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TECHNOLOGY
MACHINERY - COMPONENTS

EMC Test laboratory accredited by the Swiss Federal Office of Metrology
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Durch das Eidgenössische Amt für Messwesen (Schweiz) akkreditiertes EMV-Prüflabor

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 Akkreditierungsnummer

STS 024



Schweizerischer Prüfstellendienst
 Service suisse d'essai
 Servizio di prova in svizzera
 Swiss testing service

Report no:	
Rapport no:	12'309
Bericht Nr:	
Title:	EMC-tests on LDB 100 according to FCC Part 15,
Titre:	Subpart C
Titel:	
Date of test:	
Date de l'essai:	January 21st, 2000
Prüfdatum:	
Customer:	
Client:	LUCATRON AG
Kunde:	
Test place:	montena emc sa
Lieu de l'essai:	CH-1728 Rossens
Prüfort:	

Test performed by
 Essai effectué par :
 Prüfer

Mr. Manfred Portmann

Test report prepared by
 Rapport d'essai préparé par :
 Berichterstatler

Mr. Manfred Portmann

Test report controlled and approved by
 Rapport d'essai contrôlé et approuvé par
 Prüfbescheinigung

Mr. Jacques Ding

Rossens, **2000-1-26**

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Total number of pages

Nombre total de pages du rapport: 19

Total Anzahl Seiten

1. Summary of test results / Résumé des résultats d'essais / Zusammenfassung der Prüfergebnisse

- ☒ Pass / Réussi / Bestanden
☒ Fail / Pas réussi / Nicht bestanden
☐ Not applicable to this type of product / pas applicable à ce type de produit / nicht anwendbar für diese Produktart
☐ No test / Pas d'essai / Nicht geprüft

Test Type / Type d'essai / Art der Prüfung	Result / Résultat / Ergebnis
<i>Emission / Emission / Emissionen</i>	
Mains terminal radio frequency voltage Tension perturbatrice aux bornes d'alimentation FCC § 15.207 Störspannung auf den Energieversorgungsleitungen	✓
Radiated electromagnetic field Champ perturbateur FCC § 15.209 and 15.223 Störfeldstärke	✓

The equipment is conform to all requirements of the standards :
 L'appareil répond à toutes les exigences fixées dans les normes :
 Das Gerät entspricht sämtlichen Anforderungen der Normen :

**United States: 47 CFR "Code of Federal Regulations" - Telecommunication
 FCC Part 15, subpart C: Intentional Radiators**

2. Client / Client / Kunde

Client name and address Nom et adresse du client Name und Adresse des Kunden	LUCATRON AG Stationstrasse 10 CH-8606 Greifensee
Contact Person / Responsable / Kontaktperson	Mr. Philipp E. Müller
Telephone / Téléphone / Telefon	+41 1 905 2070
Fax / Télécopieur / Telefax	+41 1 905 2075
Mandate no / Mandat no / Auftrag Nr.	2000-4437

3. Equipment under test / Equipement à l'essai / Prüfling

Manufacturer name and address Nom et adresse du fabricant Name und Adresse des Herstellers	LUCATRON AG Stationstrasse 10 CH-8606 Greifensee
Product name / Nom du produit / Produktname	LDB-1000 Deactivator
Product description / Description du produit / Produktbeschreibung	Deactivator for anti-theft labels
Production country / Pays de fabrication / Ursprungsland	Switzerland
Product type / Type du produit / Typ des Produktes	LD-100 Deactivator N950600617
Serial no / No. de série / Seriennummer	48.1.69
Modifications before the tests Modifications apportées avant les essais Vor den Prüfungen angebrachte Änderungen	Ferit STEWARD 28A0392-0A0 on each cable
Technical documentation Documentation technique Technische Dokumentation	See pages 9.1-9.6

4. Test conditions / Conditions d'essai / Testbedingungen

Temperature / Température / Temperatur:	20 °C
Pressure / Pression / Druck:	1010 hPa
Relative humidity / Humidité relative / Relative Luftfeuchtigkeit:	35 %
Test period / Date des essais / Datum der Prüfungen:	January 21st, 2000

5. Persons present / Personnes présentes / Anwesende Personen

Test Engineer(s) / Ingénieur(s) d'essai / Prüfsingenieur(e) :

Mr. Mr. Manfred Portmann

Other(s) / Autre(s) / Andere :

Name / Nom / Name

Company / Société / Firma

Mr Philipp E. Müller

LUCATRON AG

6. Performance criteria / Critères de performance / Bewertungskriterien

No immunity tests were performed.



Measurement of the conducted disturbances 450 kHz - 30 MHz

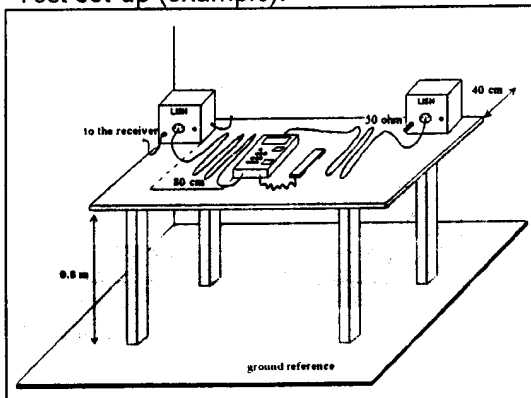
Standard: United States: 47 CFR "Code of Federal Regulations" - Telecommunication
☐ FCC Part 15, Subpart B: Unintentional Radiators: § 15.107 (a) and (b)
☒ FCC Part 15, Subpart C: Intentional Radiators: § 15.207 and
☐ class A ☐ class B

