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Federal Communications Commission
FCC-Identification Number: 90462
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
TTI-P-G 081/94-D0



Independent ETSI
compliance test house



Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2-3679-01-01/04

FCC Part 15.209

Kostal-No. : 0545READER

FCC ID: SX4READER

IC : 2795C-READER

CETECOM – ICT Services GmbH
Untertürkheimerstr. 6-10
66117 Saarbrücken, Germany

Telephone: + 49 (0) 681 / 598-0

Fax: + 49 (0) 681 / 598-9075

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

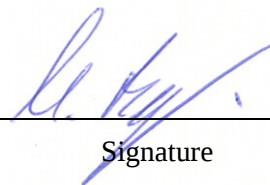
Test laboratory manager:

2004-11-11 RSC - 8411 Berg M.

Date

Section

Name


Signature

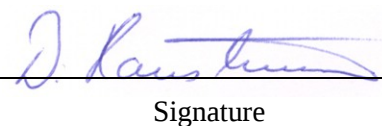
Technical responsibility for area of testing:

2004-11-11 RSC - 8412 Hausknecht D.

Date

Section

Name


Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 0

Telefax : + 49 681 598 - 9075

E-mail : Michael.Berg@ict.cetecom.de

Internet : www.cetecom-ict.de

Accredited testing laboratory

Accredited by : Regulierungsbehörde für Telekommunikation und Post (RegTP)

Listed by : Federal Communications Commission (FCC)

Authority	Identification/Registration No.
RegTP	TTI-P-G 081/94-D0
FCC	90462

1.3 Details of applicant

Name : KOSTAL Industrie Elektrik GmbH

Street : Hauert 11

City : D-44227 Dortmund

Country : Germany

Telephone : +49 (0)231 7588-0

Telefax : +49 (0)231 7588-700

Contact : Mr.Guido Werduen

Telephone : +49 (0)231 7588-546

Contact person:

Name : Guido Werduen

Telephone : +49 (0)231 7588-546

Telex : +49 (0)231 7588-700

E-mail : g.werduen@kostsl.com

1.4 Application details

Date of receipt of test item : 2004-07-22

Date of test : 2004-07-22

Person(s) who have been present during the test : Mr. Martin Degener

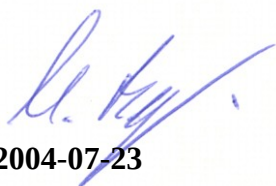
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1.5 Test item**Test Report Cover Sheet**

Company Number:	2795C
Model Number:	KOSTAL-No. :0545READER with/out Control unit No.: 05 45 10 22
Product Name:	Keyless Home Entry
Manufacturer:	KOSTAL Industrie Elektrik GmbH
Tested to Radio Standards Specification(RSS) No.:	210 Issue 5
Open Area Test Site Industry Canada Number:	3463
Frequency Range (or fixed frequency):	Tx: 0.125 MHz Rx : 433.92 MHz
R:F: Power in Watts:	
Field Strength (at what distance):	77.4 dBµV/m in 3m / -2.6 dBµV/m in 300m
Occupied Bandwidth (99% BW):	-. kHz
Type of Modulation:	NON
Emission Designator (TRC-43):	NON
Transmitter Spurious (worst case):	45.7µV/m in 3m (noise floor)
Receiver Spurious (worst case):	45.7µV/m in 3m (noise floor)
IC no.	2795C-READER
FCC ID no.	SX4READER
Temperature range	-20°C to +50°C
Power supply	24V DC ext.

ATTESTATION: I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Date: 2004-07-23

NAME AND TITLE (Please print or type):

Berg Michael, Project Engineer

Note: This form must be completed and provided with the submission.

**1.6 Test specifications: FCC Part 15 §15.225
CANADA RSS-210 Issue 5**

2 Technical test

2.1 Summary of test results

FCC Part 15 Subpart B

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

The product fulfils also the requirements for CANADA RSS-210

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

FINAL VERDICT : PASS

2.2 Test report

TEST REPORT

Test report no: 2-3679-01-01/04

LIST OF MEASUREMENTS.

The list of measured parameters is given below.

Clause		Page number
	Transmitter parameters	
§ 15.209/109	Spurious radiations – Radiated	9
§ 15.107/207	Conducted emissions	13
	Test equipment listing	13
	Photographs of the equipment	15

Equipment under test : 0545READER

Ambient temperature : 24°C

Relative humidity : 49%

SPURIOUS RADIATION

§ 15.209/109

Radiated RF Power on

SPURIOUS EMISSIONS LEVEL (µV/m)								
kHz								
f (MHz)	Detector	Level (µV/m)	Limit (µV/m)	Margin (dB)	Results			
0.125	QP	0.05	19.2	21.8	pass			
0.625	PK	6.0	38.4	16.2	pass			
0.875	PK	3.8	27.4	17.3				
1.375	PK	2.3	17.5	22.5	pass			
All other peaks > 20 dB below limit								
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

(to convert the measuring distance from 3m to 30m and 3 to 300m a correction factor from 40 dB/decade was used.)

