Intertek

Test Report

Electromagnetic Compatibility

Test Report - Nr.: 07KFE007857-L-FCC-01

Date: 2007-11-20

Type:	JA-80N
Description:	Outdoor RFID card reader
Serial number:	0703443-003

Manufacturer:	Jablotron s.r.o.
Customer:	Jablotron s.r.o.
Address (Customer):	Pod Skalkou 33 CZ 646601 Jablonec nad Nisou Czech Republic

Test Laboratory:	Intertek Deutschland GmbH, Innovapark 20, D- 87600 Kaufbeuren
FCC registration number:	90714
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Intertek Deutschland GmbH

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1. General description

1.1. Product description

The JA-80N is a component of Jablotron's Oasis 80 alarm system. It is designed to control access and door lock or to control a security system and connects to the Oasis control panel via a WJ-80 interface.
Alternatively it can be connected to an AS-80 unit as a part of a stand-alone access system.
The keypad sends data in Wiegand 26b format.

The operating frequency of the card reader is f = 125 kHz. The card / tag is passive.
The device is wire connected to WJ-80 interface and further by means of OASIS bus to the control unit.
The device is powered from the WJ-80 interface.

Antenna type : Internal, Integral
Duty cycle : no duty cycle, no periodic transmission.

1.2. Related submittal(s) Grants

This is application for certification of the transmitter.
No related devices are present.

1.3. Test Methodology

☒ The test setup and test was done according to: **ANSI C63.4: 2003**
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

☐ The test setup and test was done according to: **CISPR 22: 1998 + Corrigendum: 2003 + A1: 2000 + A2: 2003 and ANSI C63.4: 2003**
Compliance with CISPR 22 is being used to demonstrate conformity with FCC DoC requirements. This conforms with FCC Part 15.109(g).

The test results detailed in this report apply only to the JA-80N with the test setup described. Any modification such as a change, addition to or inclusion of another device into this product will require an additional evaluation.
The support equipment listed as part of the emission tests is required to properly exercise and test the device under test.

1.4. Test Facility

The test site was semi-anechoic chamber Intertek Germany (PM KF 1150). Measurement distance EUT – Antenna was d = 3 m.

1.5. List of exhibits

Following exhibits are delivered as separate pdf files. The name of file corresponds with description of exhibit with extension **.pdf**

EXHIBIT 1	Test setup photo documentation
EXHIBIT 2	External Photos
EXHIBIT 3	Internal Photos
EXHIBIT 4	Operational description
EXHIBIT 5	Block diagram
EXHIBIT 6	Circuit diagram
EXHIBIT 7	Instruction manual
EXHIBIT 8	Product label
EXHIBIT 9	Confidentiality request

2. Measurements And Test Specifications

Emission - Requirements according to

☐ FCC, Part 15, Class A, verification

☐ FCC, Part 15, Class B, DoC

☐ FCC, Part 15, Class B, certification
☒ FCC, Part 15, intentional radiator, certification

3. Description Of EUT

3.1. Configuration / Operating Conditions

☒ table-top EUT ☐ floor-standing EUT

The device is powered from the WJ-80 interface. For the purpose of test the WJ-80 interface was powered device from the fully charged laboratory accumulator battery 12 V.

The radiation measurements were performed in configuration :

JA-80N ---- WJ-80 interface ----- 12 V DC accumulator

The equipment under test (EUT) is placed on wooden table 0,8 m above ground plane.

For frequencies bellow 30 MHz the measurement was performed at distance d = 10 m (shielded loop antenna – EUT). Measured values were bellow the noise level. Therefore measurement was performed at closer distances and measured values of field strength were calculated to d = 300 m (40 dB/dec) and compared to the limit value.

Measurements in frequency range 30 MHz – 1 GHz were performed with bilog antenna HL 562. At all interference frequencies the height of the antenna is scanned in the range 1 m to 4 m with horizontal and vertical polarization and the turntable is rotated in the range 0° to 360° to obtain the highest field strength.

