TEST REPORT CONCERNING THE COMPLIANCE OF A DEACTIVATOR, BRAND NEDAP, MODEL TDC, WITH 47 CFR PART 15 (2003-07-22).

FCC listed	: 90828
Industry Canada	: IC3501
VCCI registered	: R-1518, C-1598

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MEASUREMENT/TECHNICAL REPORT

N.V. Nederlandsche Apparatenfabriek "NEDAP"

Model : TDC

FCC ID: CGDTDC

December 3, 2004

This report concerns:	Original grant/certification	~~Class 2 change~~	~~Verification~~
Equipment type:	Deactivator		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ?		~~Yes~~	~~No~~ n.a.

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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 and the measurement procedures of ANSI C63.4-1992. TNO Electronic Products & Services (EPS) B.V. at Niekerk, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: December 3, 2004 Signature:

P. de Beer
TNO Electronic Products & Services (EPS) B.V.

Description of test item

Test item	:	Deactivator
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "NEDAP"
Brand	:	Nedap
Model	:	TDC
Serial numbers	:	-
Revision	:	-
Receipt number	:	1
Receipt date	:	November 23, 2004

Applicant information

Applicant's representative	:	Mr. J.A.M. Hulshof
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Test(s) performed

Location	:	Niekerk
Test(s) started	:	November 23, 2004
Test(s) completed	:	November 24, 2004
Purpose of test(s)	:	Type approval / certification
Test specification(s)	:	47 CFR Part 15 (2003-07-22)

Test engineer (s)	:	H.J. Pieters
Report written by	:	P.A.J.M. Robben, B.Sc.E.E.
Project leader:	:	H.J. Pieters

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1 General information.

1.1 Product description.

1.1.1 Introduction.

The Deactivator, brand Nedap, model TDC, is intended to deactivate electronic labels which are attached to products in shops in order to prevent theft. The Deactivator, brand Nedap, model TDC, is typically installed at check-out counters in shops where the labels can be deactivated after a customer has purchased the product.

This Deactivator, brand Nedap, model TDC, is intended to deactivate electronic labels which will be detected by Electronic Article Surveillance Systems operating in the 7.5 - 8.75 MHz frequency band (swept frequency). Examples of such EAS systems have been previously filed with FCC ID: CGDIQ and FCC ID: CGDIQ-MD4.

1.1.2 Choice of operating frequency.

The operating frequency range of the Deactivator, brand Nedap, model TDC, is 7.5 - 8.75 MHz.

1.1.3 Operating principles.

The Deactivator, brand Nedap, model TDC, consists of a main control unit (TDC), 2-way antenna splitter devices (TDCSPLIT-2V) and antenna coupling units (TDC-BUZDUC).

The main control unit is connected to an Electronic Article Surveillance (EAS) which supplies the Deactivator, brand Nedap, model TDC, with DC power through a coaxial connection cable. This same coaxial cable is being used to supply the main control unit (TDC) with a synchronization signal and can also be used to exchange data between the main control unit (TDC) and the EAS system.

The interconnecting coaxial cables are all coaxial cables, with ferrite beads. These cables are installed by the manufacturer at the site of the customer.

The main control unit (TDC) can be connected to two 2-way antenna splitters. In total there can be 4 four antennas (each antenna is connected to a antenna coupling device) connected to one TDC.

The presence of an electronic label is detected by the main control unit (TDC). After detection of the electronic label, the main control unit issues a pulse in the 7.5 - 8.75 MHz frequency band. This pulse will effectively disable the electronic label. Such a disabled label will no longer be detected by the EAS system.

1.2 Related submittal(s) and/or Grant(s).

FCC ID: CGDIQ and FCC ID: CGDIQ-MD4.

1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found in table 1 below. FCC ID's are stated in this overview where applicable. The EUT is listed in the first row of table 1.

