telefication bv
The Netherlands
Chamber of Commerce
09076358
www.telefication.com

telefication

Test report
99512130

based on:
FCC Part 15 Subpart C, sections 15.209 (10-1-03 Edition)

Transmitter/initiator
TRW
29EC

Contents

This report comprises of five modules. The total number of pages exclusive of the pages enclosed in the additional information module is: 23

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:1999. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

Ordering party:

Company name	:	TRW Automotive Electronics
Address	:	Stratford Road Shirley
Zipcode	:	B90 4GW
City/town	:	Solihull
Country	:	United Kingdom
Date of order	:	31 March 2004

2 Product

A sample of the following product was submitted for testing:

Product name	:	Transmitter/initiator
Product category	:	Intentional radiators
Manufacturer	:	TRW Automotive Electronics
Trade mark	:	TRW
Type designation	:	29EC
FCC ID	:	KHH29EC
Emission designator	:	None
Hardware version	:	--
Software version	:	--
Serial number	:	--

3 Test schedule

Tests were carried out in accordance with the specification detailed in chapter 6 "Summary" of this report.

Tests were carried out at the following location:

- Telefication, Zevenaar

The sample of the product was received on:

- 2 April 2004

Tests were carried out on:

- 5 and 6 April 2004

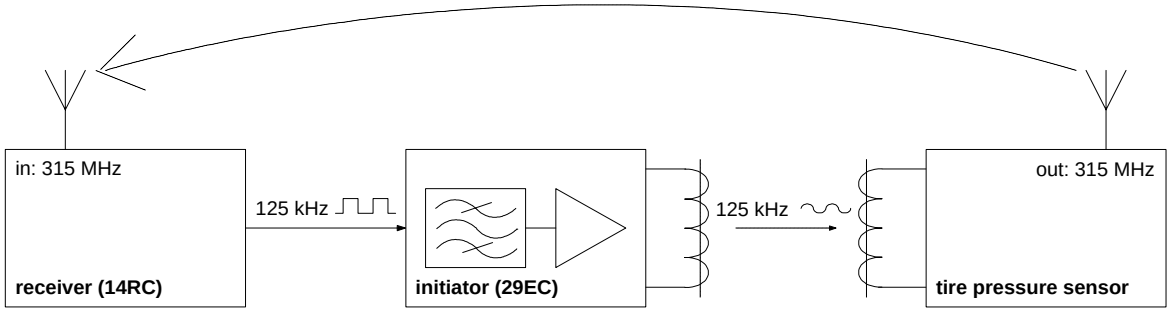
4 Product documentation

For production of this report the following product documentation was used:

Description	Date	Identification
Circuit diagram 29EC	20/06/03	59308347
Assembly drawing29EC	23/06/03	59308348
Solder paste	23/06/03	59308347
Printed wiring board	23/06/03	59308347
Fabrication drawing	23/06/03	59308347
Mother panel drawing	23/06/03	59308347
Solder mask (top)	23/06/03	59308347
Solder mask (bottom)	23/06/03	59308347
Top metal	23/06/03	59308347
Bottom metal	23/06/03	59308347

5 Observations and comments

This product operates as part of a tire pressure monitoring system, as indicated below:



As this product is to be certified separately - for repeatablilty reasons - the 125 kHz square wave from the receiver (RC14) was simulated by means of a pulse/function generator.

The initiator (29EC) is specified for operation in the frequency range 83.33 kHz – 181.82 kHz. During testing, the function/pulse generator was set to 131.5 kHz, which frequency yielded the highest attainable RF-field level.