Sample for 0.125MHz :

77.4 dBµV/m in 3m related to -2.6 dBµV/m in 300m (77.4 dBµV/m – 80 dB= -2.6 dBµV/m = 0.05 µV/m in 300m)

Measurement distance see table

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : 0545READER

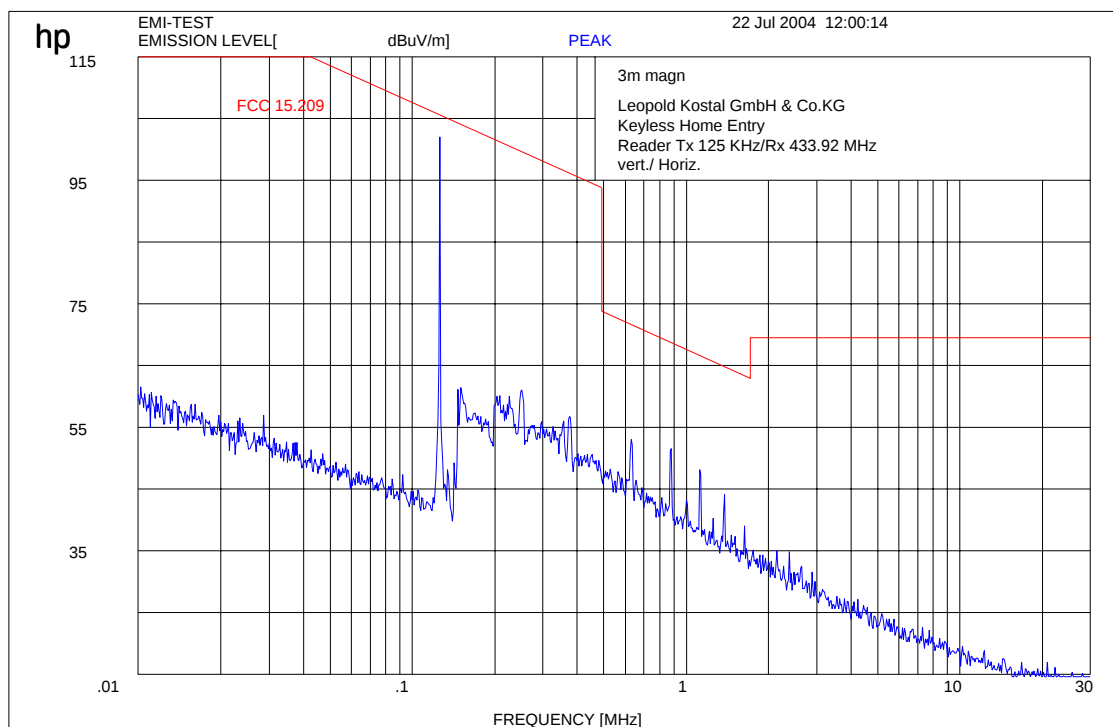
Ambient temperature : 24°C

Relative humidity : 49%

Plots of the measurements

Part 15.109 Magnetics

Reader 05 45 10 1x



(to convert the measuring distance from 3m to 30m and 30 to 300m a correction factor from 40 dB/decade was used.)

