



**TEST REPORT CONCERNING THE COMPLIANCE OF AN
ARTICLE SURVEILLANCE (EAS) SYSTEM,
BRAND Nedap, MODEL X2 IN COMBINATION WITH
ANTENNA CFA250,
WITH 47 CFR PART 15 (10-1-09) AND THE
REQUIREMENTS OF INDUSTRY CANADA:
RSS-GEN (ISSUE 3, DECEMBER 2010) AND
RSS-210 (ISSUE 8, DECEMBER 2010).**

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MEASUREMENT/TECHNICAL REPORT

**N.V. Nederlandsche Apparatenfabriek "Nedap"
 Model: X2 in combination with antenna CFA250**

**FCC ID: CGDX2
 IC: 1444A-X2**

This report concerns: Original grant/certification Permissive change Verification		
Equipment type: Article Surveillance (EAS) System		
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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (10-1-09 edition), RSS-GEN, RSS-210 and the measurement procedures of ANSI C63.4-2009. TÜV Rheinland EPS B.V. at Leek, 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: June 06, 2012

Signature:



O. Hoekstra
 Senior Engineer Telecom TÜV Rheinland EPS B.V.

Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report

Description of test item

Test item : Article Surveillance (EAS) System
Manufacturer : N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand : Nedap
Model : X2 in combination with antenna CFA250
Serial number : C529 002
FCC ID : CGDX2
IC : 1444A-X2


Applicant information

Applicant's representative : Mr. J. Hulshof
Company : N.V. Nederlandsche Apparatenfabriek "Nedap"
Address : Parallelweg 2
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Telefax number : +31 544 463 475

Test(s) performed

Location : Leek
Test(s) started : May 31, 2012
Test(s) completed : June 05, 2012
Purpose of test(s) : Equipment Authorization (Permissive Change)

Test specification(s) : 47 CFR Part 15 (10-1-09 Edition) and
RSS-GEN (ISSUE 3, DECEMBER 2010) AND RSS-210 (ISSUE 8, DECEMBER
2010)

Test engineer(s) : R. van der Meer 

Report written by : R. van der Meer

Report date : June 06, 2012

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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 system is an Article Surveillance (EAS) System for detection of 8.2MHz EAS labels, hard tags or disposable paper tags, used at the entry of shops, libraries etc. It is tested in combination with antenna CFA250. The system is a digital swept frequency hopping transmitter operating from 7.4-8.8 MHz.

The content of this report and measurement results have not been changed other than the way of presenting the data.

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

1.2.1 General.

This test report supports the Permissive Change in equipment authorization files under FCC ID: CGDX2 and IC: 1444A-X2.

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 below.

EUT1	:	Article Surveillance (EAS) System
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	CFA250
Serial number	:	C529 002
Voltage input rating	:	--
Voltage output rating	:	--
Current input rating	:	--
Remarks	:	Antenna

EUT2	:	Article Surveillance (EAS) System
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	X2
Serial number	:	C427 139 (L), C427 134 (M) and C427 113 (H)
Voltage input rating	:	6 – 33Vdc
Voltage output rating	:	--
Current input rating	:	not provided
Remarks	:	--

EUT3	:	Article Surveillance (EAS) System
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	X2
Serial number	:	C427 137 (L), C427 138 (M) and C501 022 (H)
Voltage input rating	:	6 – 33Vdc
Voltage output rating	:	--
Current input rating	:	not provided
Remarks	:	--

AUX1 : Power Supply
 Manufacturer : N.V. Nederlandsche Apparatenfabriek "Nedap"
 Brand : Nedap
 Model : NCC-MK2
 Serial number : A224 001
 Voltage input rating : 100 – 240 Vac
 Voltage output rating : 14 – 52 Vdc (typical 33,0 Vdc)
 Current input rating : 2.5 A
 Current output rating : 10.72 – 2.89 A (typical 4.55 A)
 Remarks : FCC approved

1.4 Test Summary

The EUT was tested in accordance with the specifications given in the table below.

Test Standard		Description	Page	Pass / Fail
47 CFR Part 15 (10-1-09 Edition)	RSS-210 Issue 8, December 2010			
15.207(a)	RSS-Gen(7.2.4)	Conducted emissions	--	Not tested
15.209	RSS-Gen(4.9 and 7.2.5) and RSS-210(2.5)	Radiated emissions	11 - 14	Pass
15.215(c)	RSS-Gen(4.6.1)	Occupied bandwidth	--	Not tested

Table : testspecifications

Testmethods: ANSI C63:2009 and RSS-Gen Issue 3, December 2010

This report supports a Permissive Change request and Conducted emissions and Occupied bandwidth are not retested.