Test site: ☒ anechoic chamber (ferrites) ☐ anechoic chamber (foam)
☐ shielded room ☐ laboratory
☐ open test site ☐

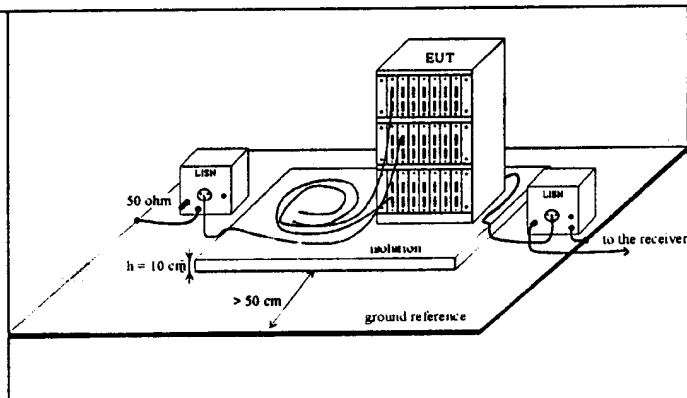
Test precision: ± 3.5 dB

Test method: The conducted disturbance on the supply line is measured from 450 kHz to 30 MHz using a spectrum analyser and a line impedance substitution network (LISN). The measurement of the radio frequency voltage between each power line and ground at the power terminals is carried out successively. Only the maximum of all the values is displayed. The peak values are recorded continuously on the graph. The values that exceed the limits are remeasured manually with the quasi -peak and the average detector of a measuring receiver. These values are indicated at the bottom of the graph.
 If the quasi -peak (QP) values exceed the limits in § 15.107 (a) and (b), and the difference of the measured quasi -peak value and the average value is 6 dB or more, that emission is considered to be broadband. In this case the QP level may be reduced by 13 dB for comparison to the limits.
 As an additional alternative to § 15.107 (a) and (b) digital devices may be shown to comply with the Standards contained in the CISPR Pub. 22 (1985) and the associated Standards.

Test set-up (example):



☒ Table-top equipment



☐ Floor-standing equipment

Test equipment:

☒ Spectrum analyser	☐ 88-14	☒ 90-26	☐ 94-24
☒ LISN	☐ 85-13	☐ 90-08	☒ 94-36
☐ LISN	☐ 94-40	☐ 95-12	☐
☐ Additional LISN	☐ 85-13	☐ 90-08	☐ 94-36 ☐ 94-40
☒ Receiver 9 kHz - 30 MHz	☐ 85-12	☐ 90-11	☒ 94-34
☒ Plotter HP/IB	☐ 88-31	☐ 91-29	☐ 93-79 ☐ 93-80
☒ Protection 10 dB / 20 dB			☒ printer
☐			
☐			

Results: ☒ complies ☐ does not comply ☐ not applicable ☐ not done

Measurement Type : Voltage Interference

Wire : Line (L + N) Max hold



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6.21

Equipment Under Test : LDB 100

Set-Up : table top

Operating Conditions : typical

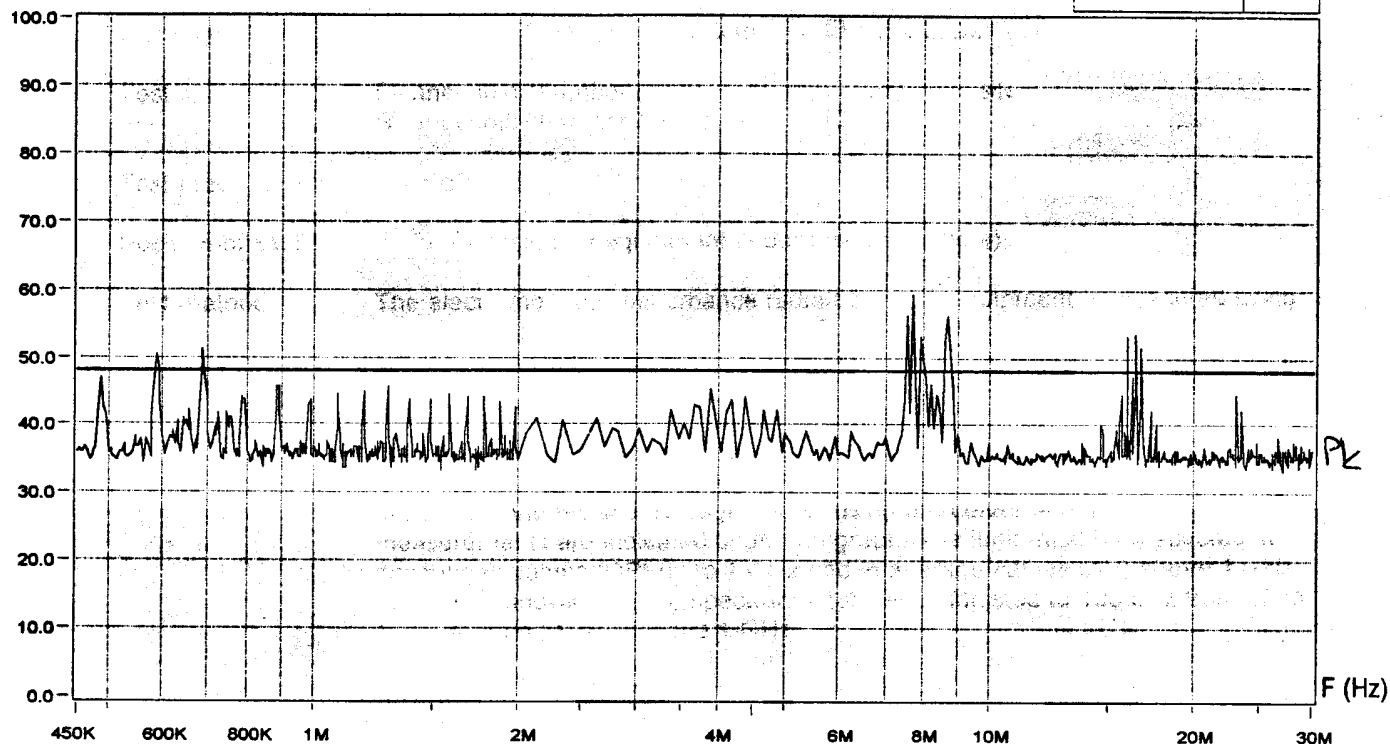
Remarks :