Measurement distance 3m

This measurement was done in 3 polarisation's, the plot shows the worst case

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

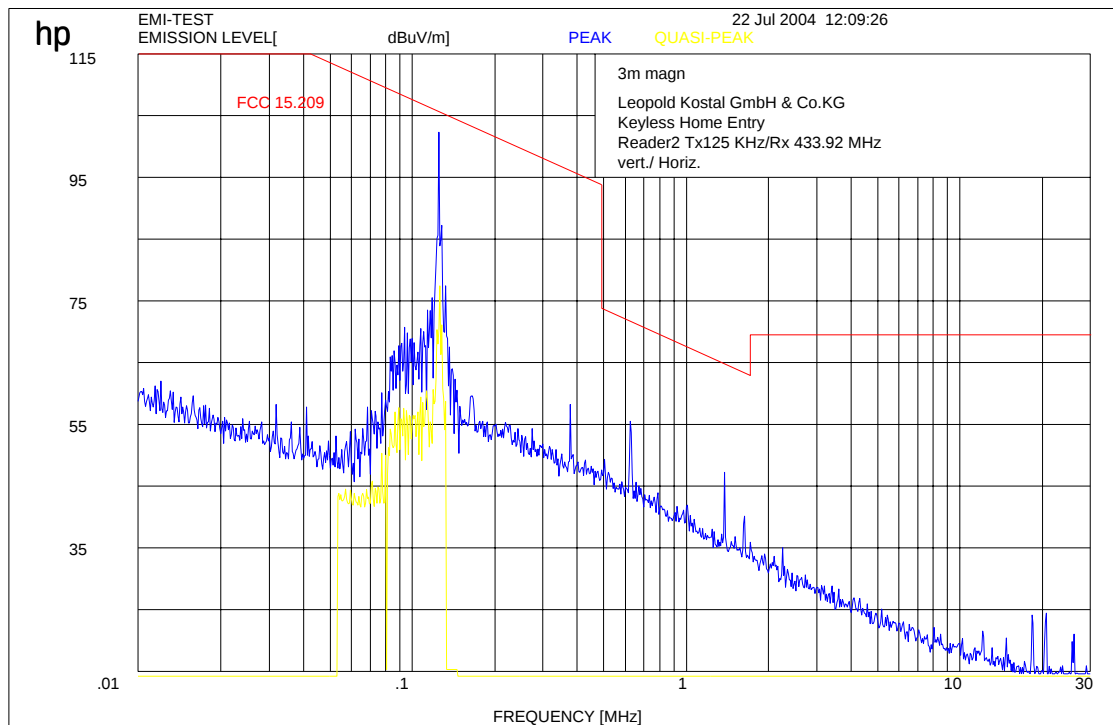
Equipment under test : 0545READER

Ambient temperature : 24°C

Relative humidity : 49%

Part 15.109 Magnetics

Reader 05 45 10 1x with Control Unit 05 45 10 22



(to convert the measuring distance from 3m to 30m and 3 to 300m a correction factor from 40 dB/decade was used.)

Measurement distance 3m

This measurement was done in 3 polarisation's, the plot shows the worst case

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : 0545READER

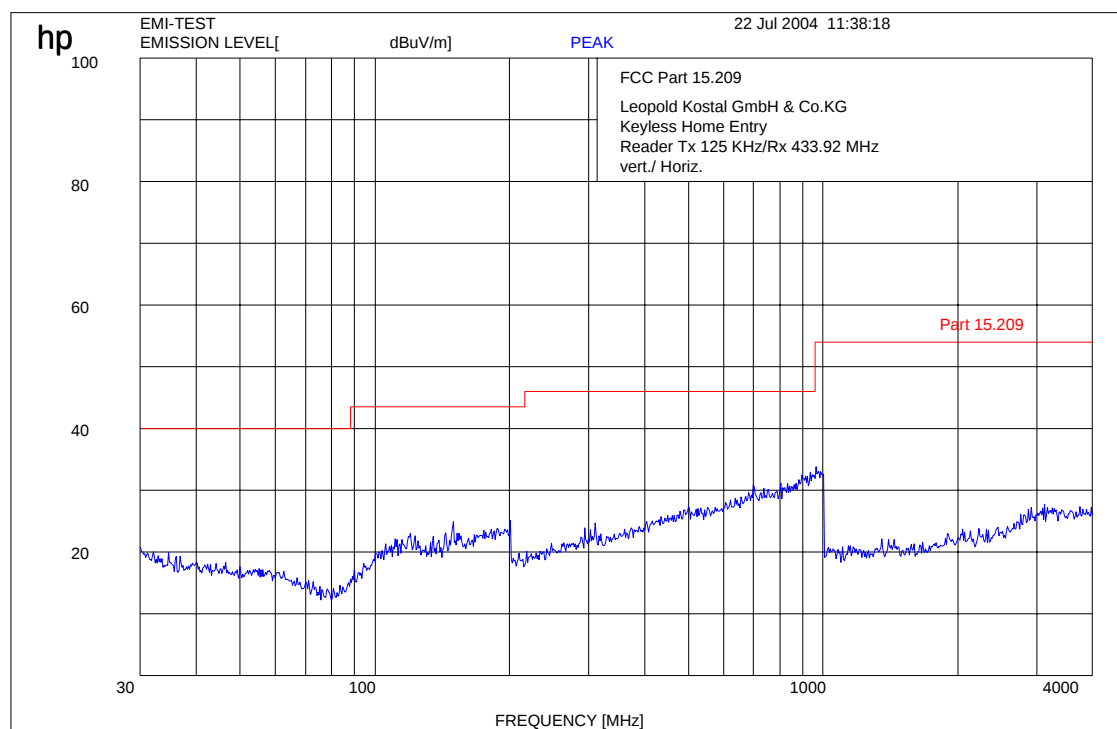
Ambient temperature : 24°C

Relative humidity : 49%

Plots of the measurements

this plot is valid for both configurations

Spurious 30 MHz – 4 GHz (Quasi Peak below 1 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : 0545READER