3.2. Major Subassemblies Or Internal Peripherals

Device	Manufacturer	Type	SN	FCC ID
Card reader	Jablotron	JA-80N	0703443-003	

3.3. Peripheral Devices Used For Testing

Device	Manufacturer	Type	SN	FCC ID
Wiegand interface	Jablotron	WJ-80	0705044-005	

3.4. Supply- And Interconnecting Cables

Line	Length	shielded	non shielded	Shield on GND / PE
WJ-80 to JA-80 N	1 m	☒	☐	

4. Test Results - Overview

	required	passed	passed with modification	not passed
Bandwidth	< 0.31 MHz, 0.25 % f_{op}	☒		
Emission		☒	☐	☐
9 kHz – 30 MHz	FCC 15.209	☒	☐	☐
30 MHz - 1000 MHz	FCC 15.209	☒	☐	☐

5. Measurement results detailed

5.1. Duty cycle and Averaging factor

The device does not transmit in Duty cycle.

5.2. Bandwidth

The measured 20 dB bandwidth is shown on Fig. 1

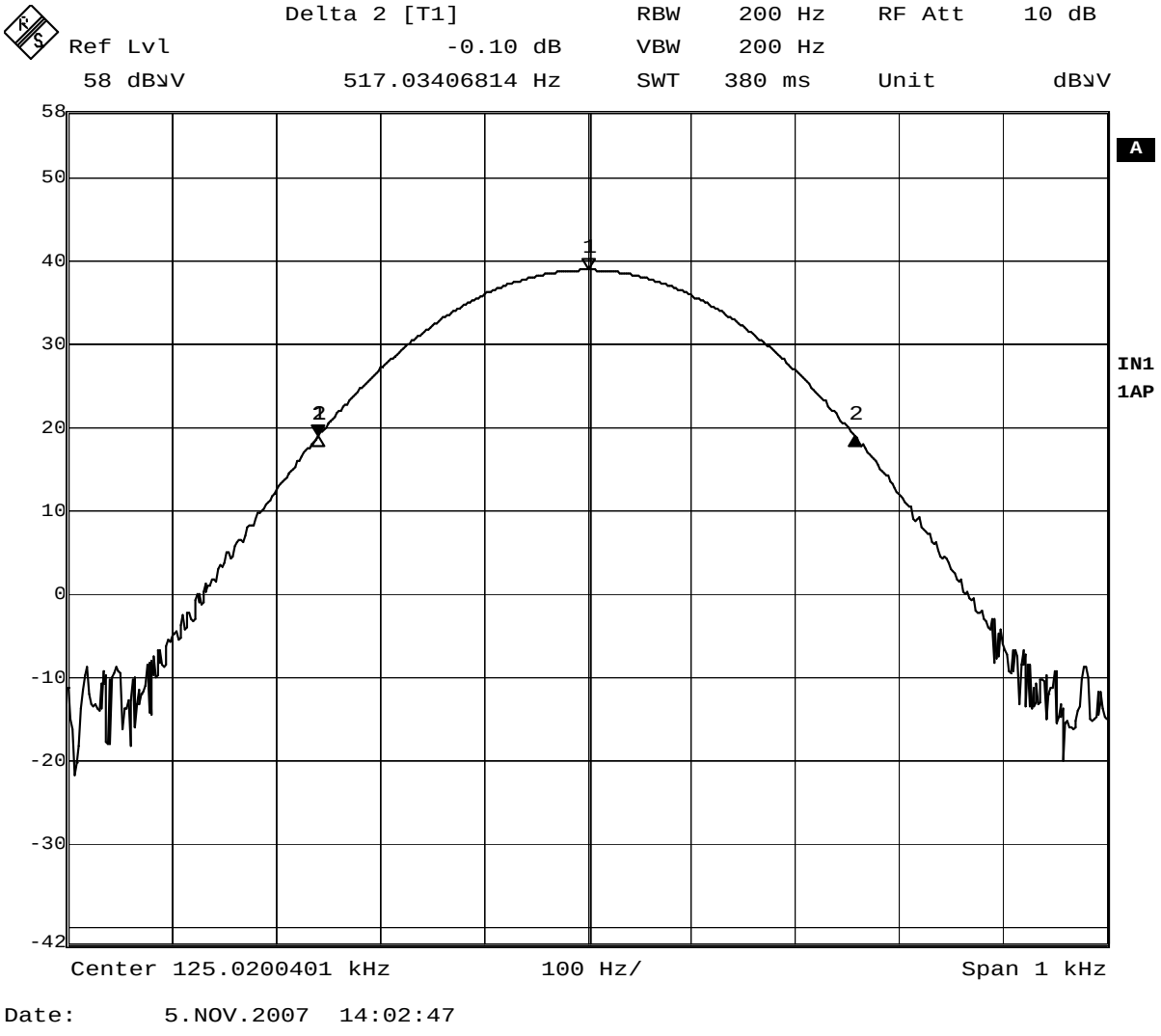


Fig .1

The BW is 517 Hz, operating frequency f = 125.02 kHz.

5.3. Extreme conditions

The drift of operating frequency in the temperature range -30^{0}C to 50^{0}C was measured in the climatic chamber. Results are given on following figures 2 -4.