Level dB μ V

FCC 15 Part C

QP Limit

AV Limit



Zone	450 KHz - 2 MHz	2 MHz - 30 MHz
Video Bandwidth	30 KHz	30 KHz
Resol Bandwidth	9 KHz	9 KHz
Sweep Time	5 s	5 s

f [MHz]	QP [dB μ V]	
0,5935	46,5	} <u>OK!</u>
0,695	47,0	
7,4 - 9,0	38,8	
14,8 - 18,0	26,0	

Operator :

Pou1

21.01.00

15,45



Radiated electromagnetic field

Standard: United States: 47 CFR "Code of Federal Regulations" - Telecommunication
☐ FCC Part 15, Subpart B: Unintentional Radiators
☒ FCC Part 15, Subpart C: Intentional Radiators
☐ class A ☐ class B §15.33 frequency range of radiated meas.:
from MHz to MHz

Distance: ☒ §15.209 ☒ §15.223
☐ 30 m ☒ 10 m ☐ 3 m ☐

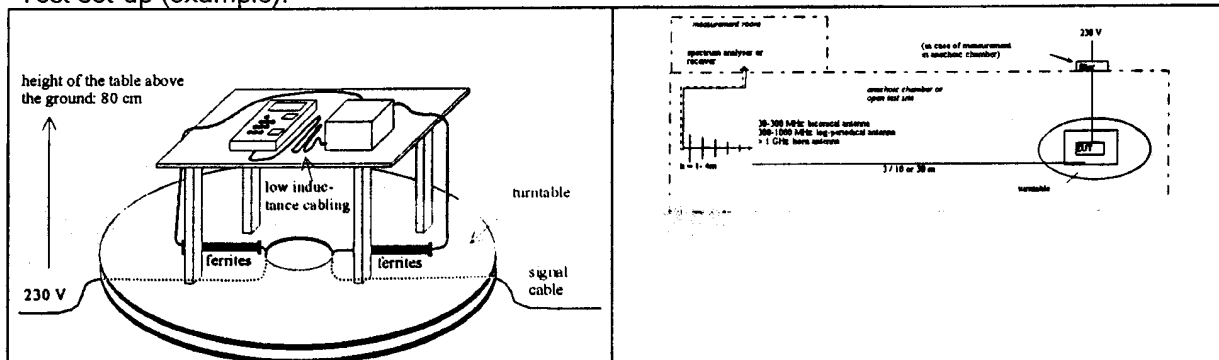
Test site: ☐ anechoic chamber (foam) ☐ open test site
☒ anechoic chamber (ferrite) ☐

Test precision: ± 4.6 dB

Position of EUT: 0.8 m (Height of equipment under test above floor)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and an antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding the limits are remeasured manually giving quasi-peak values and average values using a receiver and these measurements are indicated under the graph. The limit must be respected in quasi-peak values (QP) up to 1 GHz and in average values (AV) above 1 GHz. The 6 dB bandwidth of the spectrum analyser is adjusted to 100 kHz from 30 to 1000 MHz and 1 MHz above 1 GHz.

Test set-up (example):



Test equipment:

☒ Spectrum analyser	☐ 88-14	☒ 90-26	☐ 94-24	
☒ Receiver (CISPR 16)	☐ 85-04	☐ 90-43	☒ 94-35	
☒ Preamplifier	☐ 88-05	☒ 90-01	☐ 90-42	☐ 95-86
☐ Antenna (biconical)	☐ 82-02	☐ 87-05	☐ 87-16	☐ 91-05
☐ Antenna (log-per)	☐ 88-20	☐ 90-30	☐ 91-35	☐ 94-64
☒ Antenna (bilog, horn)	☒ 94-03	☐ 90-24	☐ 90-29	☐
☒ Plotter HPIB	☐ 88-31	☐ 91-29	☐ 93-79	☐ 93-80
☐				☒ printer

G = 28.7 dB

Results: ☒ complies ☐ does not comply ☐ not applicable ☐ not done

Measurement Type : Radiated Field
Polarisation : Horizontal (9.°)
Table Angle : 360 deg
Antenna Height : 1-4 m