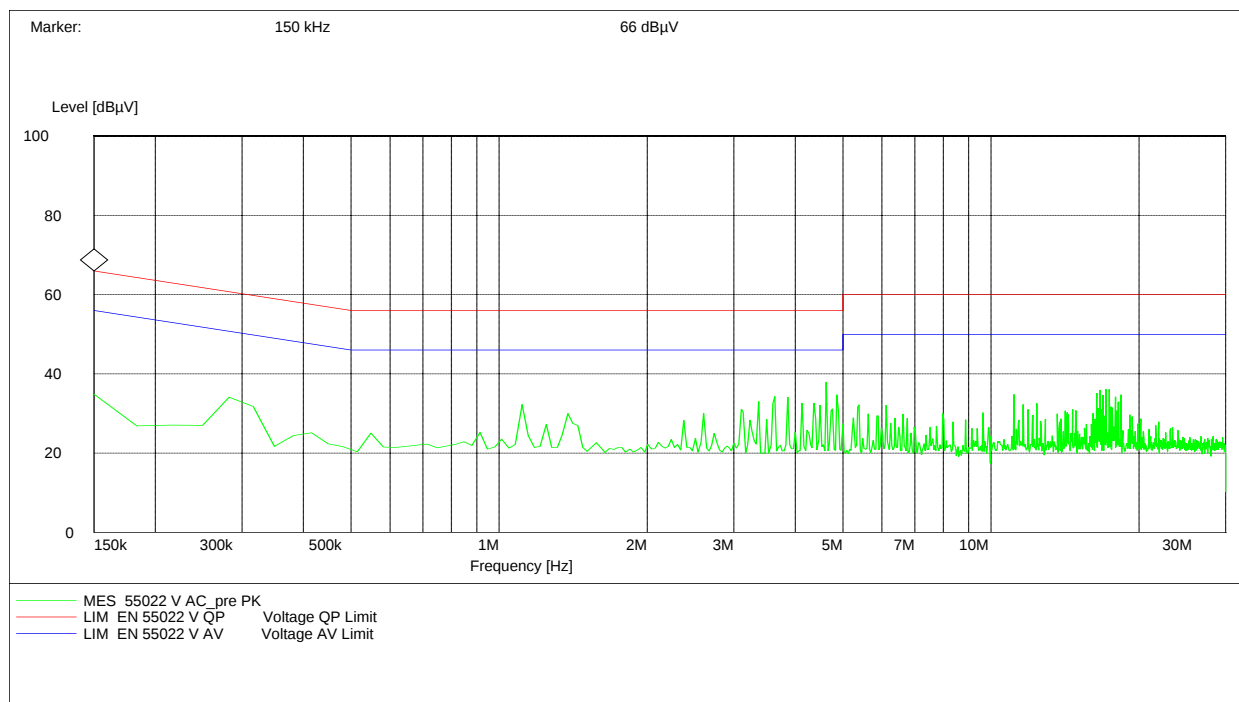
Ambient temperature : 24°C

Relative humidity : 49%

Conducted emissions

§ 15.107/207

EUT: Keyless Home Entry
Manufacturer: Kostal Industrie GmbH
Operating Condition: normal mode
Test Site: Room 006 (Shielded chamber)
Operator: Berg M.
Test Specification: CISPR 22 (EN 55022)
Comment: tested with standart power supply
Start of Test: 22.07.04 / 14:14:40



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Reciever	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