6 Summary

The product is intended for use in the following application area:

Tyre pressure monitoring for automotive applications

The sample was tested according to the following specification:

FCC Part 15 Subpart C, sections 15.209 (10-1-03 Edition)

7 Conclusions

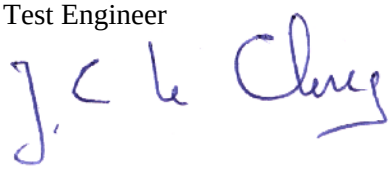
The sample of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 6 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication does not accept any responsibility for the results stated in this report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : ing. J.C. le Clercq

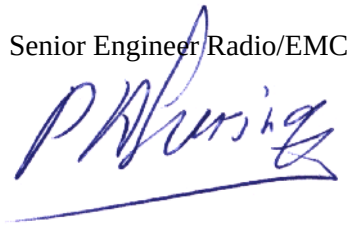
function : Test Engineer

signature : 

Review of test methods and report by:

name : ing. P.A. Suringa

function : Senior Engineer Radio/EMC

signature : 

The above conclusions have been verified by the following signatory:

date : 26 April 2004

name : J. P. van de Poll

function : Co-ordinator Test Group

signature : 

Test results module

1 Summary

Test Form: FCC Part 15; subpart C; sections 15.209
Summary

According to FCC Part 15; subpart C; sections 15.209 the following tests have been performed:

Port	Reference	Phenomena	Result
Enclosure	section 15.209	Radiated emissions	P

Results:

P	=	pass	NA	=	not applicable
F	=	fail	NP	=	not performed

2 Emission tests

2.1 Field strength of intentional signal

Compliance standard : FCC part 15, subpart C, section 15.209.
Method of test : ANSI C63.4-2001, sections 5.3 & 8.2.1; FCC part 15, subpart A, section 15.31 (f)(2), 15.33, 15.35.
Justification : Because of strong ambient signals, a measuring distance of 3 m has been chosen. An inverse linear distance extrapolation factor of -40 dB/decade has been applied to determine results at a distance of 300 m.
The EUT transmitting frequency was 131.5 kHz (worst case; highest level).

Test results :

Measurement in front of EUT			
Orthogonal Plane	Test result @ 3 m distance (dBµV/m) (QP)	Extrapolation to 300 m distance (dBµV/m) (QP)	Limit @ 300 m distance (dBµV/m) (QP)
X	83.5	3.5	25.2
Y	98.2	18.2	25.2
Z	75.4	-4.6	25.2

Test equipment:

Test equipment used: (Item numbers)	1, 2

Item numbers refer to the used test equipment module.

2.2 Field strength of unwanted emissions (< 30 MHz)

Compliance standard : FCC part 15, subpart C, section 15.209.
Method of test : ANSI C63.4-2001, sections 5.3 & 8.2.1; FCC part 15, subpart A, section 15.31 (f)(2), 15.33, 15.35.
Justification : Due to the fact that, at 300 or 30 m distance, harmonics of the intentional signal were found to be masked by ambient signals, measurements have been made at 3 m distance.
An inverse linear distance extrapolation factor of -40 dB/decade has been applied to determine the result at a distance of 30 or 300 meters.

Test results :

Orthogonal plane: X			
Frequency (kHz)	Test result @ 3 m distance (dBµV/m) (QP)	Extrapolation to 30/300 m distance (dBµV/m)	Limit (dBµV/m)
263.0	42.6	-37.4	19.2 (@ 300 m)
394.0	57.3	-22.7	15.7 (@ 300 m)
526.0	37.1	-2.9	33.2 (@ 30 m)
657.5	ambient	ambient	31.2 (@ 30 m)
789.0	ambient	ambient	29.7 (@ 30 m)
920.5	ambient	ambient	28.3 (@ 30 m)
1052.0	ambient	ambient	27.2 (@ 30 m)
1183.5	ambient	ambient	26.1 (@ 30 m)
1315.0	32.3	-7.7	25.2 (@ 30 m)