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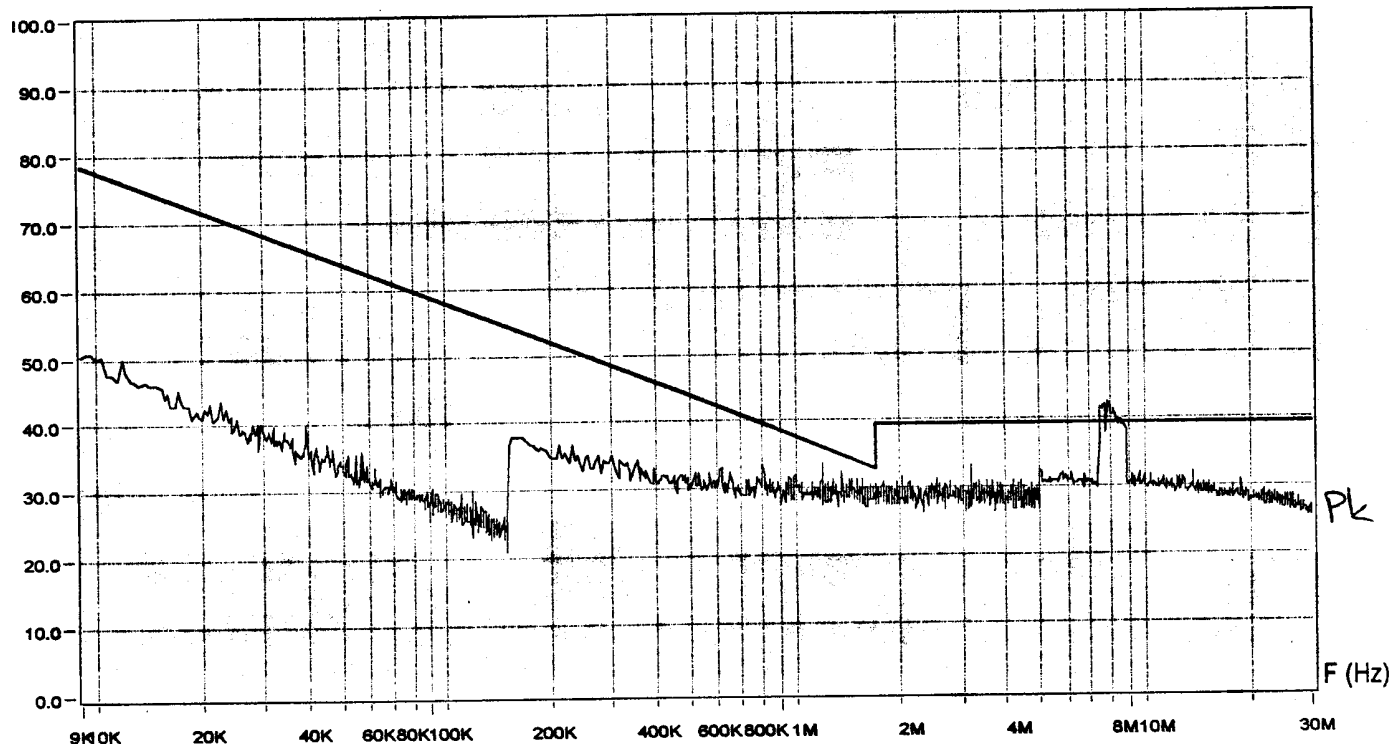
7.2

Equipment Under Test : LDB100
Set-Up : table top
Operating Conditions : typical
Remarks : limits corrected regarding measuring distance (10 m)

QP Limit	☒
----------	-------------------------------------

Level dBuV/m

FCC 15 Part C



Zone	9 KHz - 150 KHz	150 KHz - 2 MHz	2 MHz - 5 MHz	5 MHz - 30 MHz
Video Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz
Resol Bandwidth	200 Hz	10 KHz	10 KHz	10 KHz
Sweep Time	5 s	70 ms	110 ms	930 ms

Chap 15.223

operating range : 7,4 - 9,0 MHz

Limit 50 dBuV/m (10 m)

⇒ OK!

Operator :