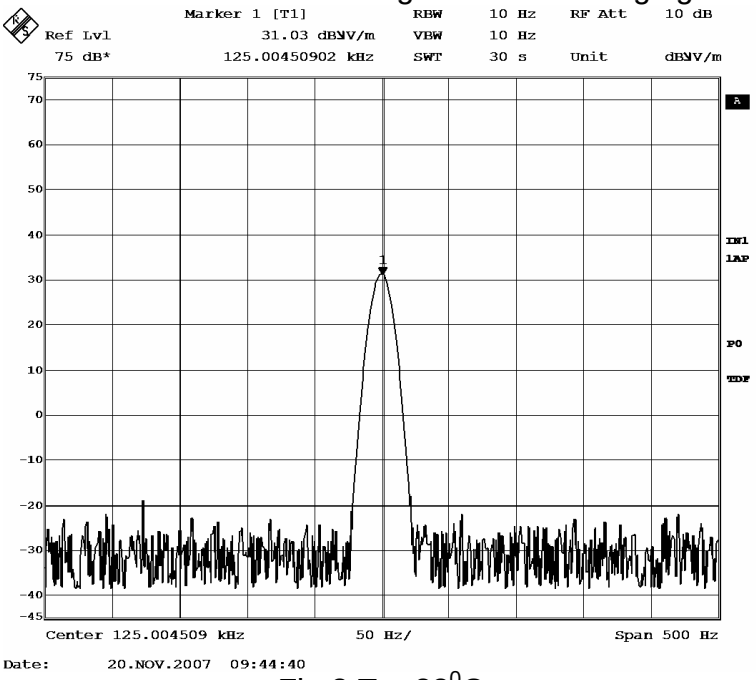


Fig.2 T = 22^{0}C

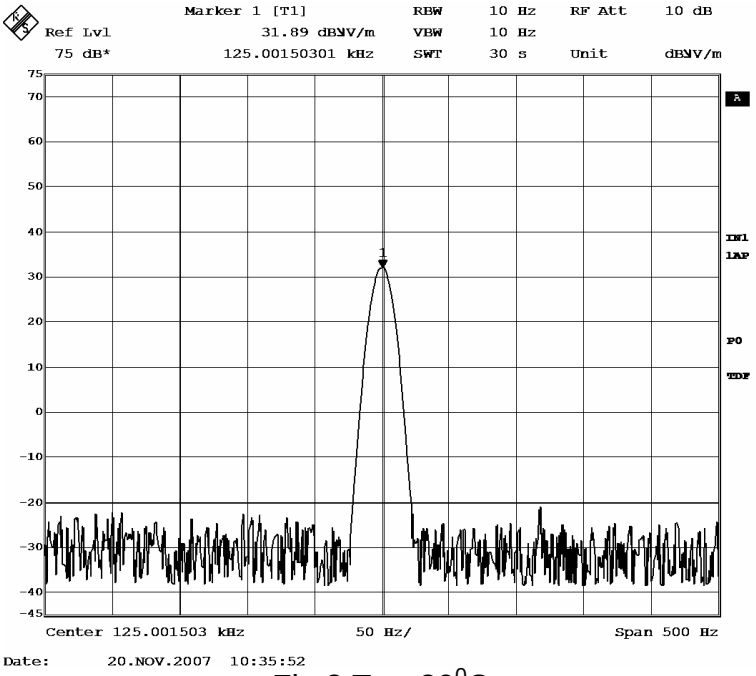


Fig.3 T = -30^{0}C

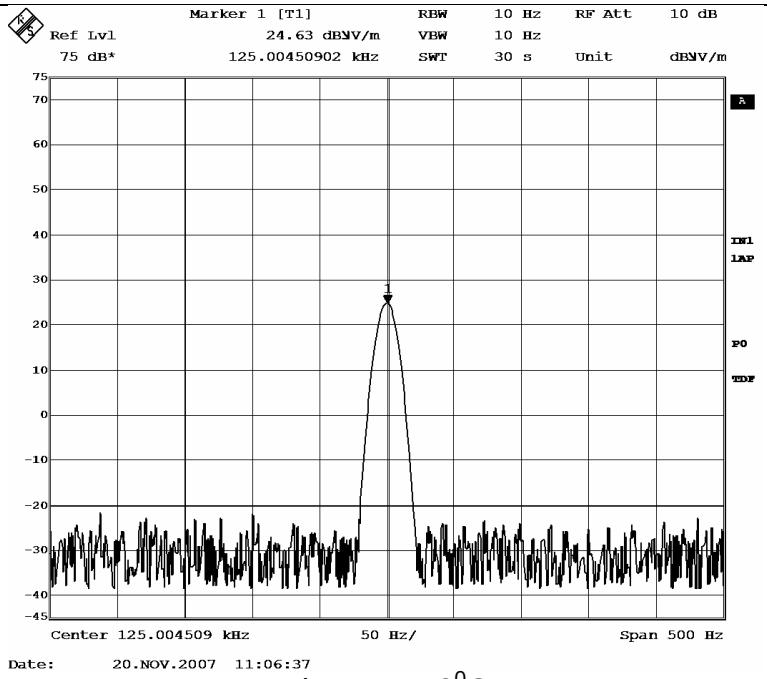


Fig.4 T = 50^0C

The temperature of environment did not cause a drift of operating frequency.

The change of supply voltage from 10.8 V to 13.2 V (± 10%) did not cause a drift of operating frequency.

5.4. Radiated Emission 9 kHz – 1 GHz

Data was measured for worst case configuration which resulted in highest emission levels. A sample calculation, configuration photographs and data tables of emissions are included.
The detector used was quasipeak.

5.3.1. Field strength calculation

The field strength is calculated by adding the reading on the measuring receiver to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitation and average factors (when the specified limit is related to average detector and measurements are made with peak detector.
A sample of calculation is included below :

E = RR + AF + CF – AG + PD + AV

Where

E	field strength in dBμV/m
RR	receiver reading including preamplifier in dBμV
CF	cable attenuation factor in dB
AF	antenna factor in dB/m
AG	amplifier gain in dB
PD	pulse desensitization in dB
AV	average factor in dB

Example :

Asssume that measured values and factors are as follows :

RR	= 60 dBμV
CF	= 1.2 dB
AF	= 12.6 dB/m
AG	= 20 dB
PD	= 0 dB
AV	= -10 dB

Then

E = 60 + 1.2 + 12.6 – 20 + 0 -10 = 43.8 dBμV/m

The radiated emission tables which follow the graphical presentation of results were created by the EMC 32 software by Rohde-Schwarz. The data of field strength include the components given above with the exception of PD and AV.

