



**TEST REPORT CONCERNING THE COMPLIANCE OF
AN ELECTRONIC ANTI PILEFERAGE SYSTEM,
BRAND NEDAP, MODEL NCC-4, WITH 47 CFR PART
15 (2003-07-22).**

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

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Test specification(s): 47 CFR Part 15 (2003-07-22)
Description of EUT: Electronic Article Surveillance System with metal detection
Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

MEASUREMENT/TECHNICAL REPORT

N.V. Nederlandsche Apparatenfabriek "NEDAP"

Model : NCC-4

FCC ID: CGDXQ-MD4

September 20, 2004

This report concerns:	Original grant/certification	Class 2 change	Verification
Equipment type:	Electronic Article Surveillance System operating on 8.1 MHz +/- 700 kHz		
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: September 20, 2004

Signature:

P.A.J.M. Robben, B.Sc.E.E.
TNO Electronic Products & Services (EPS) B.V.



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Model: NCC-4
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Description of test item

Test item : Anti Pilferage system
Manufacturer : N.V. Nederlandsche Apparatenfabriek "NEDAP"
Brand mark : Nedap
Model : NCC-4
Serial number(s) : -
Revision : -
Receipt number : 1
Receipt date : October 2, 2003

Applicant information

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Test(s) performed

Location : Niekerk
Test(s) started : October 2, 2003
Test(s) completed : October 23, 2003
Purpose of test(s) : Type approval / certification
Test specification(s) : 47 CFR Part 15 (2003-07-22)

Test engineer (s) : J. Schuurmans, 

P.J.A.M. Robben 

H.J. Pieters 

Report written by : J. Schuurmans 

Project leader: : P.A.J.M. Robben 

This report is in conformity with NEN-EN-ISO/IEC 17025: 2000.

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The test results relate only to the item(s) tested.



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1 General information.

1.1 Product description.

1.1.1 Introduction.

The XQ Anti Pilferage System protects goods, such as clothing in shops from being stolen by detecting a miniature transponder, also known as 'wafer', attached to those goods. The antennas of the system contain detection circuits to detect the wafer as soon as it is placed in the detection field. When the antennas are placed at the exits of a shop, goods with wafers still attached are detected and a possible pilferage is prohibited.

-

1.1.2 Choice of operating frequency.

The operating frequency of the Electronic Article Surveillance System XQ, brand Nedap is $8.1 \text{ MHz} \pm 700 \text{ kHz}$. Metal detection circuitry is present operating on 62.5 kHz

1.1.3 Operating principles.

The heart of the XQ system is the wafer detection. The wafer contains a resonant circuit, consisting of an air cored loop and a capacitor. If the loop enters an alternating magnetic field, such as that of a primary transmitting loop, an electric current is induced in the windings. If the frequency of the alternating magnetic field corresponds to the resonant frequency of the wafer, the voltage over the loop will cause an alternating current in the series connection of the coil and the capacitor. The current in the loop then generates its own alternating magnetic field, but with a 90 degrees phase shift. This secondary field induces a voltage in the receiver antenna and thus the wafer is detected.

A complete XQ system consists of

The Network Communication & Control unit (NCC4), having the following functions:

- Supplying the 33V DC power supply for all the units in the system.
- Supplying the antennas with the reference signal of 4 times the operating frequency of 8.1 MHz
- All settings are controlled from the NCC-4

Two antennas, a Transmit (Tx) antenna and a Receive (Rx) antenna. The antennas may contain additional functions such as customer counting, using IR technology and metal detection circuitry. The metal detection operating frequency is 62.5 kHz.

The Cables connecting the antennas are coaxial cables, with ferrite beads. These cables are installed by the manufacturer on the site of the customer.

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

Not applicable.



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FCC ID: CGDXQ-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.

Description	Manufacturer	Model number	Serial number	FCC ID	Cable descriptions
Central Unit	N.V. Nederlandsche Apparatenfabriek "NEDAP"	NCC4	-	CGDXQ-MD4	Power input/output cable.
Antenna pair	N.V. Nederlandsche Apparatenfabriek "NEDAP"	E45OID MD CC	-	CGDXQ-MD4	Shielded data/DC power cable.
Antenna pair	N.V. Nederlandsche Apparatenfabriek "NEDAP"	EQ45 MD CC	-	CGDXQ-MD4	Shielded data/DC power cable.
Antenna pair	N.V. Nederlandsche Apparatenfabriek "NEDAP"	PG45 MD CC	-	CGDXQ-MD4	Shielded data/DC power cable.

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 Nieuwerkerk, 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>.



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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 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.

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	:	Electronic Article Surveillance System
System name	:	XQ
FCC ID	:	CGDXQ-MD4
Frequency range	:	8.1 MH +/- 700 kH and 62.5 kHz
Description/details	:	See section 1.1 of this test report
Power supply	:	+33.0 Volts DC
Clock Oscillator(s)	:	30 MHz
Cabinet & Screening	:	Internal
Interface Cable(s)	:	Shielded data/DC power cable
Method of screening	:	-
Method of grounding	:	-
Operating configuration	:	See section 1.3 of this test report



2.6 Tested Operating Configurations

The flexibility of the system allows a number of different configurations. The tested setups are those using the antenna having all possible additional wiring and electronics on board. Based on good engineering practice and judgement the worst case configurations were identified and tested. The tested configurations are described below. The block diagrams of tested configuration are annexed to this report.

Possible 2-antenna configurations containing NCC4.

Configuration name	Control device	Antenna pair	Remark	Tested YES/NO
I	NCC4	E45OID MD CC	including metal detection and customer counting	YES
II	NCC4	E45OID MD	including metal detection	NO
III	NCC4	PG45 MD CC	including metal detection and customer counting	YES
IV	NCC4	PG45 MD	including metal detection	NO
V	NCC4	EQ45 MD CC	including metal detection and customer counting	YES
VI	NCC4	EQ45 MD	including metal detection	NO

The system operates in two modes:

Mode 1: The system is on, but not detecting a wafer.

Mode 2: The system is on and detecting a wafer in its detection field.

2.7 Block diagram of the EUT.

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

2.8 Schematics of the EUT.

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

2.9 Partlist of the EUT.

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



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3 Radiated emission data.