Orthogonal plane: Y			
Frequency (kHz)	Test result @ 3 m distance (dBµV/m) (QP)	Extrapolation to 30/300 m distance (dBµV/m)	Limit (dBµV/m)
263.0	68.0	12.0	19.2 (@ 300 m)
394.0	66.6	-13.4	15.7 (@ 300 m)
526.0	62.2	22.2	33.2 (@ 30 m)
657.5	61.2	21.2	31.2 (@ 30 m)
789.0	61.9	21.9	29.7 (@ 30 m)
920.5	53.3	13.3	28.3 (@ 30 m)
1052.0	ambient	ambient	27.2 (@ 30 m)
1183.5	ambient	ambient	26.1 (@ 30 m)
1315.0	42.5	2.5	25.2 (@ 30 m)

Orthogonal plane: Z			
Frequency (kHz)	Test result @ 3 m distance (dBµV/m) (QP)	Extrapolation to 30/300 m distance (dBµV/m)	Limit (dBµV/m)
263.0	46.0	-34.0	19.2 (@ 300 m)
394.0	56.5	-23.5	15.7 (@ 300 m)
526.0	36.3	-3.7	33.2 (@ 30 m)
657.5	ambient	ambient	31.2 (@ 30 m)
789.0	ambient	ambient	29.7 (@ 30 m)
920.5	ambient	ambient	28.3 (@ 30 m)
1052.0	ambient	ambient	27.2 (@ 30 m)
1183.5	ambient	ambient	26.1 (@ 30 m)
1315.0	31.0	-9.0	25.2 (@ 30 m)

Test equipment:

Test equipment used: (Item numbers)	1, 2

Item numbers refer to the used test equipment module.

2.3 Field strength of unwanted emissions (> 30 MHz)

Compliance standard : FCC part 15, subpart C, section 15.209.

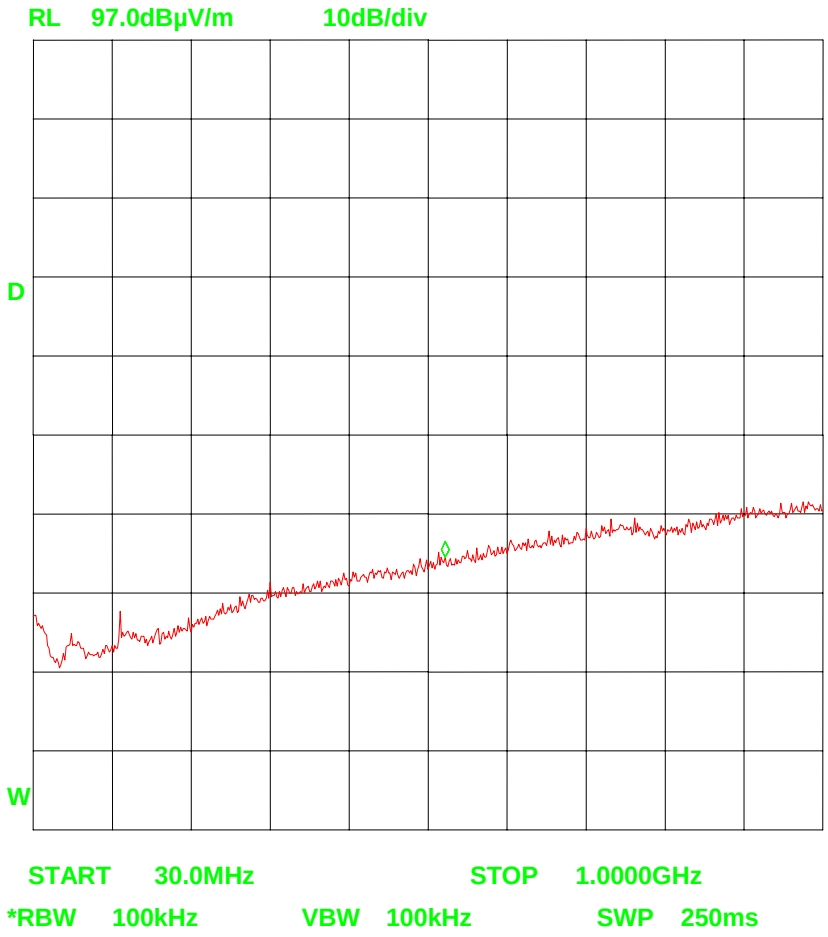
Method of test : ANSI C63.4-2001, sections 5.4, 8.2.3 & 8.3.1.2; FCC part 15, subpart A, section 15.31 (f)(2), 15.33, 15.35.