5.3.2. Normative references

Limits equivalent:	**FCC, Part 15.209**
Methods of Measurement equivalent:	**ANSI C63.4**

Test requirement

Distance Antenna – EUT	3 m (f>30MHz), for f < 30 MHz see detailed results
Frequency range	9 kHz - 1000 MHz

Place of measurement

☒ Semi anechoic chamber Intertek Germany PM KF 1150.
☐ Open Area Test Site

Measurement devices

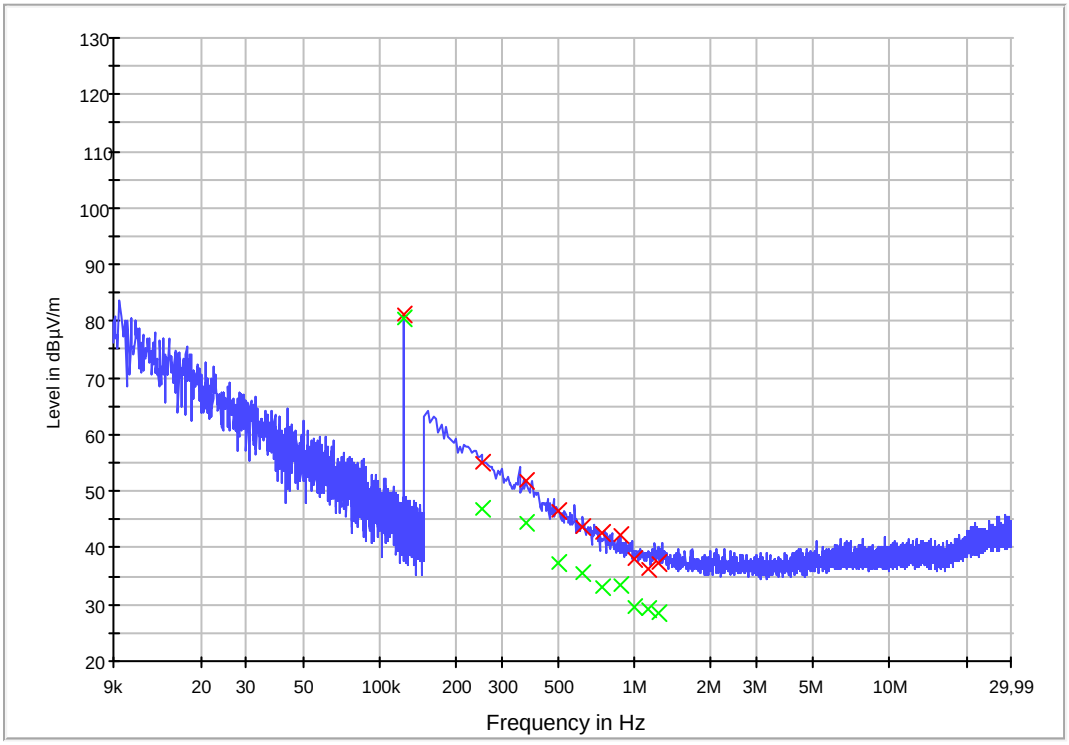
Measurement device	Type	Manufacturer	SN	Asset No.	Last Calibr.ation	Inter-val
☒ Test receiver, 20Hz-26GHz	ESIB26	Rohde & Schwarz	100150	PM KF 0948	07-03	1
☒ Antenna, 9 kHz -30 MHz	RA 30.1	MessTec	960101	PM KF 0875	07-10	2
☒ Antenna, 30-3000 MHz	HL562	Rohde & Schwarz	100354	PM KF 1123	07-03	2