Pon

21.01.00

14,45

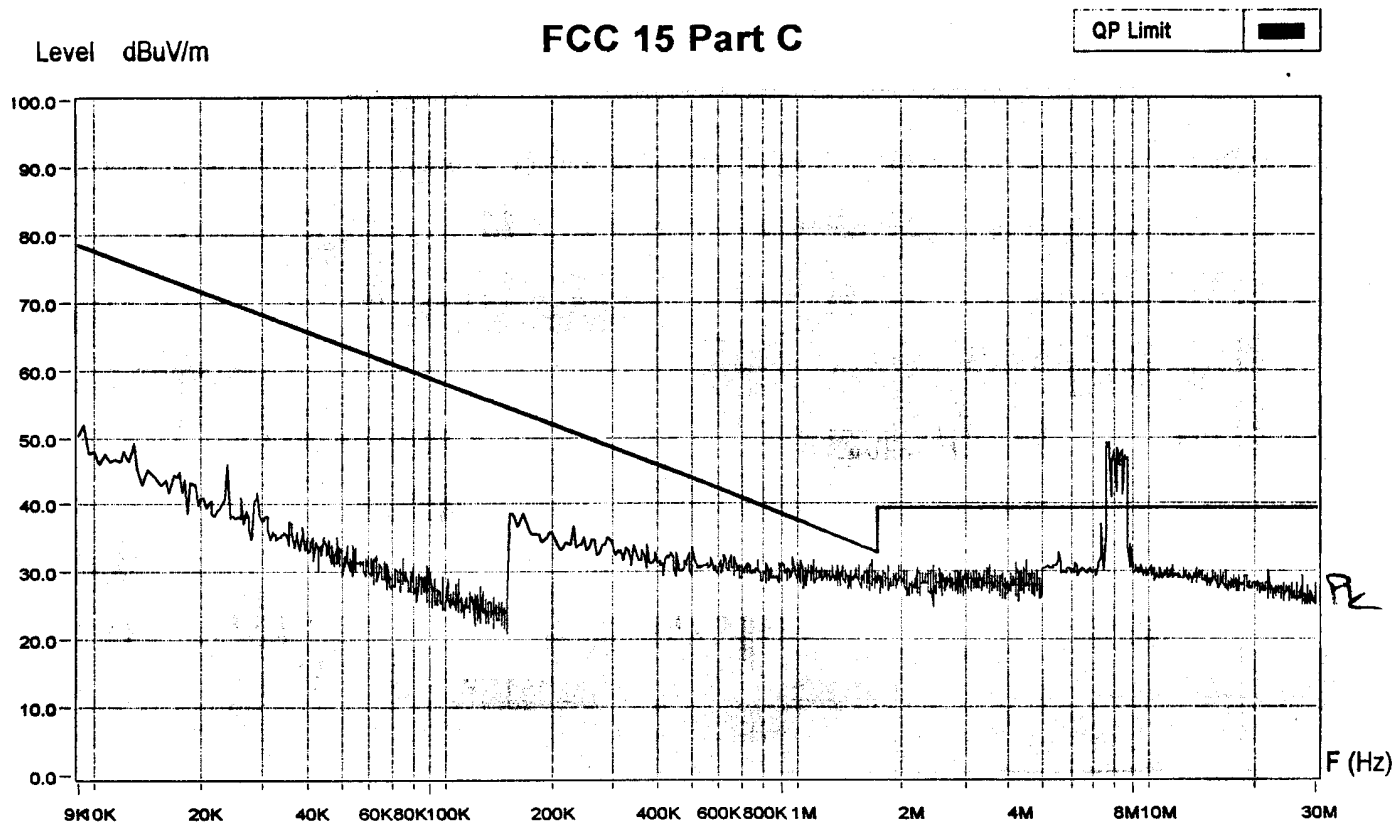
Measurement Type : Radiated Field
Polarisation : Vertical (0°)
Table Angle : 360 deg
Antenna Height : 1-4 m



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Equipment Under Test : LDB100
Set-Up : table top
Operating Conditions : typical
Remarks : limits corrected regarding measuring distance (10 m)



Zone	9 KHz - 150 KHz	150 KHz - 2 MHz	2 MHz - 5 MHz	5 MHz - 30 MHz
Video Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz
Resol Bandwidth	200 Hz	10 KHz	10 KHz	10 KHz
Sweep Time	5 s	70 ms	110 ms	930 ms

Chap 15.223

operating range : 7,4 - 9,0 MHz

Limit 50 dBuV/m (low)

⇒ OK!

Operator :

Pon

21.01.00

14,40

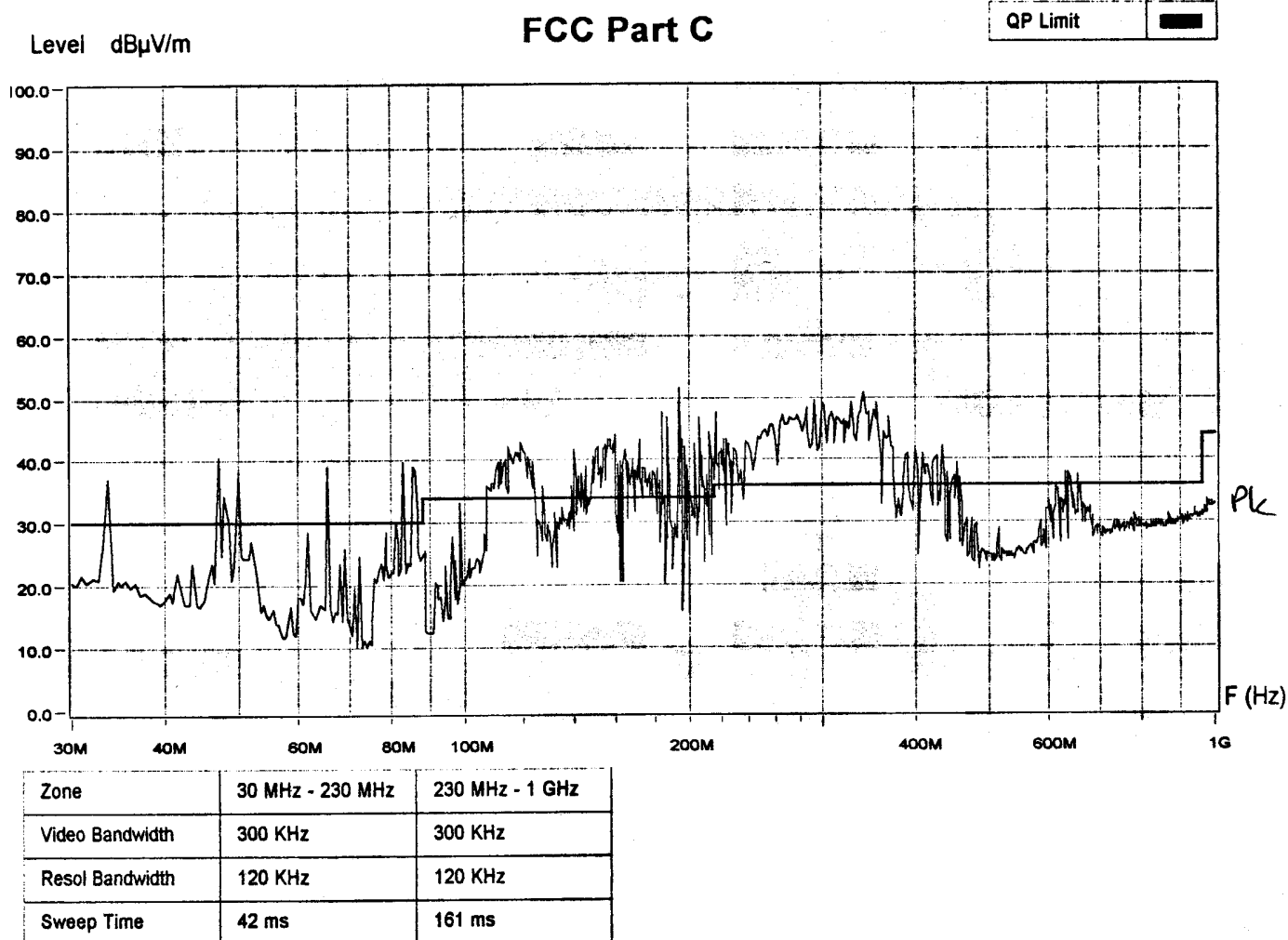
Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 360 deg.
Antenna Height : 1-4 m