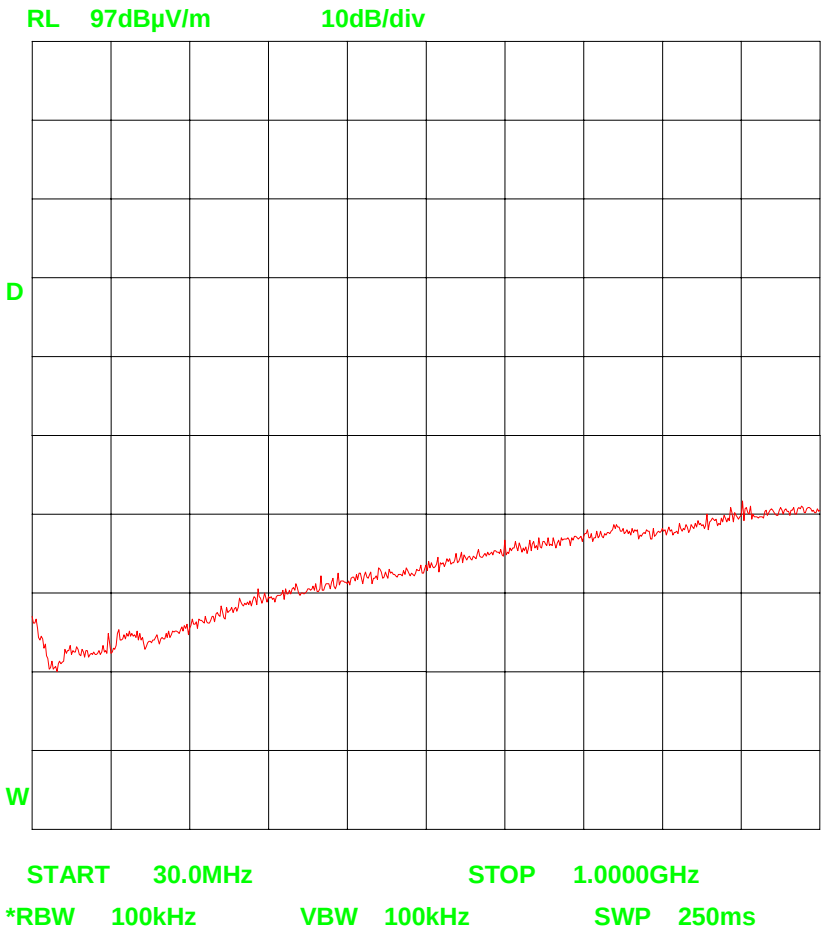
Justification : Pre-compliance measurements have been performed in an fully anechoic room. No spurious signals > 30 MHz. were found. Measurements at the Open Area Test Site were judged to be not necessary, as would have been performed at:

TNO Electronic Products & Services (EPS) B.V
Smidshornerweg 18
9822 TL Niekerk
The Netherlands

FCC listed : 90828
Industry Canada : IC3501

Test results :





Test equipment:

Test equipment used: (Item numbers)	4, 6

Item numbers refer to the used test equipment module.

Used test equipment module

This module contains the list of test equipment used.