Description	Manufacturer	Model number	Serial number	FCC ID	Cable descriptions
Deactivator	N.V. Nederlandsche Apparatenfabriek "NEDAP"	TDC	-	CGDTDC	Shielded coaxial cables to 2-way antenne splitter. Shielded coaxial cable to CC4 IQ unit.
Dual antenna splitter	N.V. Nederlandsche Apparatenfabriek "NEDAP"	TDCSPLIT-2V	-	CGDTDC	Shielded coaxial cable to EUT. Shielded coaxial cable to antenna coupling units.
Antenna coupling unit with 150x150 mm antenna (4 units present in test setup)	N.V. Nederlandsche Apparatenfabriek "NEDAP"	TDC-BUZDUC	-	CGDTDC	Shielded coaxial cables to 2-way antenna splitters. Unshielded antenna cable to antennas.
CC4 IQ unit (EAS)	N.V. Nederlandsche Apparatenfabriek "NEDAP"	CC4 IQ	-	CGDIQ, CGDIQ-MD4	Shielded coaxial cable to EUT. Unshielded power supply cable to power supply unit.
Power supply unit 110 - 240 VAC to 30 VDC/1.3 Amps	N.V. Nederlandsche Apparatenfabriek "NEDAP"	PS/NCC 30V	-	Not applicable	Unshielded power supply cable to CC4 IQ unit. Unshielded AC mains cable to power supply unit.

Table 1 - Tested system details overview.

1.4 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (2003-07-22), sections 15.207, 15.205 and 15.209.

The test methods, which have been used, are based on ANSI C63.4: 1992.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters. Below 30 MHz the radiated emission tests were carried out at measurement distances of 3 and 10 meters. The test results regarding the radiated emission tests on frequencies below 30 MHz have been extrapolated in order to determine the field strength of the measured values at measurement distances of 30 and 300 meters (as required by 47 CFR Part 15).

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.5 Test facility.

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at TNO Electronic Products & Services (EPS) B.V., located in Niekerk, 9822 TL Smidshornerweg 18, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 23, 2000.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The list of all public test facilities is available on the Internet at http://www.fcc.gov.

1.6 Product labeling.

In accordance with 47 CFR Part 15.19 (a)(3) the following text shall be placed on a label, which is attached to the EUT:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In accordance with 47 CFR Part 2.925 (a)(1), the FCC ID shall be placed on a label, which is attached to the EUT.

For further details about the labeling requirements (size, legibility, etc.) as set by the Federal Communications Commission see 47 CFR Part 15.19 (a)(3), 47 CFR Part 15.19 (b)(2), 47 CFR Part 15.19 (b)(4), 47 CFR Part 2.925 and 47 CFR Part 2.926.

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical fashion (as a customer would normally use it). During all tests the EUT was set up to function in accordance with the manufacturer's instructions. The measurements were conducted with the antennas oriented in three orientations (X-Y-Z).

The justification and manipulation of cables and equipment in order to simulate a worst-case behaviour of the test setup has been carried out as prescribed in ANSI C63.4: 1992.

2.2 EUT mode of operation.

Radiated and conducted emission measurements were carried out when the system was active and was generating a continuous transmitting signal. The EUT was also operated in standby mode and label detection mode.

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance with the appropriate sections of 47 CFR Part 15.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance with the appropriate sections of 47 CFR Part 15.

2.5 Configuration of the tested system.

Unit title	:	Deactivator
System name	:	TDC
FCC ID	:	CGDTDC
Frequency range	:	7.5 - 8.75 MHz (swept frequency)
Description/details	:	See section 1.1 of this test report
Power supply	:	Powered by CC4 IQ unit (FCC ID: CGDIQ, CGDIQ-MD4)
Cabinet & Screening	:	Metal
Interface Cable(s)	:	Shielded data/DC power coaxial cable, shielded RF carrier coaxial cables
Method of screening	:	-
Method of grounding	:	-
Operating configuration	:	See section 1.3 of this test report

2.6 Block diagram of the EUT.

The block diagram is available in the technical documentation package as an addendum to this test report.

2.7 Schematics of the EUT.

The schematics are available in the technical documentation package as an addendum to this test report.

2.8 Partlist of the EUT.

The partlist is available in the technical documentation package as an addendum to this test report.