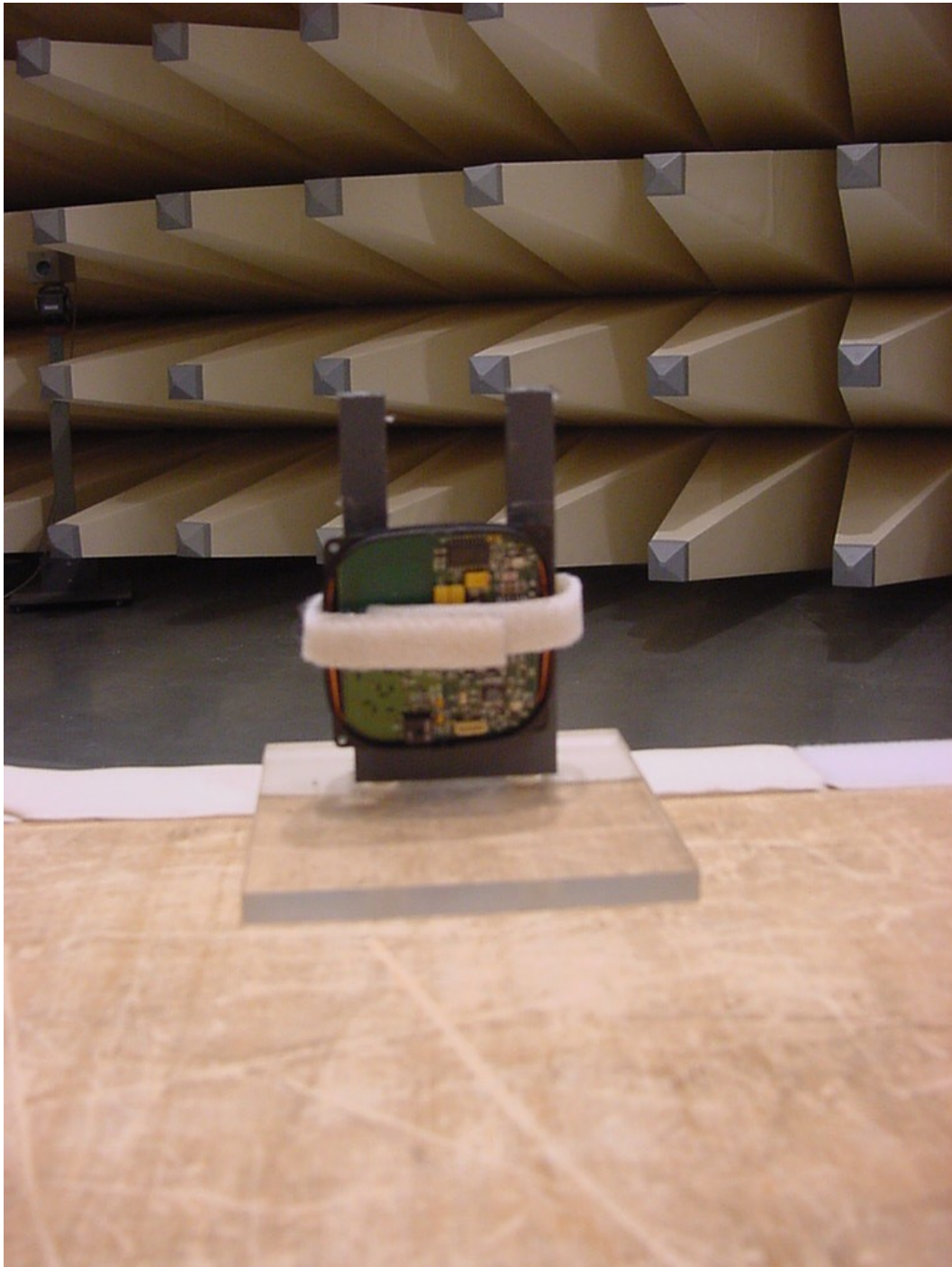
TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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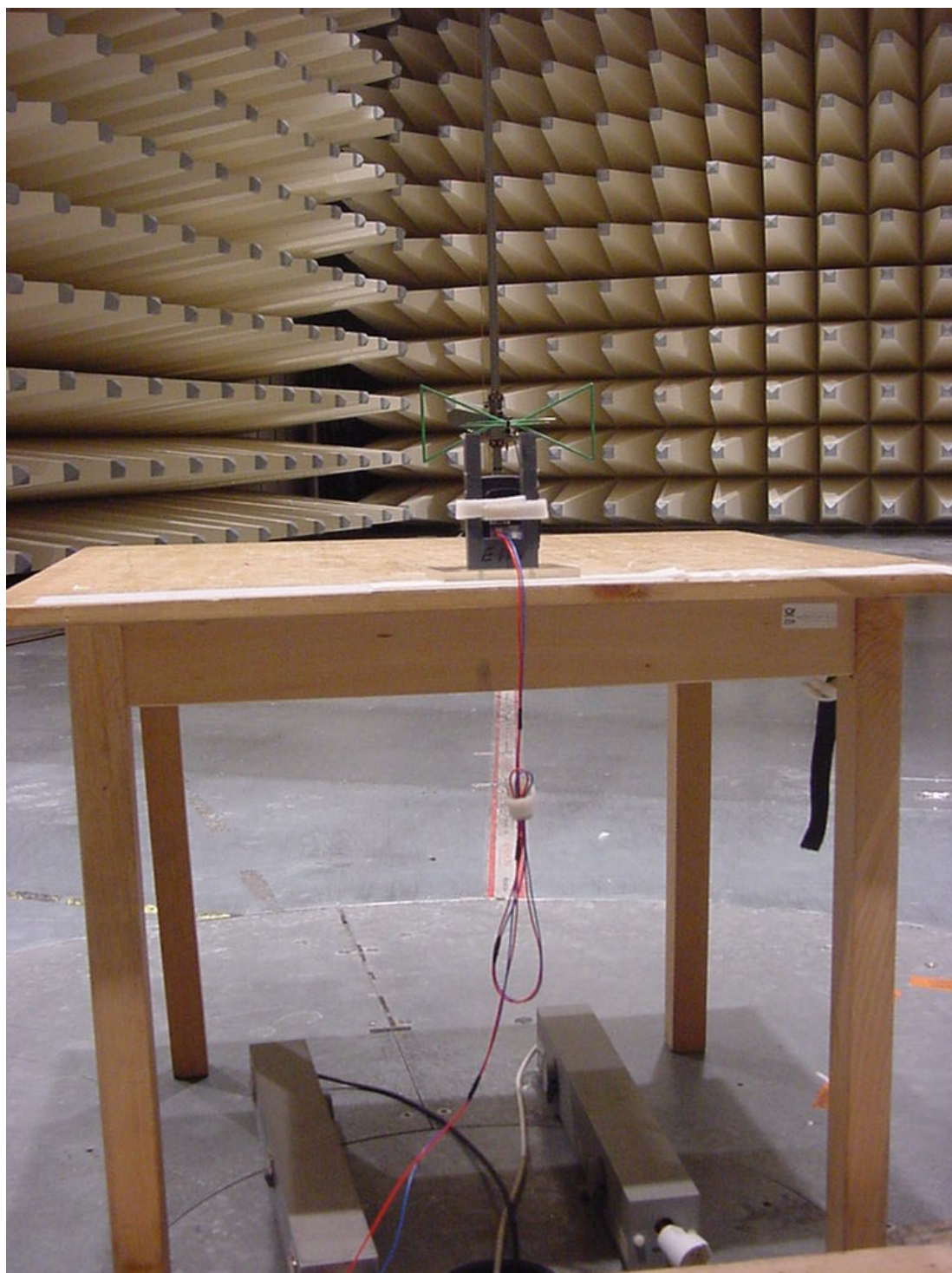
No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Spectrum Analyzer	8562A	Hewlett Packard	2809AO2682
52	Steuerrechner	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V-Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
59	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
62	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66				