3.1 Radiated emission data of configuration I.

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	
30.50	27.7	18.9	40.0	-12.3	-21.1	PASS
34.55	34.5	20.5	40.0	-5.6	-19.6	PASS
43.59	26.5	15.5	40.0	-13.5	-24.5	PASS
52.28	25.6	12.3	40.0	-14.4	-27.7	PASS
61.02	31.2	19.7	40.0	-8.8	-20.3	PASS
71.35	35.4	27.0	40.0	-4.6	-13.0	PASS
82.13	15.4	9.6	40.0	-24.6	-30.4	PASS
85.09	20.0	10.2	40.0	-20.1	-29.9	PASS
90.49	21.1	11.1	43.5	-22.4	-32.4	PASS
118.55	19.3	13.7	43.5	-24.2	-29.8	PASS
119.42	20.0	19.9	43.5	-23.5	-23.6	PASS
131.11	23.3	24.2	43.5	-20.2	-19.3	PASS
158.43	22.9	23.4	43.5	-20.6	-20.1	PASS
160.47	24.4	22.5	43.5	-19.1	-21.0	PASS
173.76	23.5	25.4	43.5	-20.0	-18.1	PASS
229.44	19.7	19.7	46.0	-26.3	-26.3	PASS
238.85	28.0	30.0	46.0	-18.0	-16.0	PASS
250.60	26.7	27.2	46.0	-19.3	-18.8	PASS
268.65	26.8	23.6	46.0	-19.2	-22.4	PASS
311.39	34.4	31.6	46.0	-11.6	-14.4	PASS
327.78	24.3	22.6	46.0	-21.7	-23.4	PASS
340.36	26.7	25.1	46.0	-19.3	-20.9	PASS
376.94	28.6	30.0	46.0	-17.4	-16.0	PASS
393.33	37.7	35.1	46.0	-8.3	-10.9	PASS
442.49	33.8	31.7	46.0	-12.2	-14.3	PASS
458.79	30.1	30.2	46.0	-15.9	-15.8	PASS
468.02	42.9	35.1	46.0	-3.1	-10.9	PASS
524.43	34.7	30.9	46.0	-11.3	-15.1	PASS
671.94	38.4	35.9	46.0	-7.6	-10.1	PASS
721.10	37.7	36.3	46.0	-8.3	-9.7	PASS
737.50	39.1	35.3	46.0	-6.9	-10.7	PASS
770.27	35.2	41.9	46.0	-10.8	-4.1	PASS
786.66	41.4	41.4	46.0	-4.6	-4.6	PASS



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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	
835.24	36.3	32.1	46.0	-9.7	-13.9	PASS
825.22	37.6	31.7	46.0	-8.4	-14.3	PASS
868.60	35.4	36.4	46.0	-10.6	-9.6	PASS
917.78	37.6	37.9	46.0	-8.4	-8.1	PASS

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205, 15.209 and 15.223 (a) and 15.231 (a)(4), (b), with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above

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.
2. n.a. means not applicable.
3. << means no emission above noise floor
4. The emissions have been measured in mode 1 and in mode 2. The highest emission is noted

Test engineer

Signature : 

Name : J. Schuurmans

Date : October 8, 2003



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

Frequency (MHz)	Measurement results dB μ V Quasi-peak		Antenna factor dB	Cable loss dB	Measurement results dB(μ V)/m Quasi-peak (calculated)	Limits Part 15.209 dB(μ V)/m (calculated)
	3 meters	10 meters				
0.062	67.1	n.a.	19.5	1	<10.0	48.5 – 13.8 (300 m)
0.125	<10.0	n.a.	19.5	1	<10.0	33.8 – 22.9 (30 m)
1.705 – 7.49	<10.0	n.a.	19.5	1	<10.0	30.0 (30 m)
7.49	69.2	40.2	19.5	1	34.2(30 m)	40.0 (30 m)
8.70	68.9	40.8	19.5	1	35.6 (30 m)	40.0 (30 m)
8.70 - 30.00	<10.0	n.a.	19.5	1	<10.0	29.5 (30 m)

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205 and 15.209 and 15.223, with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above.

Notes:

1. An example of the calculated field strength 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. The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.
7. The emissions on 7.49 and 8.7 MHz are measured while the sweep was stopped at those frequencies.

Test engineer

Signature : 

Name : J. Schuurmans

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3.2 Radiated emission data of configuration III.

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

Frequency (MHz)	Measurement results dB(μ V)/m @ 3 metres Quasi-peak		Limits dB(μ V)/m @ 3 metres Quasi-peak	Margin (dB) Quasi-peak		Result
	Vertical	Horizontal		Vertical	Horizontal	
35.35	37.5	24.9	40.0	-2.6	-15.2	PASS
70.62	24.5	14.9	40.0	-15.5	-25.1	PASS
131.11	20.9	30.2	43.5	-22.6	-13.3	PASS
215.90	29.7	18.2	43.5	-13.8	-25.3	PASS
229.44	27.6	36.7	46.0	-18.4	-9.3	PASS
245.83	20.1	24.2	46.0	-25.9	-21.8	PASS
262.22	32.1	36.6	46.0	-13.9	-9.4	PASS
278.61	33.4	33.8	46.0	-12.6	-12.2	PASS
294.99	40.6	34.2	46.0	-5.4	-11.8	PASS
300.70	23.9	27.5	46.0	-22.1	-18.5	PASS
311.38	39.7	31.2	46.0	-6.3	-14.8	PASS
360.55	35.2	33.0	46.0	-10.8	-13.0	PASS
442.49	26.9	27.5	46.0	-19.1	-18.5	PASS
501.17	27.7	32.0	46.0	-18.3	-14.0	PASS
524.44	33.6	32.7	46.0	-12.4	-13.3	PASS
573.60	31.0	27.0	46.0	-15.0	-19.0	PASS
671.94	37.0	35.6	46.0	-9.0	-10.4	PASS
704.71	35.5	34.1	46.0	-10.5	-11.9	PASS
721.11	35.2	38.8	46.0	-10.8	-7.2	PASS
770.27	34.5	32.0	46.0	-11.5	-14.0	PASS
786.66	33.6	34.9	46.0	-12.4	-11.1	PASS
852.23	36.5	32.6	46.0	-9.5	-13.4	PASS
917.77	38.0	35.7	46.0	-8.0	-10.3	PASS

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205, 15.209 and 15.223 (a) and 15.231 (a)(4), (b), with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above.