1.4.1 Description of input and output ports.

Number	Terminal	From	To	Remarks
1	Mains	Mains	AUX1	--
2	Power supply	AUX1	EUT 2	Shielded cable
3	Antenna coax cable	EUT2	EUT1	Shielded cable
4	Power supply	EUT2	EUT3	Shielded cable
5	Antenna coax cable	EUT2	EUT1	Shielded cable

Operation mode 1: System "Passive", not detecting a label.
 Operation mode 2: System "Active", detecting a label.

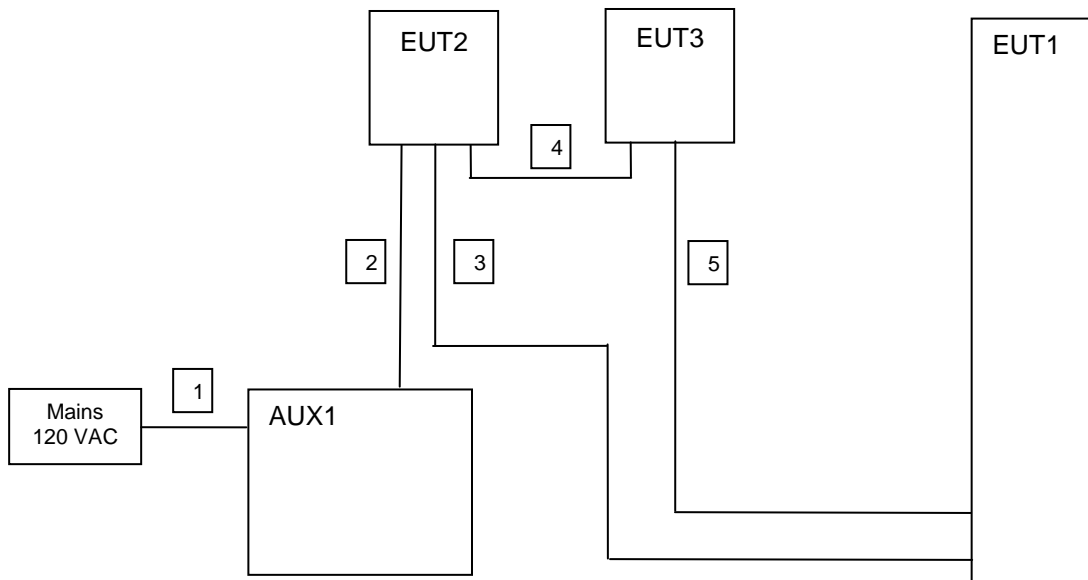


Figure 1: Basic testsetup and connections

1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-09 Edition), sections 15.31, 15.207 and 15.209, RSS-GEN (ISSUE 3, DECEMBER 2010) RSS-210 (ISSUE 8, DECEMBER 2010).

The test methods, which have been used, are based on ANSI C63.4: 2009.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.

Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters .

To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the appropriate extrapolation factor is used.

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.

1.6 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland 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 (10-1-06 edition).

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 description of the test facilities has been filed to Industry Canada under registration number 2932G-1. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.7 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 120VAC/60Hz to the AC/DC Power Supply – the DC output was varied across the voltage range specified by the manufacturer
Air pressure	: 950 – 1050 hPa

When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical situation as a customer would normally use it.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 2009.

2.2 EUT mode of operation.

The EUT has been tested in passive mode , i.e. the EUT is ready to detect a tag, since in that mode the power level is always at it's maximum value. While in active mode, ie while reading a tag, the power level is reduced to prevent damaging the tag. The intentional radiator tests have been performed with a complete functioning EUT and interconnections.

To make correct measurements possible the frequency sweep of the transmitter is stopped during the measurements.

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

2.5 Product Labelling

The product labeling information is available in the technical documentation package.

2.6 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

2.7 Schematics of the EUT.

The schematics are available in the technical documentation package.

2.8 Part list of the EUT.

The part list is available in the technical documentation package.

3 No operation in restricted bands

The EUT is a digital swept frequency hopping transmitter. The EUT hops on discrete frequencies. The discrete frequencies that can be transmitted by the EUT are as follows:

Channel	1	7565000	Hz
Channel	2	7608750	Hz
Channel	3	7652500	Hz
Channel	4	7696250	Hz
Channel	5	7740000	Hz
Channel	6	7783750	Hz
Channel	7	7827500	Hz
Channel	8	7871250	Hz
Channel	9	7915000	Hz
Channel	10	7958750	Hz
Channel	11	8002500	Hz
Channel	12	8046250	Hz
Channel	13	8090000	Hz
Channel	14	8133750	Hz
Channel	15	8177500	Hz
Channel	16	8221250	Hz
Channel	17	8265000	Hz
Channel	18	8308750	Hz
Channel	19	8352500	Hz
Channel	20	8396250	Hz
Channel	21	8440000	Hz
Channel	22	8483750	Hz
Channel	23	8527500	Hz
Channel	24	8571250	Hz

