	8566B	N-3442
x	Synthesized CW Generator 1-20 GHz	Hewlett-Packard	83711A	N-3451
	Horn Antenna	EMCO		
	Horn Antenna	EMCO		
	Disturbance Power			
	Test Receiver 20 MHz-1.0 GHz	Rohde&Schwarz	ESVS 20	N-2886
	Absorbing Clamp 30 MHz-1 GHz	Rohde&Schwarz	MDS 21	N-2179.2
	Clamp Positioning Controller	Rohde&Schwarz	HCC	N-3321.2
	Automatic Clamp Slideway	Rohde&Schwarz	HCA	N-3321.1
	Harmonics/Flicker			
	Universal Power Analyzer	Voltech	PM 3000A	N-2881
	1 ϕ Impedance Stabilizing Network	Voltech		N-3166
	Discontinuous Conducted Emission			
	Test Receiver	Chase	DIA 1512	N-3548
	Test Receiver	Chase	DIA 1512	N-2270
	Artificial Mains Network (LISN)	Rhode&Schwarz	ESH-2 Z5	N-2099.2
	Artificial Mains Network (LISN)	Schwarzbeck	NNLA 8120	N-2168
	Conducted Emission On Output Line			
	High Voltage Probe	Rohde&Schwarz	ESH2-Z3	N-2337.3
	High Voltage Probe	Schwarzbeck	TK 9420	N-3368
	Magnetic Field			
	Test Receiver 9 kHz-30 MHz	Rohde&Schwarz	ESHS 10	N-3528
	Trippel-loop Antenna (2 meter loop)	Rohde&Schwarz	HM 020	N-3320
	Artificial Mains Network (LISN)	Rohde&Schwarz	ESH-3 Z5	N-3402



	Instruments	Manufacturer	Model	N-No.
	Insertion Loss			
	Test Receiver 9 kHz-30 MHz	Rhode&Schwarz	ESH-3	N-2099.1
	Artificial Mains Network (LISN) 150 Ω	Chase	MN 2016	N-3342
	Ballun (Balance to unbalance transformer)	NEMKO	Ballun 1	N-3343

APPENDIX 2 TEST EQUIPMENT USED (Immunity)

	Instruments	Manufacturer	Model	N-No.
	Electrostatic Discharge			
	ESD Simulator 2-18 kV	Schaffner	NSG 433	N-2890
	AC Mains Disturbances			
	Interference Test System	Schaffner	NSG 600	N-2883
	Burst Generator	Schaffner	NSG 625	N-2883.1
	Combined Wave Generator	Schaffner	NSG 623	N-2883.2
	Dropout And Variation Simulator	Schaffner	NSG 603A	N-2883.3
	High Energy Puls Generator	Schaffner	NSG 651	N-2884
	Surge Pulse Coupling Network	Schaffner	CDN 110	N-2884.1
	Coupling Clamp	Schaffner	CDN 125	N-2891
	Radiated Immunity			
x	Anechoic Chamber	Euroshield		
x	Signal Generator	Rohde&Schwarz	SMT 03	
x	Power Meter	Boonton		
x	Power Amplifier	Amplifier Research	1000 L	N-3463
x	Power Amplifier	Amplifier Research	200W1000M7	N-3464
x	Biconical Antenna 20-300 MHz	EMCO	3109	
x	Logperiodic Antenna 200-1000 MHz	EMCO	3146	N-3468
x	Field Probes	Amplifier Research	FP 3000A	
x	System Interface	EMCAutomation	SI-200	
	Radiated/Conducted Immunity			
	Signal Generator	Rohde&Schwarz	SMG	N-2885
	Power Meter	Rohde&Schwarz	NRVD	N-3573
	Power Amplifier 10 kHz-100 MHz	Amplifier Research	25A100	N-2888
	Power Amplifier 100 MHz-1 GHz	Amplifier Research	25W1000M7	N-2889
	System Interface	EMC Automation	SI-100	N-2893
	Coupling/Decoupling Network	FCC	FCC-801-6-C1/75	N-3501
	Coupling/Decoupling Network	FCC	FCC-801-6-T2	N-3439
	Coupling/Decoupling Network	FCC	FCC-801-6-T4	N-3500
	Coupling/Decoupling Network	FCC	FCC-801-6-M4	N-3502
	Coupling/Decoupling Network	FCC	FCC-801-6-M3	N-3599
	Coupling/Decoupling Network	FCC	FCC-801-6-M2	N-3606
	Coupling/Decoupling Network	FCC	FCC-801-6-M1	N-3605
	EM Clamp	FCC	F-2031	N-3438
	GTEM! Cell	EMCO	5317	N-2892