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.
2. n.a. means not applicable.
3. << means no emission above noise floor.
4. The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.

Test engineer

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	3 meters	10 meters				
0.0625	<10.0	n.a.	19.5	1	<10.0	48.5 – 13.8 (300 m)
0.125	<10.0	n.a.	19.5	1	<10.0	33.8 – 22.9 (30 m)
1.705 – 7.49	<10.0	n.a.	19.5	1	<10.0	30.0 (30 m)
7.49	68.5	40.3	19.5	1	35.0 (30m)	40.0 (30 m)
8.70	67.4	37.3	19.5	1	28.3 (30 m)	40.0 (30 m)
8.70 - 30.00	<10.0	n.a.	19.5	1	<10.0	29.5 (30 m)

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205 and 15.209 and 15.223, with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above.

Notes:

1. An example of the calculated field strength may found in the Appendix 1.
2. Frequency range: 9-90 kHz: Average detector used during measurements.
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Date : October 2, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
 Description of EUT: Electronic Article Surveillance System with metal detection
 Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
 Brand mark: Nedap
 Model: NCC-4
 FCC ID: CGDXQ-MD4

3.3 Radiated emission data of configuration V.

3.3.1 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	
30.50	32.4	22.1	40.0	-7.6	-17.9	PASS
35.33	35.9	21.3	40.0	-4.2	-18.8	PASS
35.63	35.4	18.5	40.0	-4.6	-21.5	PASS
35.96	35.7	20.1	40.0	-4.3	-19.9	PASS
71.99	23.3	17.2	40.0	-16.7	-22.8	PASS
110.03	33.7	36.5	43.5	-9.8	-7.0	PASS
117.35	27.0	26.4	43.5	-16.5	-17.1	PASS
131.10	28.3	27.5	43.5	-15.2	-16.0	PASS
147.50	29.8	29.3	43.5	-13.7	-14.2	PASS
168.07	18.7	22.0	43.5	-24.8	-21.5	PASS
229.44	27.7	30.6	46.0	-18.3	-15.4	PASS
327.78	35.9	36.2	46.0	-10.1	-9.8	PASS
344.17	33.2	35.3	46.0	-12.8	-10.7	PASS
360.55	39.7	40.7	46.0	-6.3	-5.3	PASS
501.17	24.5	30.5	46.0	-21.5	-15.5	PASS
671.94	39.3	37.6	46.0	-6.7	-8.4	PASS
704.73	38.4	36.8	46.0	-7.6	-9.2	PASS
721.10	38.2	36.8	46.0	-7.8	-9.2	PASS
733.35	30.0	30.0	46.0	-16.0	-16.0	PASS
737.50	36.2	36.9	46.0	-9.8	-9.1	PASS
753.88	30.7	30.7	46.0	-15.3	-15.3	PASS
770.27	30.7	30.7	46.0	-15.3	-15.3	PASS
786.66	34.7	35.5	46.0	-11.3	-10.5	PASS



Test specification(s): 47 CFR Part 15 (2003-07-22)
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Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

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	
819.45	31.4	35.9	46.0	-14.6	-10.1	PASS
835.84	41.0	37.2	46.0	-5.0	-8.8	PASS
852.39	40.8	39.1	46.0	-5.2	-6.9	PASS
917.78	40.3	40.9	46.0	-5.7	-5.1	PASS

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205, 15.209 and 15.223 (a) and 15.231 (a)(4), (b), with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above

Notes:

- Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
- n.a. means not applicable.
- << means no emission above noise floor.
- The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.

Test engineer

Signature

Name : J. Schuurmans

Date : October 8, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
 Description of EUT: Electronic Article Surveillance System with metal detection
 Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
 Brand mark: Nedap
 Model: NCC-4
 FCC ID: CGDXQ-MD4

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

Frequency (MHz)	Measurement results dB μ V Quasi-peak		Antenna factor dB	Cable loss dB	Measurement results dB(μ V)/m Quasi-peak (calculated)	Limits Part 15.209 dB(μ V)/m (calculated)
	3 meters	10 meters				
0.062	68.5	30.5	19.5	1	<10.0	48.5 – 13.8 (300 m)
0.125	10.0	n.a.	19.5	1	<10.0	33.8 – 22.9 (30 m)
1.705 – 7.49	<10.0	n.a.	19.5	1	<10.0	30.0 (30 m)
7.49	66.9	37.8	19.5	1	38.6 (30m)	40.0 (30 m)
8.70	65.8	38.6	19.5	1	34.3 (30 m)	40.0 (30 m)
8.70 - 30.00	<10.0	n.a.	19.5	1	<10.0	29.5 (30 m)

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205 and 15.209 and 15.223, with the EUT operating in continuous transmit mode on 8.1 MHz +/- 700 kHz, are depicted in the table above.

Notes:

1. An example of the calculated field strength 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. The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.
7. The emissions on 7.49 MHz and 8.7 MHz are measured while the sweep was stopped at those frequencies.
8. Harmonics of 7.49 MHz and 8.7 MHz have been checked for contribution.

Test engineer

Signature

Name : J. Schuurmans

Date : October 2, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
 Description of EUT: Electronic Article Surveillance System with metal detection
 Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
 Brand mark: Nedap
 Model: NCC-4
 FCC ID: CGDXQ-MD4

4 Conducted emission data.

4.1 Conducted emission data of configurarion I.

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	
0.160	45.5	42.0	45.3	41.2	65.5	58.3	-20.0	-16.3	-20.2	-17.1	PASS
0.200	44.1	37.0	43.7	40.3	63.6	55.9	-19.5	-18.9	-19.9	-15.6	PASS
0.240	39.7	38.3	37.9	36.1	62.1	53.9	-22.4	-15.6	-24.2	-17.8	PASS
0.280	41.2	39.0	37.2	36.1	60.8	52.3	-19.6	-13.3	-23.6	-16.2	PASS
0.320	38.9	36.0	36.3	35.9	59.7	50.8	-20.8	-14.8	-23.4	-14.9	PASS
0.361	37.7	37.0	36.3	35.9	58.7	49.5	-21.0	-12.5	-22.4	-13.6	PASS
0.401	39.6	38.2	36.5	36.3	57.8	48.4	-18.2	-10.2	-21.3	-12.1	PASS
0.441	36.9	36.2	36.5	35.9	57.0	47.4	-20.1	-11.2	-20.5	-11.5	PASS
0.481	36.8	36.3	36.0	36.0	56.3	46.4	-19.5	-10.1	-20.3	-10.4	PASS
7.534	37.1	21.0	35.8	19.7	60.0	50.0	-22.9	-29.0	-24.2	-30.3	PASS
7.844	38.3	21.9	37.4	21.2	60.0	50.0	-21.7	-28.1	-22.6	-28.8	PASS
8.249	36.5	20.3	36.5	20.2	60.0	50.0	-23.5	-29.7	-23.5	-29.8	PASS
15.068	4.0	0.0	2.0	0.0	60.0	50.0	-56.0	-50.0	-58.0	-50.0	PASS
15.688	1.9	0.0	2.2	0.0	60.0	50.0	-58.1	-50.0	-57.8	-50.0	PASS
16.498	2.4	0.0	2.2	0.0	60.0	50.0	-57.6	-50.0	-57.8	-50.0	PASS
29.854	18.5	5.2	20.8	6.7	60.0	50.0	-41.5	-44.8	-39.2	-43.3	PASS