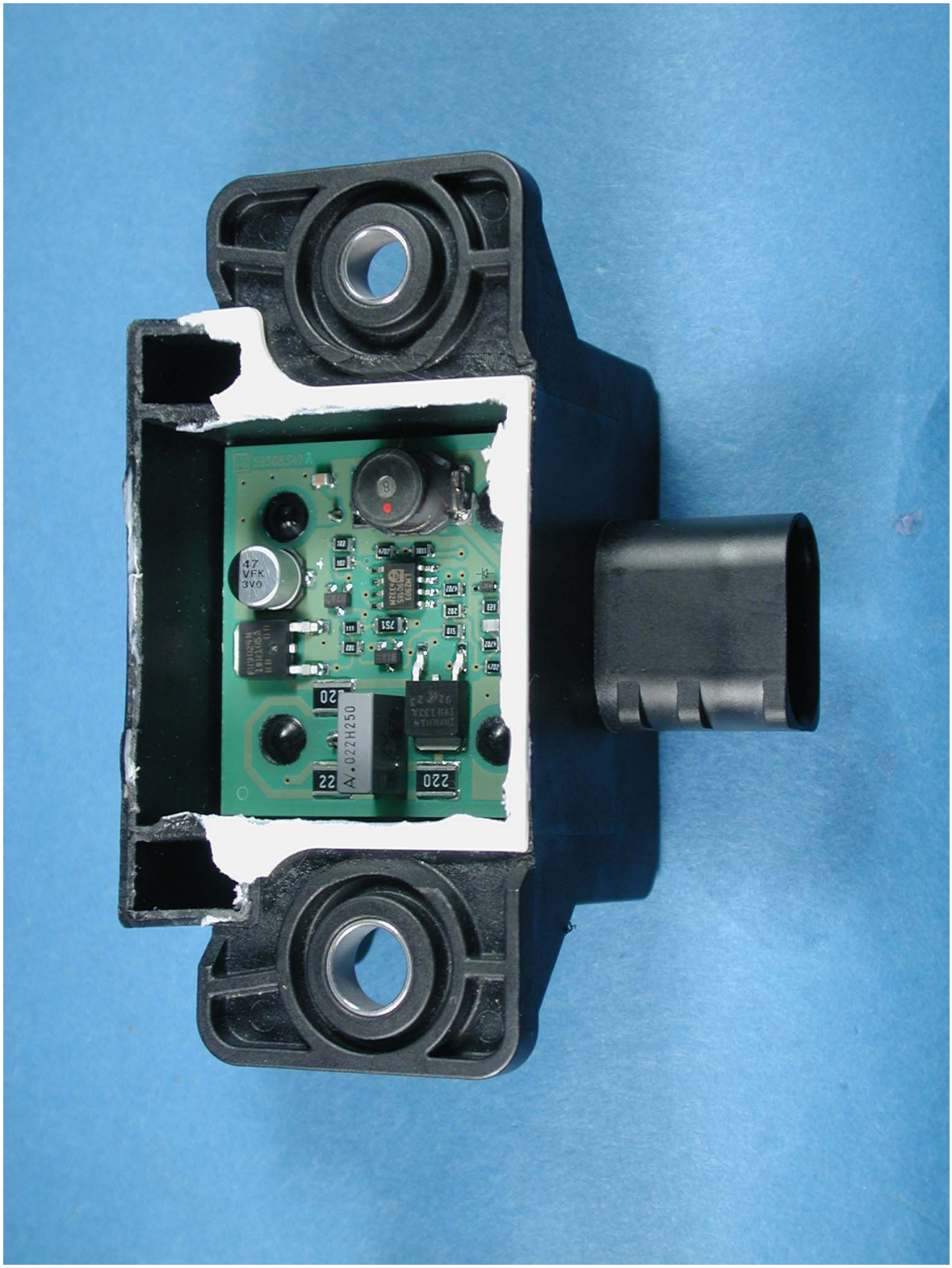
Ref	Description	Telefication ident.	Manufacturer	Model
1	Test receiver	TE 00205	R & S	ESH3
2	Active loop antenna	TE 00746	R & S	HFH 2-Z2
3	Test receiver	TE 00091	R & S	ESV(P)
4	Logper/bow-tie antenna	TE 00700	EMCO	3143
5	Artificial Mains Network (AMN)	TE 00208	R & S	ESH3-Z5
6	Analyzer	TE 00481	HP	8563E
7	Pulse/function generator	TE 000347	HP	8111A