3 Radiated emission data.

3.1 Radiated emission data.

3.1.1 Radiated field strength measurements (frequency range of 30 - 1000 MHz, E-field).

Frequency (MHz)	Measurement results dB(µV)/m @ 3 metres Quasi-peak		Limits dB(µV)/m @ 3 metres Quasi-peak	Margin (dB) Quasi-peak		Result
	Vertical	Horizontal		Vertical	Horizontal	
30.59	32.6	27.5	40.0	-7.4	-12.5	PASS
34.86	24.1	18.2	40.0	-16.0	-21.9	PASS
38.16	28.0	28.5	40.0	-12.0	-11.5	PASS
48.61	21.7	9.9	40.0	-18.3	-30.1	PASS
49.46	22.0	12.0	40.0	-18.0	-28.0	PASS
122.04	24.6	15.7	43.5	-18.9	-27.8	PASS
122.25	37.8	28.8	43.5	-5.7	-14.7	PASS
168.04	29.3	34.1	43.5	-14.2	-9.4	PASS
259.74	26.8	20.5	46.0	-19.2	-25.5	PASS
360.30	27.7	19.9	46.0	-18.3	-26.1	PASS
421.50	30.2	24.0	46.0	-15.8	-22.0	PASS
425.42	34.1	24.9	46.0	-11.9	-21.1	PASS
440.95	34.0	25.7	46.0	-12.0	-20.3	PASS
460.61	32.7	23.1	46.0	-13.3	-22.9	PASS
477.16	29.2	23.6	46.0	-16.8	-22.4	PASS
589.82	40.7	33.1	46.0	-5.3	-12.9	PASS
622.59	33.9	29.5	46.0	-12.1	-16.5	PASS
672.51	31.6	29.8	46.0	-14.4	-16.2	PASS
687.90	34.3	28.6	46.0	-11.7	-17.4	PASS

Table 2 - Radiated emissions in the frequency range of 30 - 1000 MHz (E-field).

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205, 15.209 and 15.223, with the EUT operating in continuous transmit mode, standby mode and label detection mode, are depicted in table 2.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.

Test engineer

Signature : 

Name : H.J. Pieters

Date : November 24, 2004

3.1.2 Radiated field strength measurements (frequency range of 0.009 - 30 MHz, H-field).

Frequency (MHz)	Measurement results dBµV Quasi-peak		Antenna factor	Cable loss	Measurement results dB(µV)/m Quasi-peak (calculated)	Limits Part 15.209 dB(µV)/m (calculated)
	3 meters	10 meters	dB	dB		
1.705– 7.50	<<	<<	19.5	1	<10.0	30.0 (30 m)
7.50	56.0	34.8	19.5	1	34.9 (30 m)	40.0 (30 m)
7.64	54.1	32.9	19.5	1	33.1 (30 m)	40.0 (30 m)
8.75	57.4	34.6	19.5	1	33.3 (30 m)	40.0 (30 m)
8.75 - 30.00	<10.0	<<	19.5	1	<10.0	29.5 (30 m)

Table 3 - Radiated emission measurements in the frequency range of 0.009 - 30 MHz (H-field).

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205, 15.209, 15.223 and 15.31 (c), with the EUT operating in continuous transmit mode, standby mode, label detection mode and with the sweep stopped at 7.50 MHz and 8.75 MHz, are depicted in the table above.

Notes:

1. An example of the calculated field strangth may found in the Appendix 1.
2. Frequency range: 9-90 kHz: Average detector used during measurements.
3. Frequency range: 110-490 kHz: Average detector used during measurements.
4. <<. indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range.
5. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
6. According to 47 CFR Part 15, section 15.223, bandwidth shall be more than 10% of the frequency to apply the limits as given in table 3. The bandwidth of the system is 7.50 MHz - 8.75 MHz.
7. The EUT sweeps from 7.50 MHz to 8.75 MHz. The sweep does not stop in bands as listed in 47 CFR Part 15, section 15.205 (restricted bands of operation). The fundamental emission is outside the bands, as listed in 47 CFR Part 15, section 15.205, for more than 99% of the time when the device is actively transmitting, without compensation for duty cycle.

Test engineer

Signature : 