4 Radiated emission data.

4.1 Radiated field strength measurements (30 MHz – 1 GHz, E-field).

Frequency (MHz)	Measurement results @3m Vertical (dB μ V)	Measurement results @3m Horizontal (dB μ V)	Correction factor (dB)	Results @3m after correction Vertical (dB μ V/m)	Results @3m after correction Horizontal (dB μ V/m)	Limits @3m (dB μ V/m)	Pass/Fail
35.82	7.3	6.2	15.4	22.7	21.6	40	Pass
43.58	9.6	6.3	11.8	21.4	18.1	40	Pass
49.40	6.3	6.1	8.7	15.0	14.8	40	Pass
64.92	6.8	6.6	5.3	12.1	11.9	40	Pass
623.64	7.5	7.5	22.1	29.6	29.6	46	Pass
854.50	7.3	7.3	26.3	33.6	33.6	46	Pass

Table 1a Radiated emissions of the EUT, sweep stopped at lowest frequency.

Frequency (MHz)	Measurement results @3m Vertical (dB μ V)	Measurement results @3m Horizontal (dB μ V)	Correction factor (dB)	Results @3m after correction Vertical (dB μ V/m)	Results @3m after correction Horizontal (dB μ V/m)	Limits @3m (dB μ V/m)	Pass/Fail
55.22	6.4	6.5	6.2	12.6	12.7	40.0	Pass
125.06	6.0	6.0	11.9	17.9	17.9	43.5	Pass
379.20	5.7	5.8	17.0	22.7	22.8	46.0	Pass
582.90	6.8	6.7	22.0	28.8	28.7	46.0	Pass
687.66	7.5	7.5	23.3	30.8	30.8	46.0	Pass
941.80	7.3	7.2	27.9	35.2	35.1	46.0	Pass

Table 2b Radiated emissions of the EUT, sweep stopped at middle frequency.

Frequency (MHz)	Measurement results @3m Vertical (dB μ V)	Measurement results @3m Horizontal (dB μ V)	Correction factor (dB)	Results @3m after correction Vertical (dB μ V/m)	Results @3m after correction Horizontal (dB μ V/m)	Limits @3m (dB μ V/m)	Pass/Fail
33.88	6.9	6.5	16.0	22.9	22.5	40.0	Pass
41.64	6.4	6.2	12.9	19.3	19.1	40.0	Pass
45.52	6.7	6.3	10.7	17.4	17.0	40.0	Pass
326.82	5.6	5.6	15.3	20.9	20.9	46.0	Pass
359.80	5.7	5.7	16.4	22.1	22.1	46.0	Pass
406.36	5.7	5.7	17.9	23.6	23.6	46.0	Pass

Table 3c Radiated emissions of the EUT, sweep stopped at highest frequency.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209, RSS-210 and RSS-Gen are depicted in Table 1a,1b and 1c. The system is tested as a whole, so with all equipment as shown in Figure.1 in place and functioning. Being the worst case situation.


Notes:

1. Field strength values of radiated emissions at frequencies not listed in the tables above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ± 5.0 dB
3. The reported field strength values are the worst case values at the indicated frequency. The antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. A Quasi-peak detector was used with a resolution bandwidth of 120 kHz.
5. The EUT was tested in passive mode (i.e. without a tag in its proximity). Maximum values have been noted.
6. The EUT1 was tested in horizontal position only, being the only position it will be used in as stated in the manual.

Used test equipment and ancillaries:

99608	99699	99847	99861	99858				

Test engineer

Signature : 
 Name : Richard van der Meer
 Date : June 05, 2012

4.2 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field), Peak and Average values.

Frequency (kHz)	Measurement results	Detector	Antenna factor	Cable loss	Extrapolation factor	Measurement results (calculated)	Limits
	dB μ V/m @3m					dB μ V/m@30m	dB μ V/m@30m
7565.00	70.3	Pk	19.5	1	40	50.8	60
8177.50	71.3	Pk	19.5	1	40	51.8	60
8571.25	66.6	Pk	19.5	1	40	47.1	60

Note:

Sweep stopped at lowest, middle and highest frequency

Table 2a Radiated emissions of the EUT, sweep stopped at lowest frequency, Peak values

Frequency (kHz)	Measurement results Peak	Detector	Correction factor	Measurement results (calculated Average)	Limits
	dB μ V/m @30m			dB	dB μ V/m@30m
7565.00	50.8	Pk	-23.28	27.52	40.0
8177.50	51.8	Pk	-23.28	28.52	40.0
8571.25	47.1	Pk	-23.28	23.82	40.0

Note:

Sweep stopped at lowest, middle and highest frequency

Table 2b Radiated emissions of the EUT in combination with AUX2, Average values

See page 14 for notes.