Photographs of the equipment

Test site



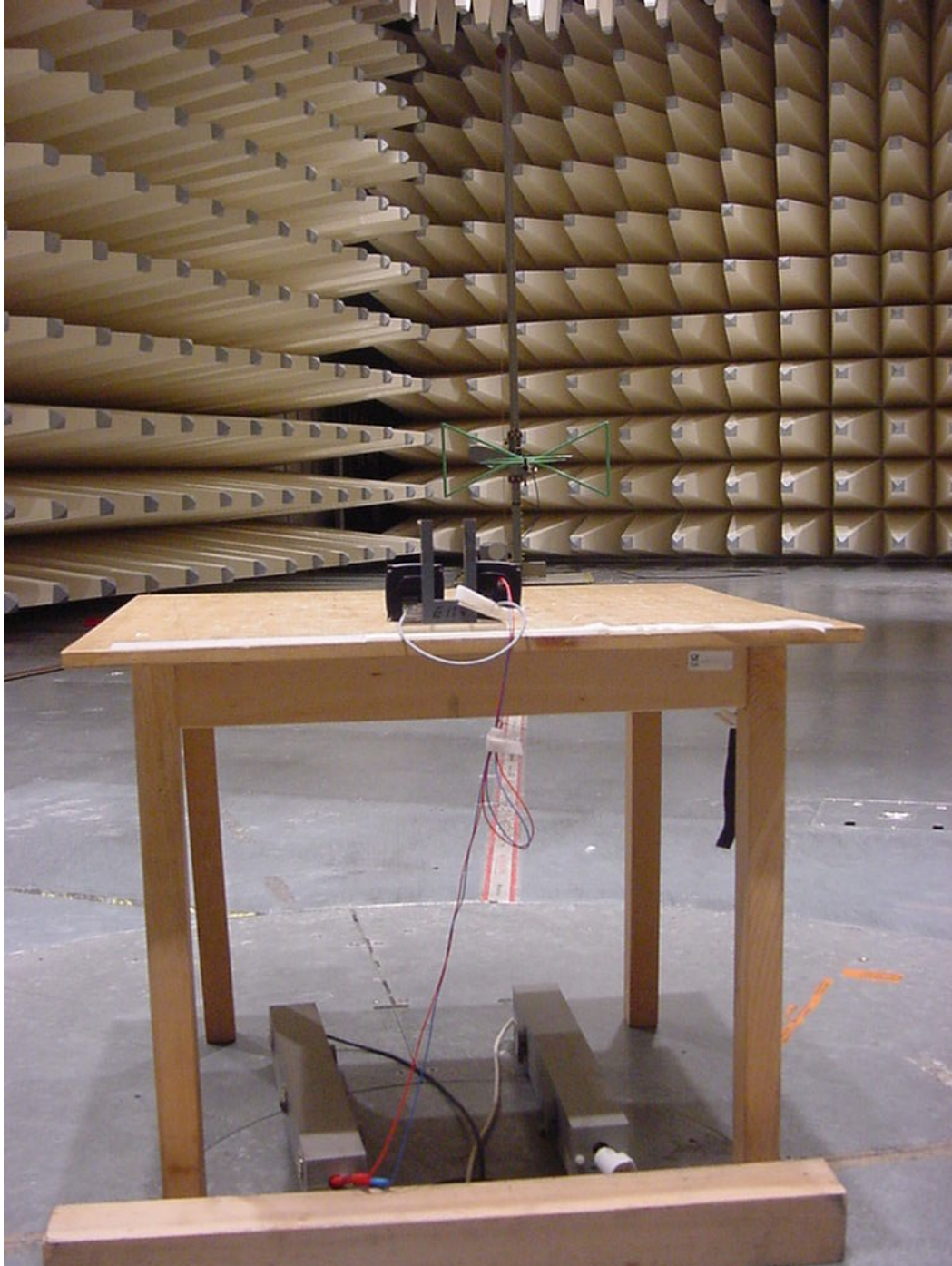
Test site



Test site

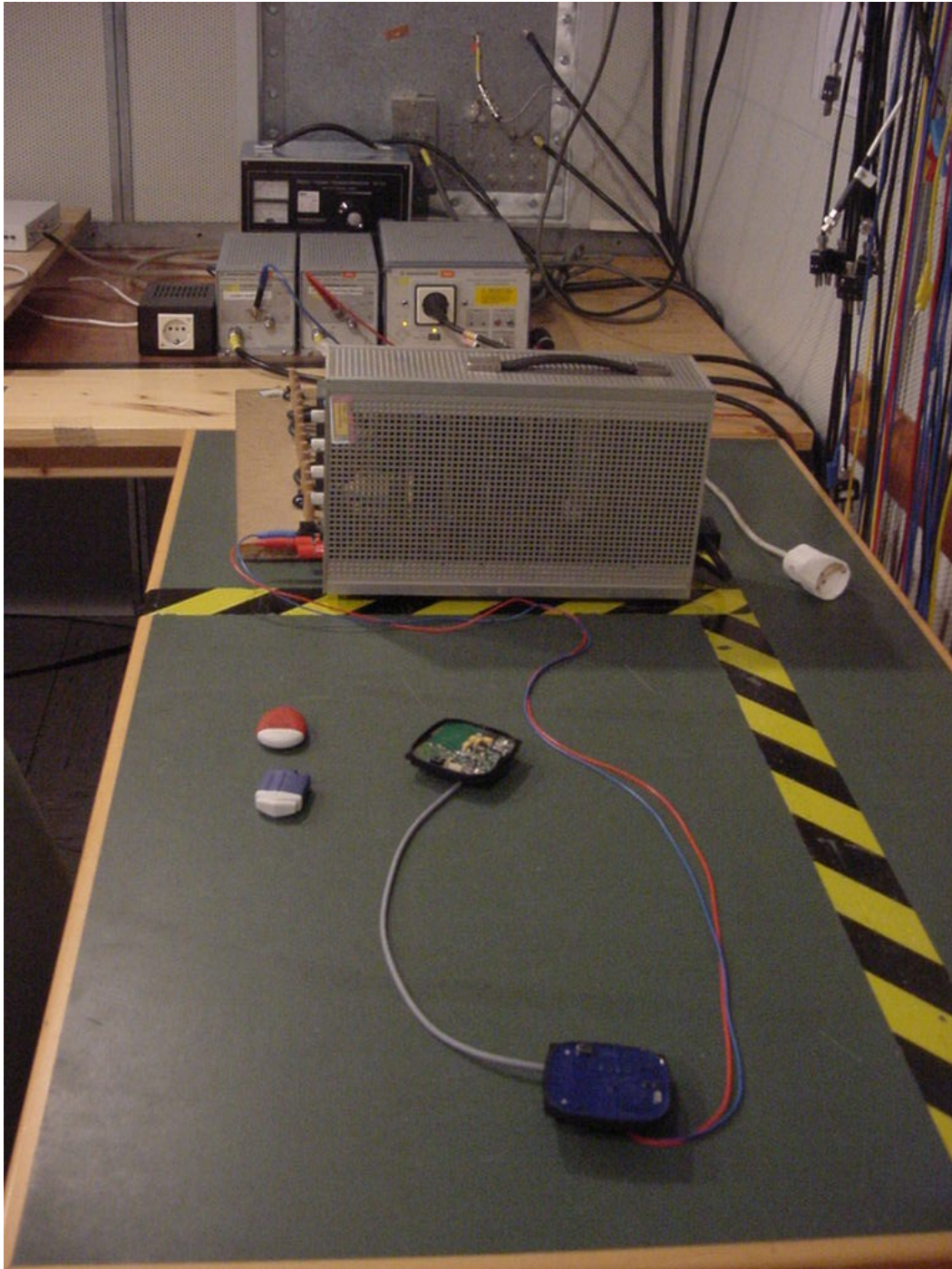


Test site



Test site

Reader with Control Unit (worst case)