Name : H.J. Pieters

Date : November 24, 2004

4 Conducted emission data.

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Margin (dB) Neutral		Margin (dB) Line 1		Result
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV	
0.15	38.4	20.9	38.5	16.3	66.0	56.0	-27.6	-35.1	-27.5	-39.7	PASS
0.20	28.4	7.8	29.3	3.0	63.6	53.6	-35.2	-45.8	-34.3	-50.6	PASS
0.44	20.2	5.2	16.4	2.8	57.1	47.1	-36.9	-41.9	-40.7	-44.3	PASS
0.82	27.4	17.0	25.8	6.4	56.0	46.0	-28.6	-29.0	-30.2	-39.6	PASS
1.39	29.2	18.3	28.8	13.3	56.0	46.0	-26.8	-27.7	-27.2	-32.7	PASS
2.00	33.0	20.7	34.9	23.3	56.0	46.0	-23.0	-25.3	-21.1	-22.7	PASS
3.98	38.9	27.3	39.4	27.3	56.0	46.0	-17.1	-18.7	-16.6	-18.7	PASS
5.30	37.3	26.1	38.8	27.0	60.0	50.0	-22.7	-23.9	-21.2	-23.0	PASS
7.00	40.1	28.0	39.1	26.5	60.0	50.0	-19.9	-22.0	-20.9	-23.5	PASS
7.50	56.3	45.2	34.5	49.0	60.0	50.0	-3.7	-4.8	-25.5	-1.0	PASS
8.00	32.8	21.6	32.6	22.0	60.0	50.0	-27.2	-28.4	-27.4	-28.0	PASS
8.75	59.5	48.3	55.9	49.5	60.0	50.0	-0.5	-1.7	-4.1	-0.5	PASS
9.00	30.5	20.8	30.6	20.2	60.0	50.0	-29.5	-29.2	-29.4	-29.8	PASS
13.20	29.3	19.5	30.1	20.1	60.0	50.0	-30.7	-30.5	-29.9	-29.9	PASS
17.00	25.4	16.6	25.1	16.1	60.0	50.0	-34.6	-33.4	-34.9	-33.9	PASS
20.20	20.2	10.5	20.2	11.9	60.0	50.0	-39.8	-39.5	-39.8	-38.1	PASS
24.45	17.2	9.0	16.4	8.2	60.0	50.0	-42.8	-41.0	-43.6	-41.8	PASS
27.50	25.7	18.0	24.2	16.6	60.0	50.0	-34.3	-32.0	-35.8	-33.4	PASS

Table 4 - Conducted emission measurements in the frequency range of 0.15 - 30 MHz.

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15, sections 15.207 and 15.31 (c), at the 110 Volts AC mains connection terminals of the AC/DC power supply which was connected to the EAS system (which was connected to the EUT) and with the EUT operating in continuous transmit mode, standby mode, label detection mode and with the sweep stopped at 7.50 MHz and 8.75 MHz, are depicted in table 4.

Notes:

1. During the measurement it was taken into account that the main operating frequency of 8.2 MHz of the EUT could be present on the 110 Volts AC mains connection terminals. The possible occurrence of this frequency of 8.2 MHz and its harmonics, throughout the range of 8.2 MHz to 30 MHz, was checked during the measurement. The conducted emissions on frequencies which are not listed in the table above were found to be below 25 dB(µV) on both line 1 and line 2.