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7.4

Equipment Under Test : LDB100
Set-Up : table top
Operating Conditions : typical
Remarks : limits corrected regarding measuring distance (10 m)



f [MHz]	QP dB μ V/m	
30-60	≤ 18	} <u>OK!</u> (Broadband disturbances)
60-100	≤ 18	
100-200	≤ 33	
200-500	≤ 30	
620-680	≤ 20	

Operator :

P011

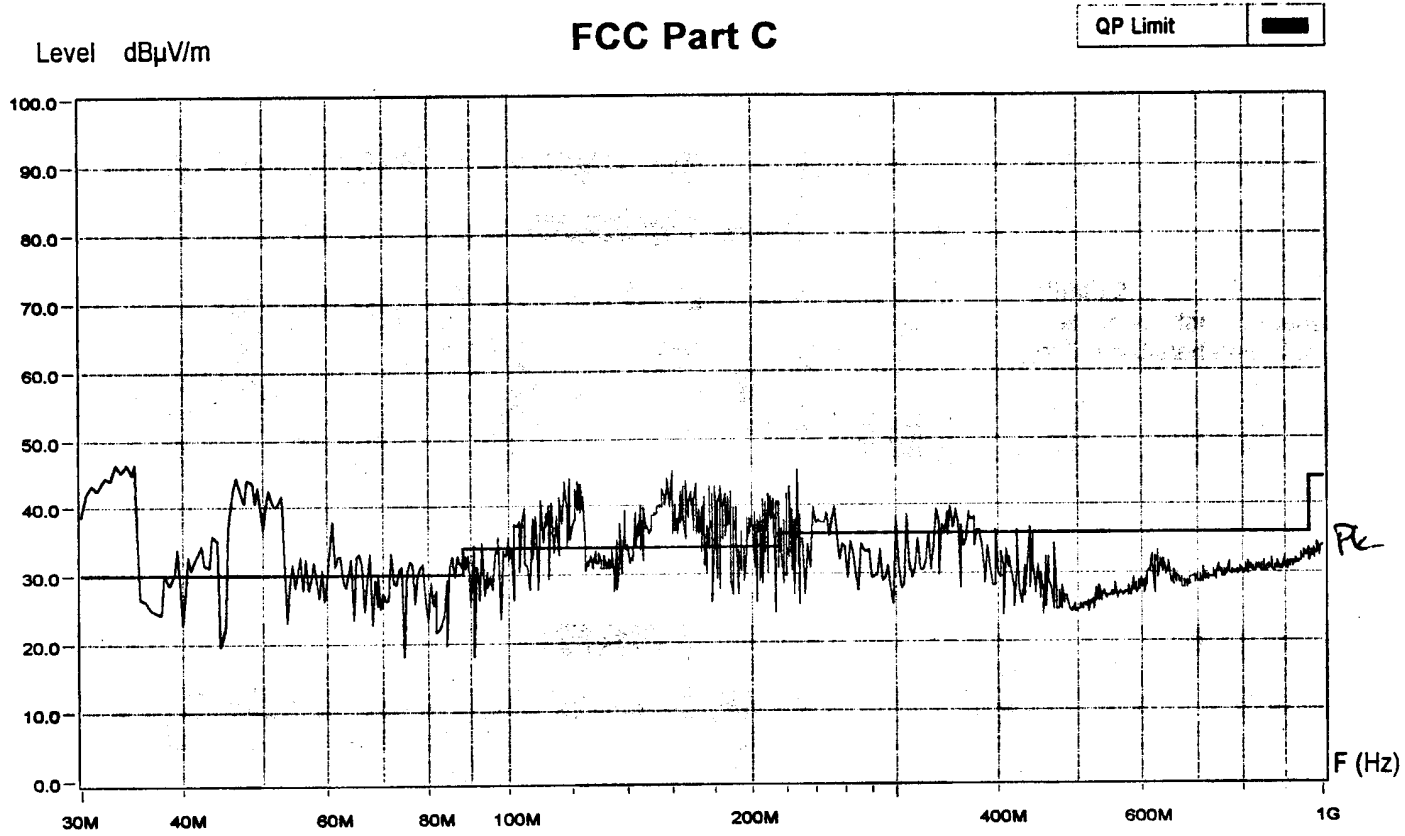
21.01.00

11,57

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 360 deg.
Antenna Height : 1-4 m