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15, section 15.207, at the 110 Volts AC mains connection terminals of the AC/DC power supply connected to the EUT and with the EUT operating in continuous sweep mode on 8.2 +/- 700 kHz, are depicted in table above.

Notes:

- During the measurement it was taken into account that the main operating frequency of 8.1 MHz of the EUT could be present on the 110 Volts AC mains connection terminals. The possible occurrence of this frequency of 8.1 MHz and its harmonics, throughout the range of 8.1 MHz +/- 700 kHz 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.
- The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.

Test engineer

Signature

Name

: P.A.J.M. Robben

Date

: October 3, 2003



4.2 Conducted emission data of configurarion III.

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	
0.160	46.5	41.5	46.9	42.7	65.5	58.3	-18.3	-16.7	-17.6	-25.7	PASS
0.200	33.0	40.0	43.5	37.3	63.6	55.9	-20.3	-16.8	-20.0	-18.8	PASS
0.240	37.3	36.2	39.7	36.7	62.1	53.9	-25.2	-18.5	-22.8	-17.2	PASS
0.280	37.6	36.5	41.5	39.5	60.8	52.3	-29.4	-16.2	-19.6	-13.3	PASS
0.320	36.7	35.7	39.3	36.3	59.7	50.8	-24.4	-16.1	-20.5	-14.7	PASS
0.361	36.3	35.9	38.3	37.0	58.7	49.5	-22.9	-14.1	-21.4	-12.9	PASS
0.401	37.1	36.5	39.7	38.3	57.8	48.4	-20.8	-12.2	-19.4	-10.8	PASS
0.441	36.5	35.9	37.5	36.6	57.0	47.4	-21.1	-12.0	-20.6	-10.9	PASS
0.481	36.3	36.1	37.0	36.4	56.3	46.4	-20.2	-10.9	-19.6	-10.4	PASS
7.522	36.4	16.9	38.3	21.8	60.0	50.0	-23.3	-29.6	-21.9	-28.2	PASS
7.844	39.5	22.9	41.0	24.1	60.0	50.0	-20.3	-26.8	-19.2	-26.1	PASS
8.383	39.5	22.8	40.1	23.4	60.0	50.0	-20.3	-27.0	-20.0	-26.8	PASS
15.044	2.7	0.0	2.4	0.0	60.0	50.0	-57.3	0.0	-57.3	0.0	PASS
15.688	2.2	0.0	2.3	0.0	60.0	50.0	-57.7	0.0	-57.4	0.0	PASS
16.726	2.5	0.0	2.2	0.0	60.0	50.0	-57.5	0.0	-57.5	0.0	PASS
29.860	30.5	13.3	28.7	12.7	60.0	50.0	-30.9	-36.9	-31.1	-37.1	PASS

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15, section 15.207, at the 110 Volts AC mains connection terminals of the AC/DC power supply connected to the EUT and with the EUT operating in continuous sweep mode on 8.2 +/- 700 kHz, are depicted in table above.

Notes:

- During the measurement it was taken into account that the main operating frequency of 8.1 MHz of the EUT could be present on the 110 Volts AC mains connection terminals. The possible occurrence of this frequency of 8.1 MHz and its harmonics, throughout the range of 8.1 MHz +/- 700 kHz 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.
- The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.

Test engineer

Signature :

Name :

P.A.J.M. Robben

Date :

October 3, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
 Description of EUT: Electronic Article Surveillance System with metal detection
 Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
 Brand mark: Nedap
 Model: NCC-4
 FCC ID: CGDXQ-MD4

4.3 Conducted emission data of configurarion V.

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	
0.160	47.9	42.5	48.3	43.2	65.5	58.3	-17.6	-15.8	-17.2	-15.1	PASS
0.200	44.0	39.9	44.1	37.8	63.6	55.9	-19.6	-16.0	-19.5	-18.1	PASS
0.241	38.3	36.5	40.2	37.7	62.1	53.9	-23.8	-17.4	-21.9	-16.2	PASS
0.282	38.2	36.9	42.0	39.8	60.8	52.2	-22.6	-15.3	-18.8	-12.4	PASS
0.322	36.5	36.1	40.0	36.7	59.7	50.8	-23.2	-14.7	-19.7	-14.1	PASS
0.362	36.7	36.3	38.3	37.3	58.7	49.5	-22.0	-13.2	-20.4	-12.2	PASS
0.402	37.7	36.9	39.9	38.5	57.8	48.4	-20.1	-11.5	-17.9	-9.9	PASS
0.442	36.9	36.3	37.9	37.1	57.0	47.3	-20.1	-11.0	-19.1	-10.2	PASS
0.483	36.9	36.5	37.4	36.8	56.3	46.4	-19.4	-9.9	-18.9	-9.6	PASS
0.523	36.4	36.4	36.7	36.7	56.0	46.0	-19.6	-9.6	-19.3	-9.3	PASS
7.487	41.4	24.4	43.3	25.3	60.0	50.0	-18.6	-25.6	-16.7	-24.7	PASS
8.711	45.6	26.0	47.1	30.4	60.0	50.0	-14.4	-24.0	-12.9	-19.6	PASS
14.900	3.0	-2.3	2.9	-2.3	60.0	50.0	-57.0	-52.3	-57.1	-52.3	PASS
17.400	4.0	-1.3	4.0	-1.3	60.0	50.0	-56.0	-51.3	-56.0	-51.3	PASS
29.850	27.4	12.1	26.2	10.8	60.0	50.0	-32.6	-37.9	-33.8	-39.2	PASS

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15, section 15.207, at the 110 Volts AC mains connection terminals of the AC/DC power supply connected to the EUT and with the EUT operating in continuous sweep mode on 8.2 +/- 700 kHz, are depicted in table above.