Photographs module

Photograph 1: *Transmitter/initiator, top view*

Photograph 2: *Transmitter/initiator, bottom view*

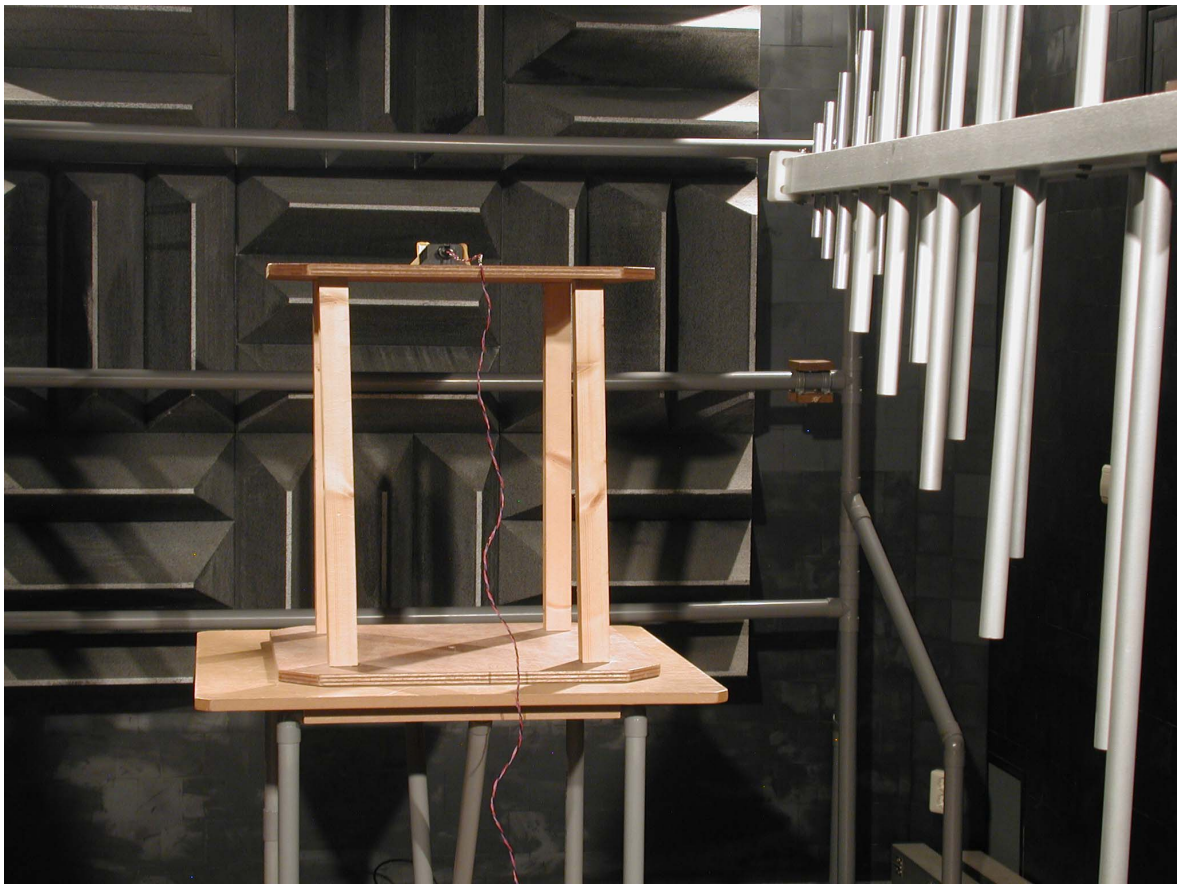
Photograph 3: *Transmitter/initiator, interior view*



Photograph 4: *10 m test set up, (< 30 MHz)*

Photograph 5: 3 *m test set up, (< 30 MHz)*

Photograph 6: T*est set up (> 30 MHz)*



Additional information module

No additional information is contained in this module.