PHOTOGRAPHS OF THE EQUIPMENT

Photograph no.: 1



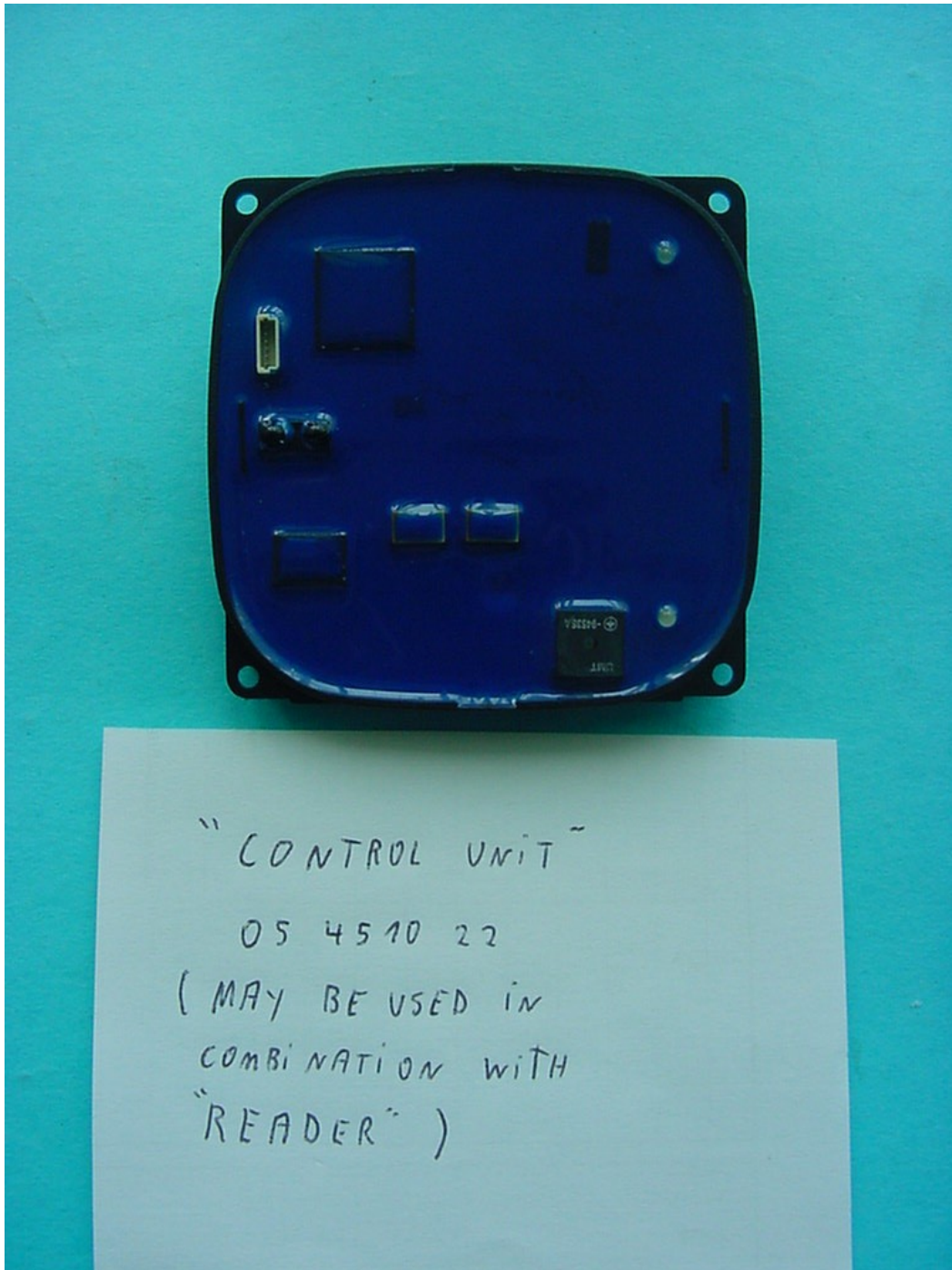
PHOTOGRAPHS OF THE EQUIPMENT

Photograph no.: 2



PHOTOGRAPHS OF THE EQUIPMENT

Photograph no.: 3



PHOTOGRAPHS OF THE EQUIPMENT

Photograph no.:4