Notes:

- During the measurement it was taken into account that the main operating frequency of 8.1 MHz of the EUT could be present on the 110 Volts AC mains connection terminals. The possible occurrence of this frequency of 8.1 MHz and its harmonics, throughout the range of 8.1 MHz +/- 700 kHz to 30 MHz, was checked during the measurement. The conducted emissions on frequencies which are not listed in table above were found to be below 25 dB(μV) on both line 1 and line 2.
- The emissions have been measured in mode 1 and in mode 2. The highest emission is noted.

Test engineer

Signature

Name

: J. Schuurmans

Date

: October 2, 2003



5 Plots of emission bandwidth of carrier signal.

5.1 Plot of emission bandwidth of carrier signal of configuration I.

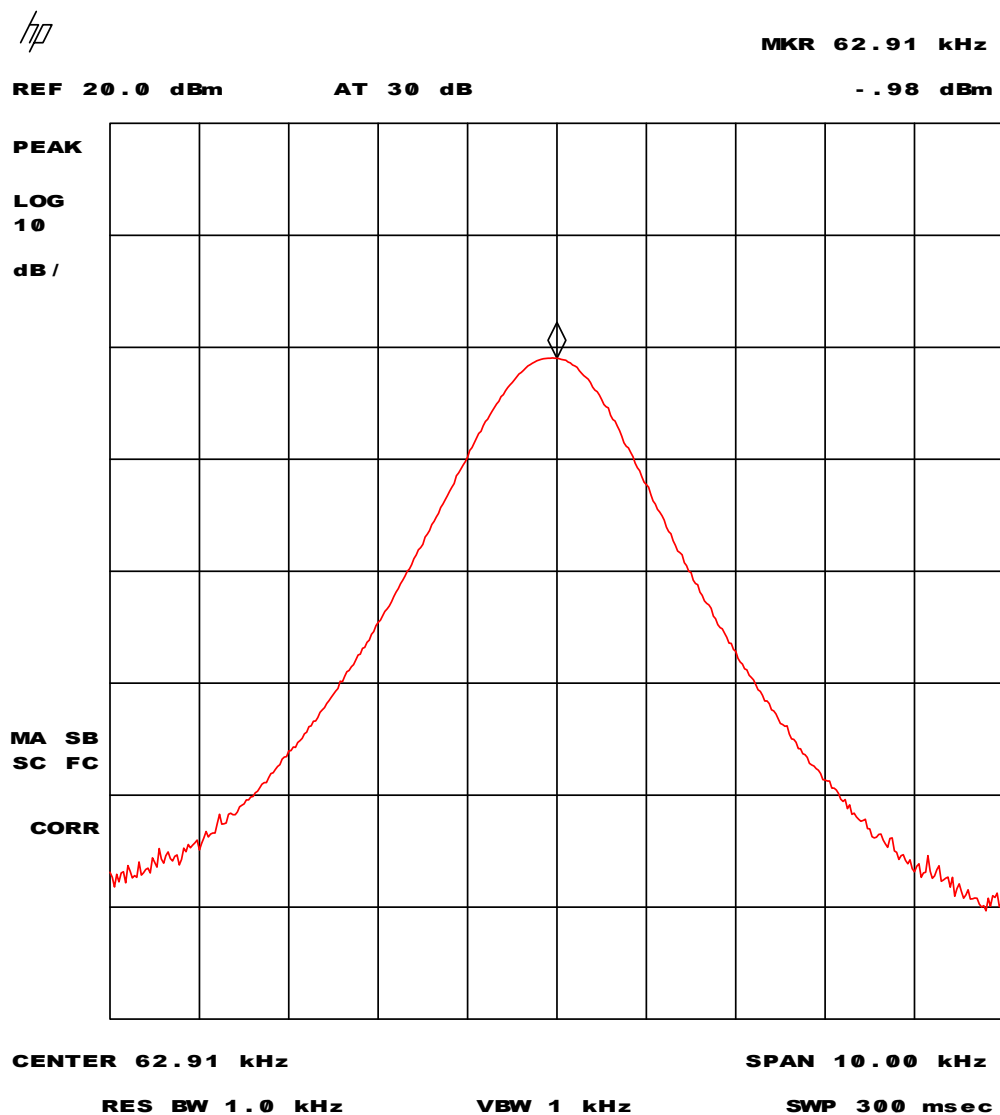


Figure 1 Plot of the 62.5 kHz metal detection signal

Test engineer

Signature

:

Name

: H.J. Pieters

Date

: October 10, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
Description of EUT: Electronic Article Surveillance System with metal detection
Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