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

Frequency (MHz)	Measurement results	Detector	Antenna factor	Cable loss	Extrapolation factor	Measurement results (calculated)	Limits
	dBµV @3m					dBµV/m@30m	
9.93624 (m)	37.8	Qp	19.6	1	40	18.4	29.5
10.75184 (m)	33.2	Qp	19.6	1	40	13.8	29.5
11.320 (l)	33.2	Qp	19.6	1	40	13.8	29.5
12.13836 (m)	23.0	Qp	19.6	1	40	3.6	29.5
12.822 (h)	31.2	Qp	19.6	1	40	11.8	29.5
13.280 (l)	21.2	Qp	19.6	1	40	1.8	29.5
16.46104 (m)	21.2	Qp	19.7	1	40	1.9	29.5
17.190 (h)	23.7	Qp	19.7	1	40	4.4	29.5

Note: Sweep stopped at lowest(l), middle(m) and highest(h) frequency

Table 2c Radiated emissions of the EUT in combination with AUX2, Quasi-Peak values

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.223 and 15.35 with the EUT operating in continuous transmit mode, are depicted in Table 2a, 2b and 2c.

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade extrapolation factor, antenna factor and cable loss. i.e at 8177.50 kHz: 71.3 dBµV + 19.5dB + 1dB - 40dB= 50.8 dBµV/m.
2. A resolution bandwidth of 9kHz was used during testing
3. Field strength values of radiated emissions at frequencies not listed in Table 2a and 2c are more than 20 dB below the applicable limit
4. The loop antenna was varied in horizontal and vertical orientations and also around it's axis. The reported value is the worst case found at the reported frequency.
5. The EUT was tested in passive mode (i.e. without a tag in its proximity). Maximum values have been noted.
6. The EUT1 was tested in horizontal position only, being the only position it will be used in as stated in the manual.
7. Measurement uncertainty is ±5.0dB
8. Correction factor is the Duty Cycle of the EUT as obtained from the original testreport: See testreport 11071502.fcc01_Rev02_Nedap_X2_FCC-IC_report.pdf.

Used test equipment and ancillaries:

15453	99699	99861	99847	99855				
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Test engineer

Signature :
 Name : R. van der Meer
 Date : May 30, 2012.



5 Conducted emission data.

5.1 Conducted emission data of the EUT

Not tested. This was already tested with the original filing, with a 50 Ohm load in place of the antenna.
See testreport 11071502.fcc01_Rev02_Nedap_X2_FCC-IC_report.pdf.

5.2 Plots of the emissions, Occupied bandwidth/99% bandwidth

Not tested. This was already tested with the original filing.
See testreport 11071502.fcc01_Rev02_Nedap_X2_FCC-IC_report.pdf.

5.3 Duty Cycle correction

Duty cycle correction factor (Cf) = 20 Log (RF On time / Repetition rate)

$Cf = 20 \text{ Log } (4.20 \text{ us} / 61.30 \text{ us}) = -23.28 \text{ dB}$

Obtained from original certification.
See testreport 11071502.fcc01_Rev02_Nedap_X2_FCC-IC_report.pdf.

6 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
12476	Antenna mast	EMCO	TR3	NA	NA
12477	Antenna mast 1-4 mtr	Poelstra	NA	NA	NA
15453	Active loopant. 60 cm	Chase	HLA6120	04/2012	04/2013
15633	Biconilog Testantenna	Chase	CBL 6111B	01/2012	01/2013
99070	Coax 15m RG213	NMi Certin B.V.	Cable 15M OATS	10/2011	10/2012
99107	Controller	Heinrich Deisel	4630-100	NA	NA
99161	Variac 250V 6A	RFT	LTS006	NA	NA
99608	Controller	EMCS	DOC202	NA	NA
99609	Antenna mast	EMCS	AP-4702C	NA	NA
99651	Variac	NA	Vast Activa: 08-9510	NA	NA
99699	Measuring receiver	R&S	ESCI	03/2012	03/2013
99847/99580	Semi Anechoic Room	Siepel	FCC listed : 90828	12/2011	12/2014
99855	Temperature-Humiditymeter	Extech	SD500	02/2012	02/2013
99858	RF Cable S-AR	Gigalink	AGP0500	02/2012	02/2013
99861	Controller S-AR	Maturo	SCU/088/8090811	NA	NA

NA= Not Applicable