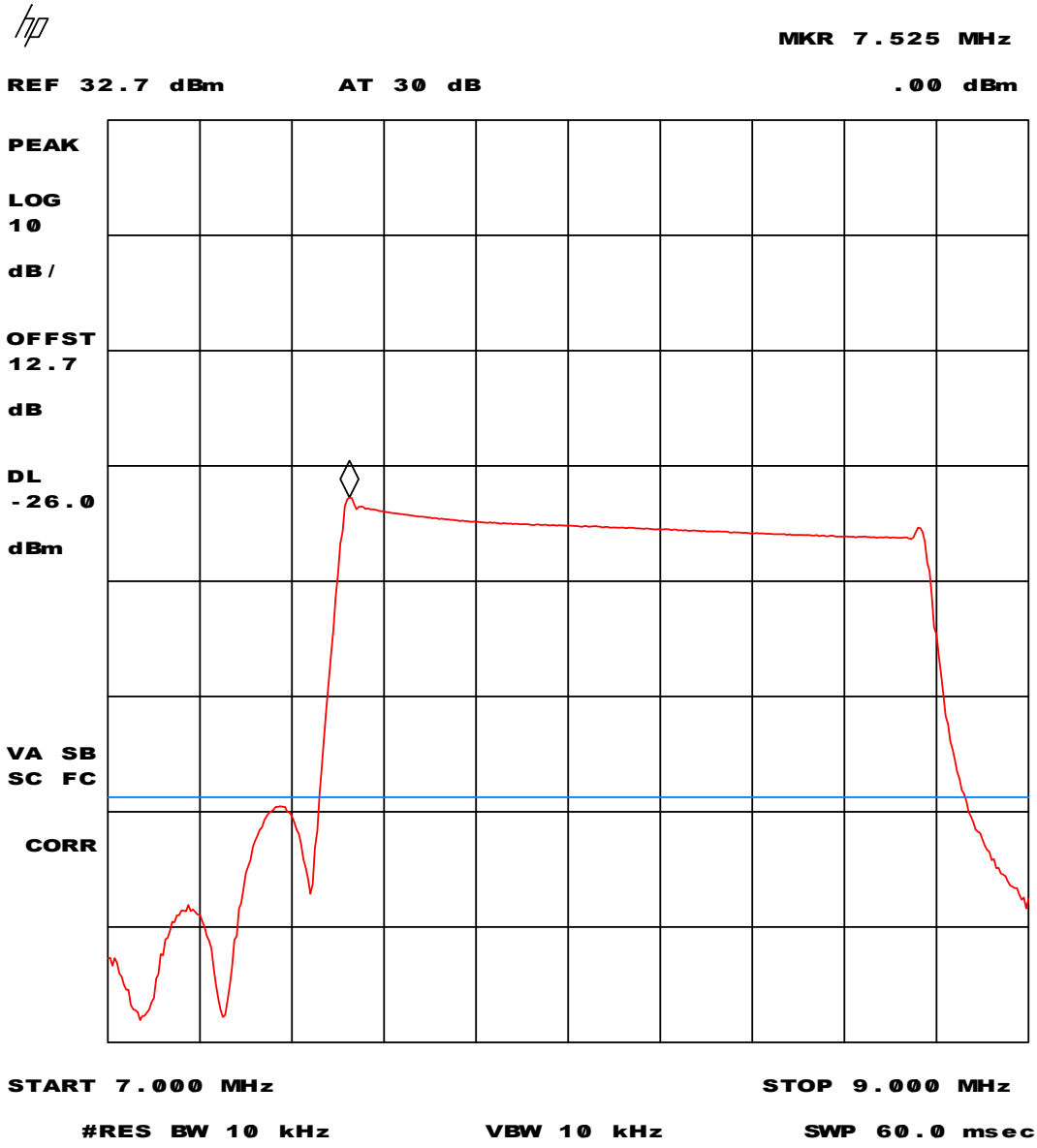
Test engineer

Signature : 

Name : H.J. Pieters

Date : November 24, 2004

5 Plot of emission bandwidth of the carrier signal.



6 List of utilized test equipment.

Inventory number	Description	Brand	Model
12471	Biconical antenna 20MHz-200MHz	EATON	94455-1
12473	Log-per antenna 200-1000MHz	EATON	96005
12476	Antenna mast	EMCO	TR3
12477	Antenna mast 1-4 mtr	Poelstra	--
12482	Loop antenna	EMCO	6507
12605	calibrated dipole 28MHz-1GHz	Emco	3121c
12636	Polyester chamber	Polyforce	--
12640	Temperature chamber	Heraeus	VEM03/500
13664	Spectrum analyzer	HP	HP8593E
13452	Digital multi meter	HP	34401A
13886	Open Area testsite	Comtest	--
14450	2.4 GHz bandrejectfilter	BSC	XN-1783
15633	Biconilog Testantenna	Chase	CBL 6111B
15667	Measuring receiver	R&S	ESCS 30\
99055	Non-conducting support	NMi	--
99061	Non-conducting support 150cm	NMi	--
99068	Detector N-F/BNC-F	Radiall	R451576000
99069	Cable 5m RG214	NMi	--
99071	Cable 10m RG214	NMi	--
99077	Regulating trafo	RFT	LTS006
99112	Tripod	Chase	--

Appendix 1

Calculated measurements results radiated field strength, H-Field

General Formula:

d_s = short distance; H_s is field strength at short distance

d_l = long distance; H_l is field strength at long distance

$$(d_s/d_l))^n = H_l/H_s \text{ ……..[eq1]}$$

$$n \log(d_s/d_l) = \log(H_l/H_s) \text{ or } n = \log(H_l/H_s) / \log(d_s/d_l)$$

Calculation of n, for measured field strengths

H_s = 75.5 dBµV/m = 5956.62 µV/m

H_l = 54.3 dBµV/m = 518.80 µV/m

n = log(518.80/5956.62) / log(3/10)

n = 2.03

Calculated field strength at new distance, from the 10 meter value:

H_s now becomes H_s = 518.80 µV/m and d_s=10

Assume d_l =30

Now from [eq1] H_l becomes:

$H_l = H_s * (d_l/ds)^{-n}$

So $H_l = 518.80 * (30/10)^{-2.03}$ = 55.8 uV/m or 34.9 dBuV/m