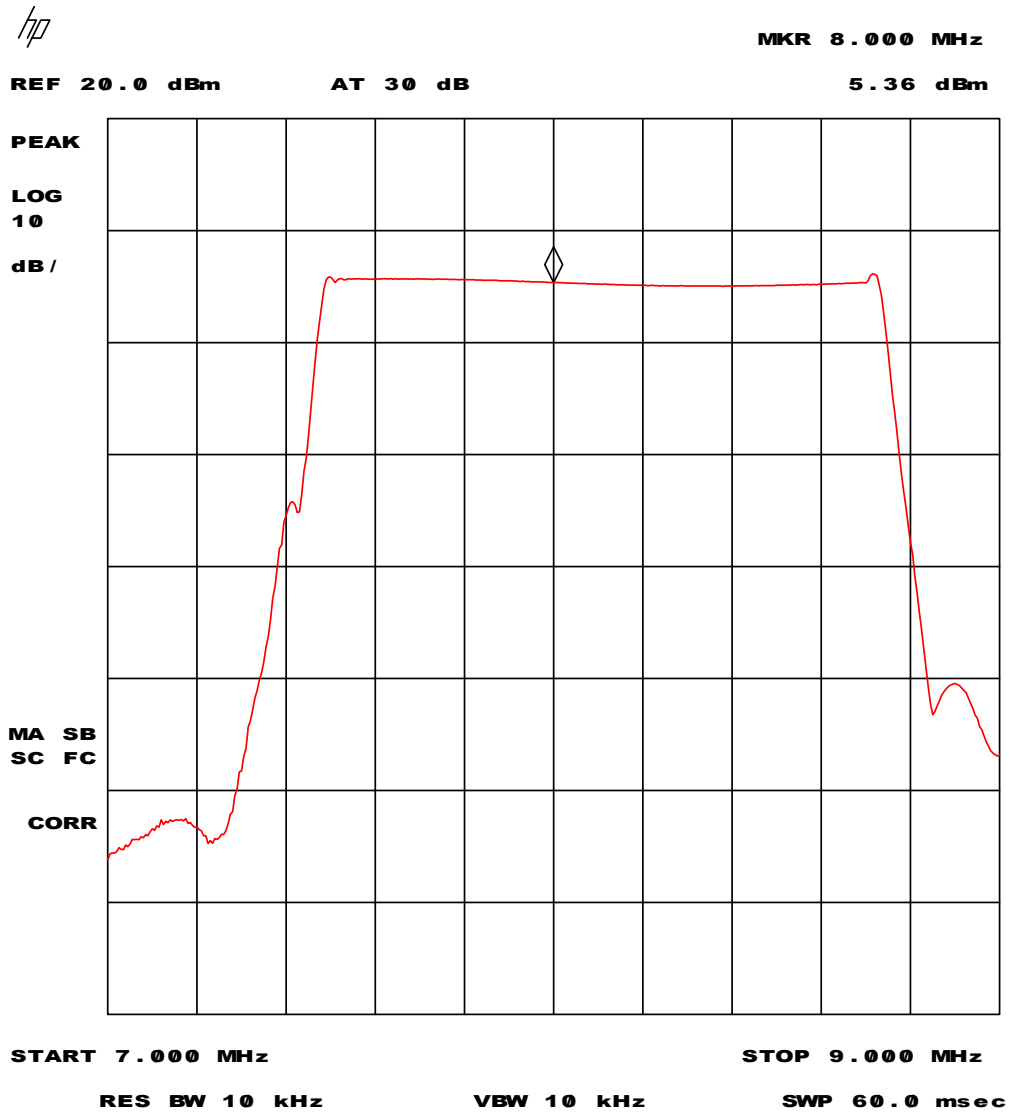


Figure 2 Plot of the 8 MHz sweeping signal

Test engineer

Signature

:

Name

: H.J. Pieters

Date

: October 10, 2003



5.2 Plot of emission bandwidth of carrier signal of configuration III.

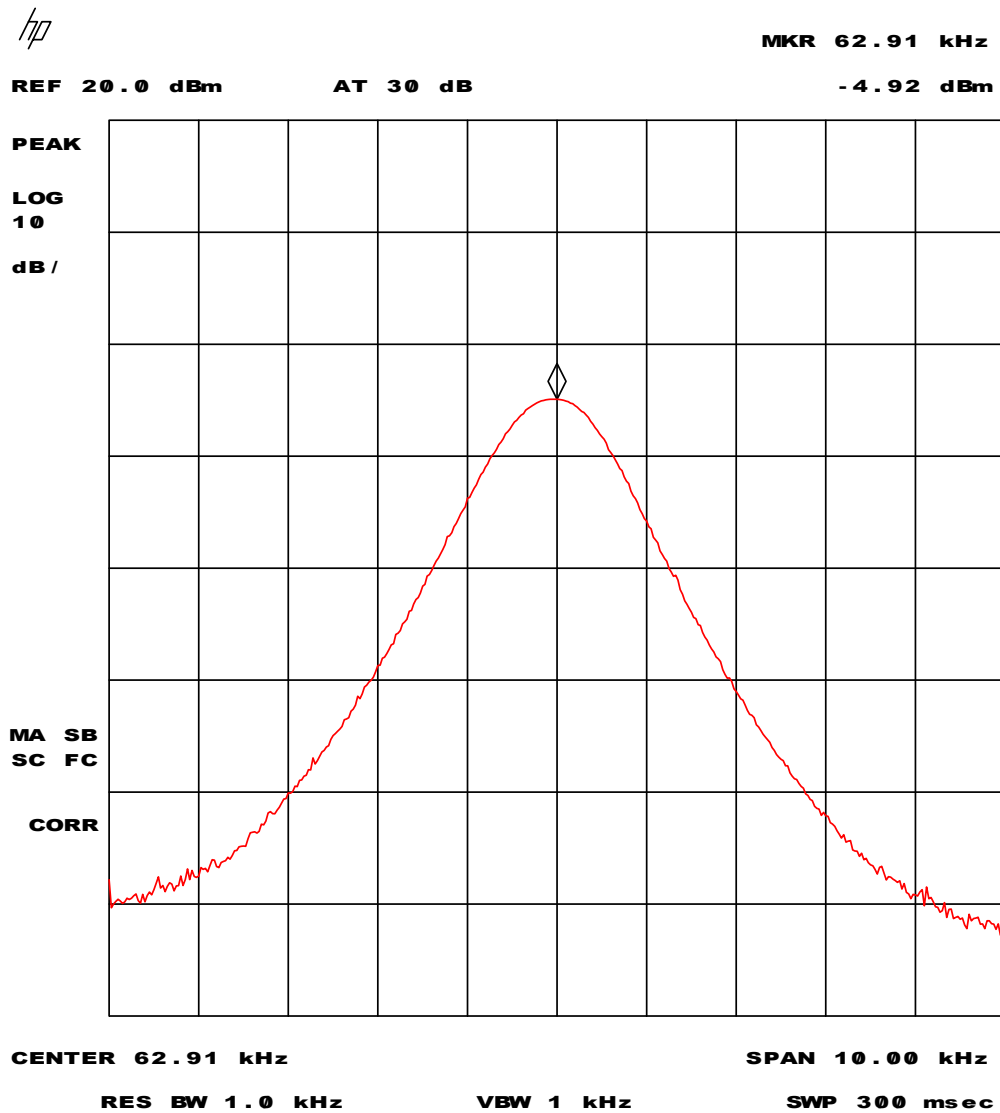


Figure 3 Plot of the 62.5 kHz metal detection signal

Test engineer

Signature

:

Name

: H.J. Pieters

Date

: October 10, 2003

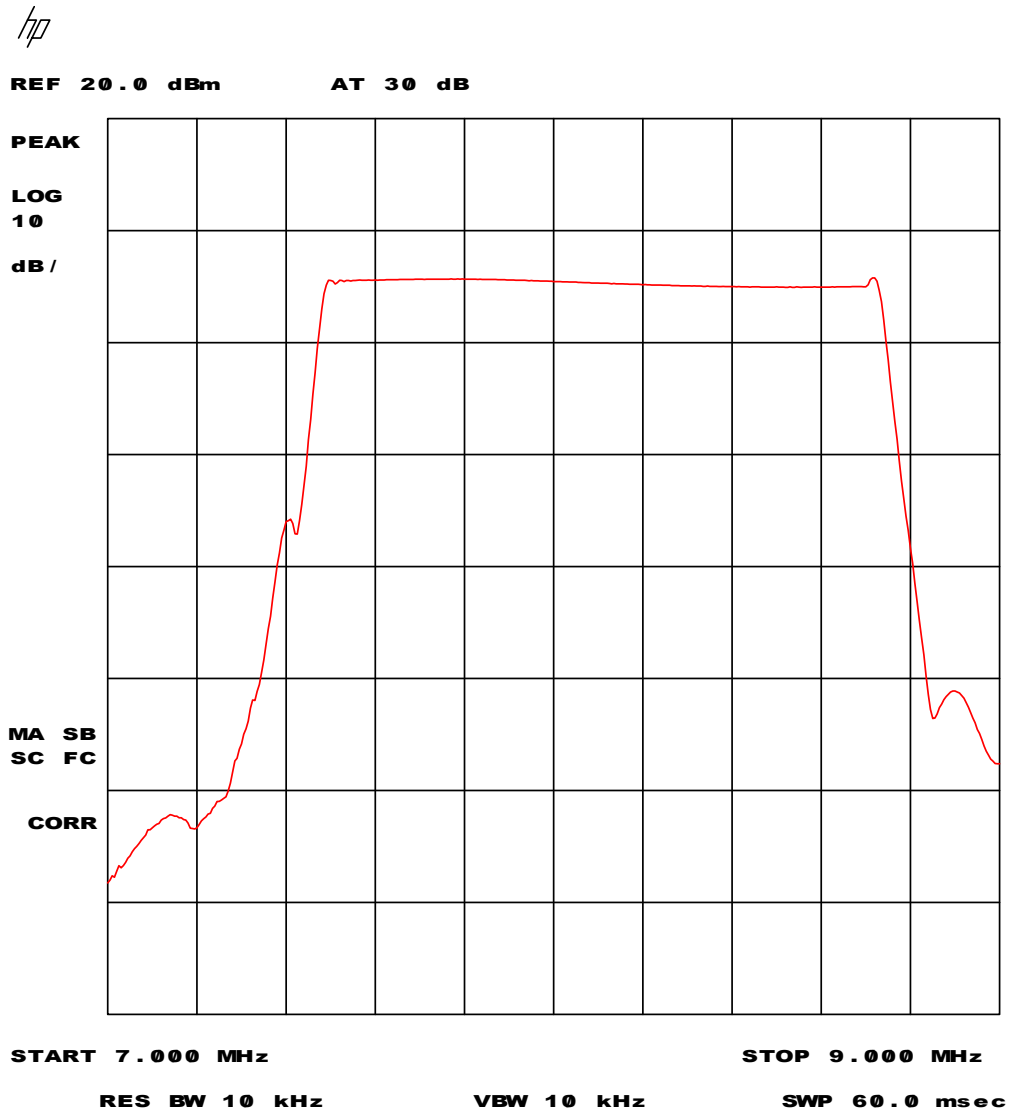


Figure 4 Plot of the 8 MHz sweeping signal

Test engineer

Signature

:

Name

: H.J. Pieters

Date

: October 10, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
Description of EUT: Electronic Article Surveillance System with metal detection
Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