7.5

Equipment Under Test : LDB100
Set-Up : table top
Operating Conditions : typical
Remarks : limits corrected regarding measuring distance (10 m)



Zone	30 MHz - 230 MHz	230 MHz - 1 GHz
Video Bandwidth	300 KHz	300 KHz
Resol Bandwidth	120 KHz	120 KHz
Sweep Time	42 ms	161 ms

f [MHz]	QP [dB μ V/m]	
30 - 60	≤ 28	} <u>OK!</u> (Broadband disturbances)
60 - 90	≤ 20	
90 - 130	≤ 23	
130 - 300	≤ 29	
300 - 450	≤ 23	

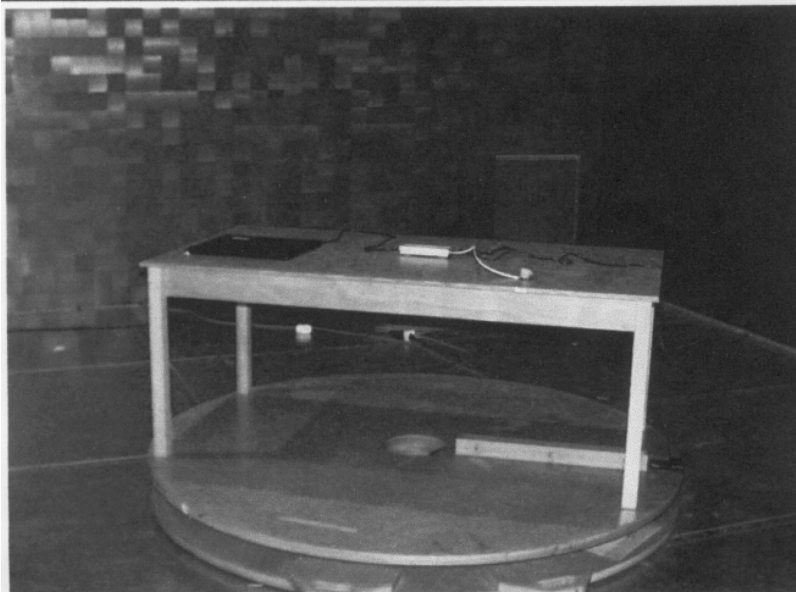


Photo 1

Test set-up for the measurement
of the radiated emission

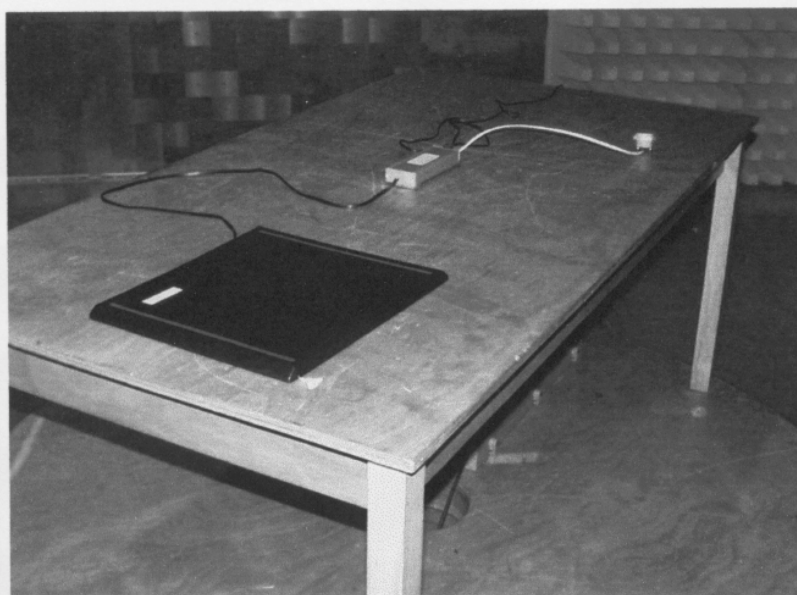


Photo 2

Test set-up for the measurement
of the radiated emission



Photo 3

Test set-up for the measurement
of the conducted emission

LUCATRON

8.2 Mhz Deactivator

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Stationsstrasse 10
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Switzerland
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Fax. ++41 1 905 20 75
<mailto:info@lucatron.com>
<http://www.lucatron.com>

1. Product Overview

§.2

1.1 Core product

Part number	Description
LDB-100	DONLY Deactivator

1.2 Accessories

Part number	Description
ACC-100	Universal Power Supply, Euro Connector
ACC-201	Deactivation Pad, 35.5 cm x 30.5 cm (14" x 12")
ACC-401	Alarm Lamp with cable, 60 cm (2 ft)
ACC-402	Remote Control Cable, 2 m (6 ½ ft) with ferrite core

→ Manufacturer: FRIWO
Type: FW7230/12

1.3 Remarks

2. Product Description

9.3

2.1 ONLY Deactivator (P/N LDB-100)

2.1.1 Description

The LDB-100 is a stand-alone or hand-held one-channel deactivator for 8.2 MHz EAS labels. It generates an electromagnetic RF field, which is radiated over an external antenna loop. This RF field destroys the resonance capacitor of a paper label in the RF field. The process is repeated about 100 times a seconds and at the same times a receiver in the deactivator checks whether deactivation was successful. In the case that the LDB-100 failed to deactivate the label, e.g. because a nondeactivatable hard tag is in the field, an alarm (optical or acoustic) will be emitted. This receiving function also works, when there are other synchronized or non-synchronized deactivators nearby.