5.3.3. Emission Test results

Test requirements	☒ **passed**	☐ **passed with modification**	☐ **not passed**

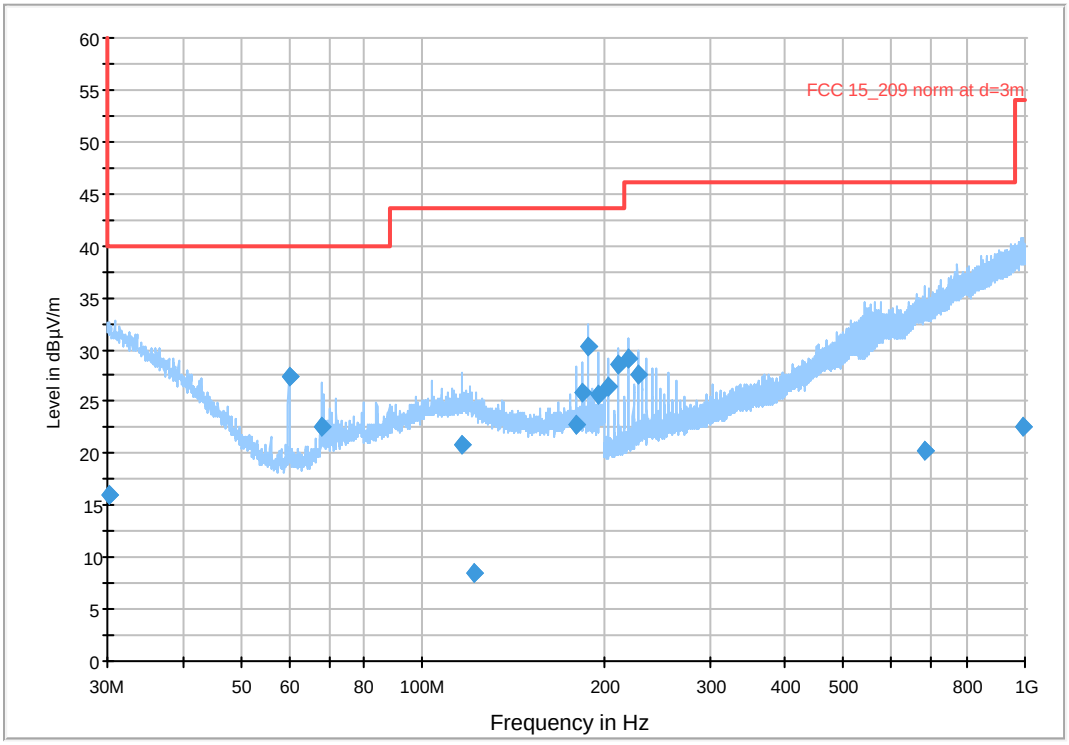
Comment:
The radiated emissions between 9 kHz and 1000 MHz are under the limit specified in FCC 15.209

5.3.3.1 Radiated Emission 9 kHz – 30 MHz (d = 3m)



Operational frequency f = 125 kHz.

5.3.3.2 Radiated Emission 30 MHz – 1 GHz



5.3.3.3 Radiated Emission : table 9 kHz – 1 GHz

Measurements based on a measurement time of 1000 ms unless otherwise noted.
Correction factor in table is for indication only – it was taken into account by measurement software.
Limits are valid for measuring distance d = 3m unless otherwise noted.

Frequency (MHz)	Average (dBµV/m) d = 3 m	Average (dBµV/m) d=300 m (calculated 40 dB/dec)	QuasiPeak (dBµV/m)	Corr, (dB)	Margin (dB)	Limit (dBµV/m)	BW (kHz)
0,125	80,5	0,5		35,7	-25,1	25.6*)	0,2
30,15			16	19,9	-24	40	120
60			27,5	5,7	-12,5	40	120
68			22,5	6,6	-17,5	40	120
116			20,9	10,9	-22,6	43,5	120
122,15			8,6	10,7	-34,9	43,5	120
180			22,7	8,9	-20,8	43,5	120
184			25,8	8,5	-17,7	43,5	120
188			30,4	8,2	-13,1	43,5	120

*) limit at d = 300 m

The measurement at operation frequency f = 125 kHz was performed at measurement distances d = 3 m, 4 m, 5 m and 6 m with results as follows :

d	3 m	4 m	5 m	6 m
E dBµV/m	80,5	73,4	67,1	59,5

To compare measured values at operating frequency f = 125 kHz with the limits it was used the 40 dB/decade conversion.
Extrapolated field strength at distance d = 300 m calculated from measuring distances 3 m, 4 m, 5 m and 6 m is :

E (dBµV/m)	**0,5**	**-1,6**	**- 4,03**	**-8,46**

For comparison with limit the highest value was taken, E = 0,5 dBµV/m .