5.3 Plot of emission bandwidth of carrier signal of configuration V.

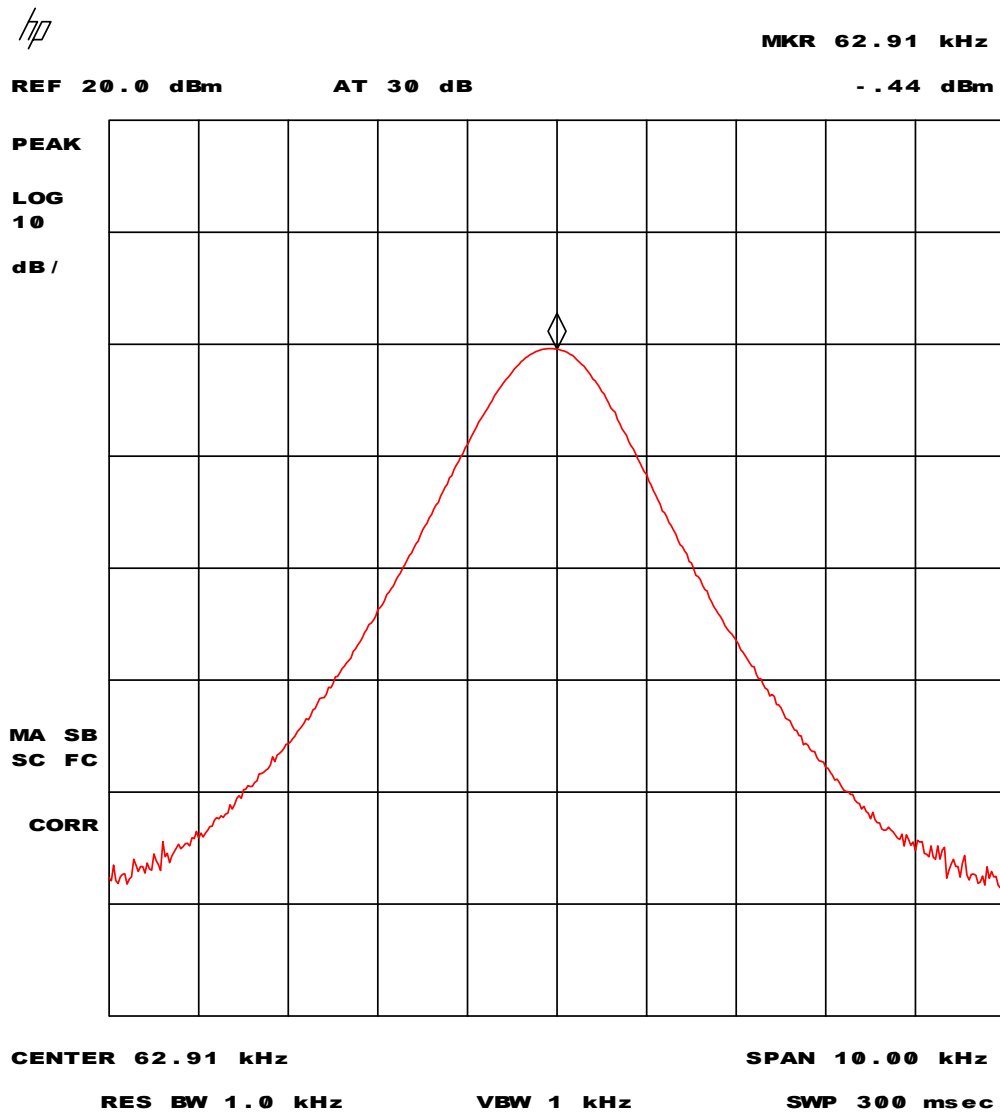


Figure 5 Plot of the 62.5 kHz metal detection signal

Test engineer

Signature

Name

: H.J. Pieters

Date

: October 10, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
Description of EUT: Electronic Article Surveillance System with metal detection
Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

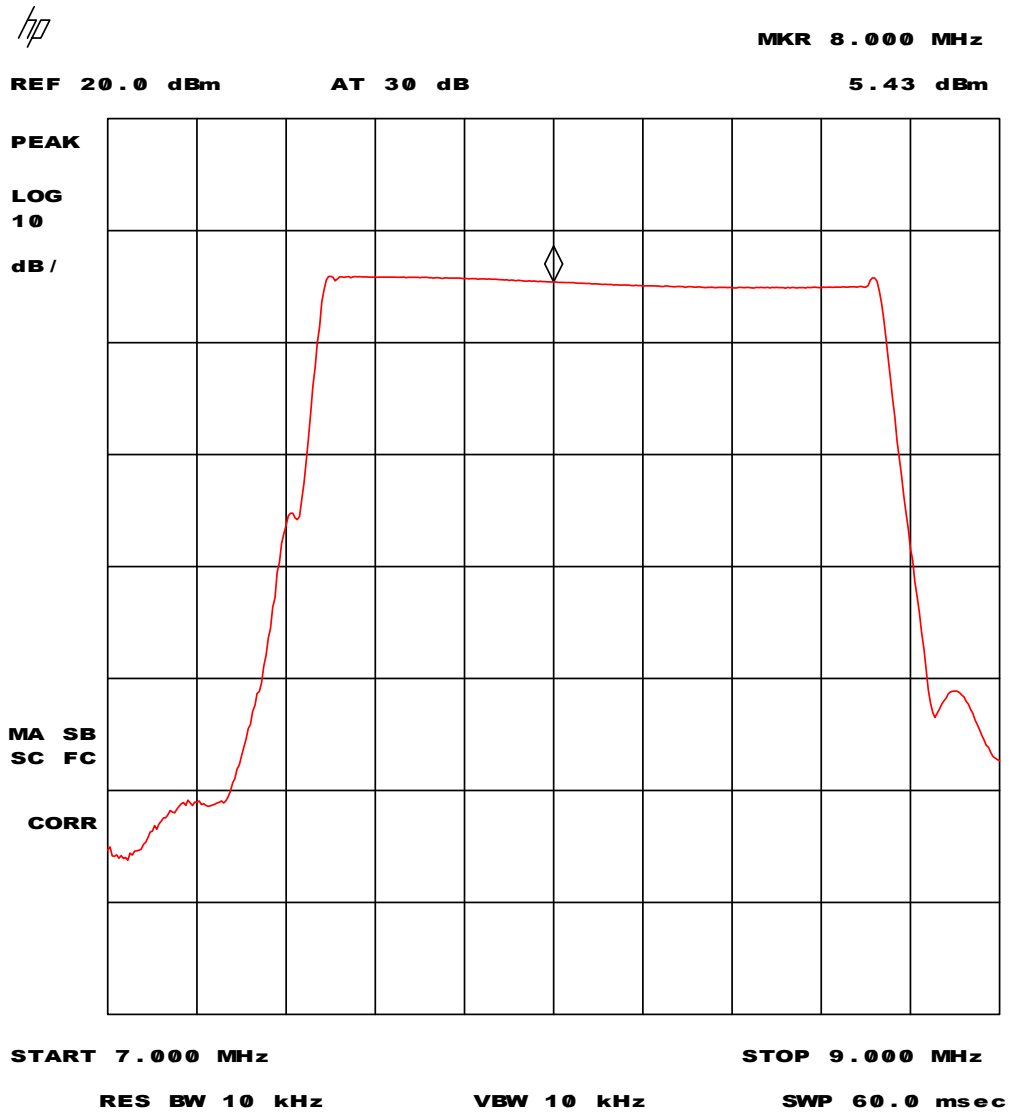


Figure 6 Plot of the 8 MHz sweeping signal

Test engineer

Signature :

Name :

Date : October 10, 2003



Test specification(s): 47 CFR Part 15 (2003-07-22)
Description of EUT: Electronic Article Surveillance System with metal detection
Manufacturer: N.V. Nederlandsche App.fabriek "NEDAP"
Brand mark: Nedap
Model: NCC-4
FCC ID: CGDXQ-MD4

6 List of utilized test equipment.

Inventory number	Description	Brand	Type
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

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

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

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

Calculation of n, for measured field strengths

$$H_s = 69.2 \text{ dB}\mu\text{V/m} = 30549.2 \mu\text{V/m}$$

$$H_l = 40.2 \text{ dB}\mu\text{V/m} = 1083.9 \mu\text{V/m}$$

$$n = \log(188.4/2398.8) / \log(3/10)$$

$$n = 2.77$$

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

H_s now becomes $H_s = 1083.9 \mu\text{V/m}$ and $d_s=10$

Assume $d_l=30$

Now from [eq1] H_l becomes:

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

$$\text{So } H_l = 1083.9 * (30/10)^{-2.77} = 51.5 \text{ uV/m or } 34.2 \text{ dBuV/m}$$