2.1.2 Specifications

Power Supply	12 V DC / 250 mA
Mechanical dimensions	24 mm x 55 mm x 155 mm (0.95" x 2.15" x 6.10")
Weight	200 g (7 oz.)
Input Power Connector	5.0 mm x 1.95 mm x 14 mm (DIN 45323)
Frequency Range	7.4 – 9 MHz
Output Antenna	0.8 - 2.0 μ H
I/O Connector	RJ45 (for external synchronization, external switch and alarm)
Synchronization	None or Wire
RF Transceiver	1 channel
Data Interface	None
Interlock	No
Register Control	No
Deactivation Check	According to VDI 4471

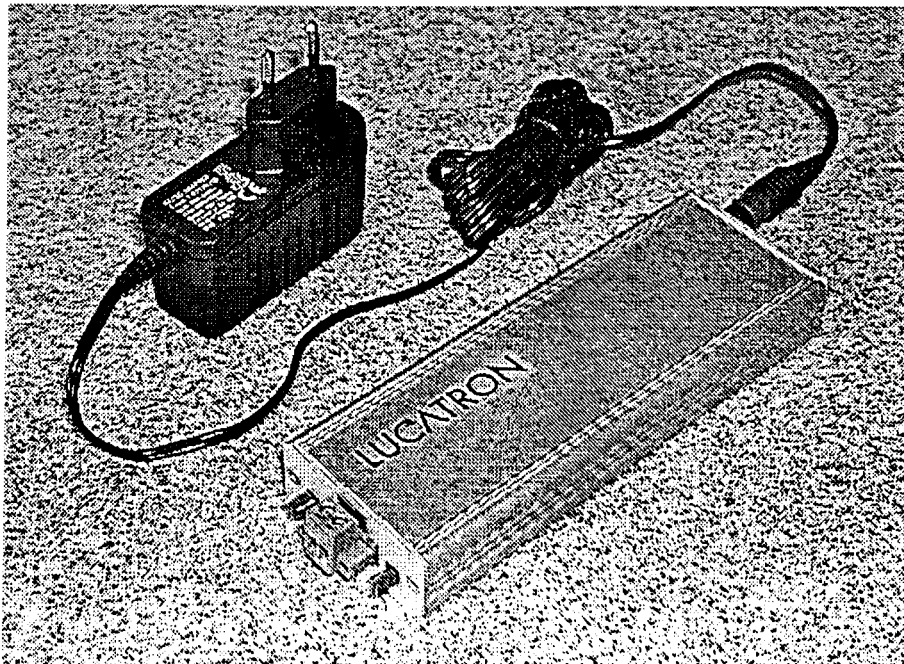


Fig. 1: LDB-100 deactivator with ACC-100 power supply

9.4

2.1.3 Deactivation performance

Any antenna loop with an inductance between 0.8 and 2.0 μ H can be connected to the LDB-100. Impedance outside this specification is possible but will degradation the deactivation distance. With a free standing loop of 30 cm by 30 cm (12" by 12") and a twisted pair connection wire of 85 cm (32") a typical deactivation distance of 30 cm (12") can be reached. The output of the deactivator is protected against short circuits.

2.1.4 I/O control connector

The LDB-100 has a RJ45 connector for external in- and output. One output line (ALARM) is dedicated for alarming purposes and where a LED or a buzzer can be connected. This output is protected against short circuit and is limited to 12 V / 20 mA. One of the two input lines (SYNC) is used to synchronize the LDB-100 with Lucatron Checkout Systems. The second input (ON/OFF) is intended for an external switch such as a key - or a foot switch, in order to prevent deactivation by non authorized persons.

2.1.5 Installation and replacement

The deactivator is mounted with stripes of detachable fasteners close to the deactivation loop, typically underneath the sales desk. The deactivation loop is connected to the LDB-100 and the external peripheral components are connected to the RJ45 connector. Finally the power supply is plugged into the power outlet and the deactivator is ready to go.

A defective device can be easily replaced by unplugging the power supply first and then the external components. A replacement device can then be mounted on the stripes. By reconnecting the external component cables and by plugging the power supply into the outlet the deactivator is ready again.

2.1.6 Deactivation control

The LDB-100 checks if the tag has been deactivated correctly according to standard VDI 4471. Therefore he can detect for Failure to Deactivate (FTD) of the labels or the presence of a hard tag.

2.1.7 Extension of control cable

If a remote control cable of more than 85 cm (32") is connected, it has to be filtered with a ferrite cable core of type TDK HF70RH14 or Kitagawa RISC-6-F or the cable type ACR-401 has to be used.

2.2 Universal Power Supply (P/N ACC-100)

9.6

2.2.1 Description

The ACC-100 is a Universal Power Supply for the LDB-100 and LDB-200 series. For customers in Central Europe the deactivators can be ordered with the power supply included. In that case the part number is XXXXX for a DONLY deactivator with the power supply.

2.2.2 Specifications

Input Voltage:	110 - 240 V AC
Input Frequency	47 - 63 Hz
Input Current	max. 200 mA
Output Voltage	12 V DC
Output Current	max. 700 mA
Mechanical Dimensions	approx. 73 mm x 29 mm x 79 mm (2 7/8" x 1 1/8" x 3 1/8")
Plug	Two round pins (4 mm diameter) for continental Europe