6. Test setup Photo documentation

EXHIBIT 1

Fig. 1 OATS measurement , 9 kHz < f < 30 MHz

Fig. 2 Front view – anechoic hall

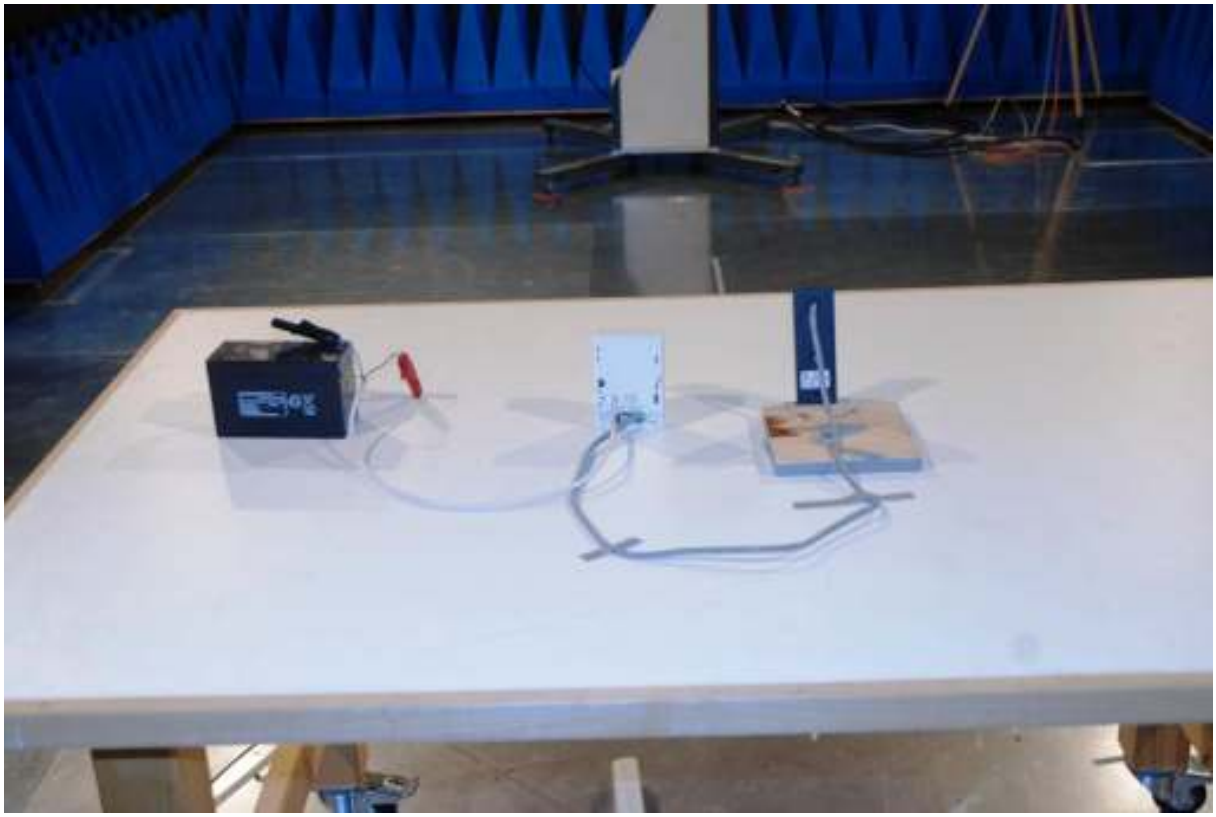


Fig. 3 Rear view – anechoic hall

7. EUT Photo documentation

External Photos : **EXHIBIT 2**
Internal Photos : **EXHIBIT 3**

8. Technical specification

Operational description : **EXHIBIT 4**

8.1. Block Diagram Of The EUT

EXHIBIT 5

8.2. Circuit Diagram Of The Layout

EXHIBIT 6

8.3. Instruction manual

EXHIBIT 7

8.4. Product Labelling

EXHIBIT 8