TEST REPORT CONCERNING THE COMPLIANCE OF A 7.4 - 8.8 MHz DEACTIVATOR OF DISPOSABLE TAGS, BRAND NEDAP, MODEL SMART DEAC WITH 47 CFR PART 15 (JULY 10, 2008).

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October 27, 2009

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Industry Canada : 2932G-1
VCCI Registered : R-1518, C-1598
R&TTE, LVD, EMC Notified Body : 1856

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MEASUREMENT/TECHNICAL REPORT

N.V. Nederlandsche Apparatenfabriek "Nedap"
Model : SMART DEAC

FCC ID: CGDSMARTDEAC

October 27, 2009

This report concerns: Original grant/certification ~~Class 2 change~~ ~~Verification~~ Equipment type: Deactivator of disposable tags, operating on 7.4 - 8.8 MHz		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ? ~~Yes~~ ~~No~~ n.a.		
Report prepared by:	Name	: Richard van der Meer
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The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (july 10, 2008) and the measurement procedures of ANSI C63.4-2003. TÜV Rheinland 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: October 27, 2009

Signature: 

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

Description of test item

Test item	:	Deactivator of disposable tags
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model(s)	:	SMART DEAC
Serial number(s)	:	X902 163
Revision	:	Firmware version: X9 V6.6

Applicant information

Applicant's representative	:	Mr. J. Hulshof
Company	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Address	:	Parallelweg 2
Postal code	:	7141 DC
City	:	Groenlo
Country	:	The Netherlands
Telephone number	:	+31 544 471 444
Telefax number	:	+31 544 466 839

Test(s) performed

Location	:	Niekerk
Test(s) started	:	October 13, 2009
Test(s) completed	:	October 26, 2009
Purpose of test(s)	:	Equipment Authorization (Original grant/certification)
Test specification(s)	:	47 CFR Part 15 (July 10, 2008)

Test engineer(s)	:	R. van der Meer 
Report written by	:	R. van der Meer 
Report date	:	October 27, 2009

Table of contents

1 General information.

1.1 Product description.

1.1.1 Introduction.

The Nedap SMART DEAC is a Plug and Play deactivator based on pulse listen technolgy, providing a reliable deactivation of currently used 8.2 MHz RF disposable labels for EAS (=Electronic Article Surveillance). The system operates in the frequency range: 7.4 MHz up to 8.8 MHz with a sweep of 600Hz.

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 original grant/certification in equipment authorization files under FCC ID: **CGDSMARTDEAC**.

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.

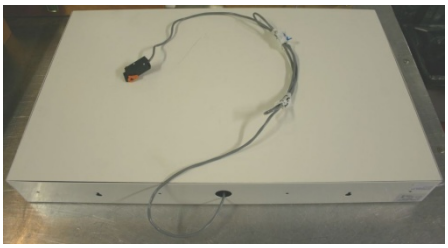
EUT1	:	Deactivator of disposable tags
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	SMART DEAC
Serial number	:	X902 163
Voltage input rating	:	12Vdc
Voltage output rating	:	n.a.
Current input rating	:	not provided
Antenna	:	External (AUX1-AUX3)
Remarks	:	Firmware version: X9 V6.6

AUX1	:	Antenna
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	BPL-D680x420S
Serial number	:	X929 001
Remark	:	Nedap Part NO: 9935053

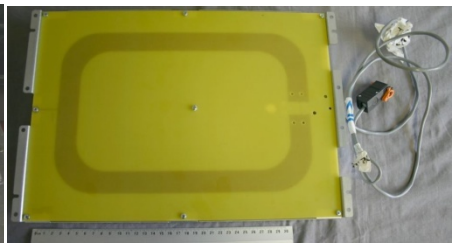
AUX2	:	Antenna
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	BPL-DA380x280S
Serial number	:	X928 006
Remark	:	Nedap Part NO: 9930302

AUX3	:	Antenna
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek "Nedap"
Brand	:	Nedap
Model	:	DAPL-275x275
Serial number	:	U927 036
Remark	:	Nedap Part NO: 9911537

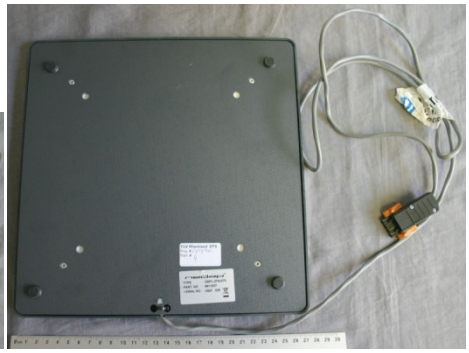
AUX4	:	Indicator light (LED)
Manufacturer	:	N.V. Nederlandsche Apparatenfabriek “Nedap”
Brand	:	Nedap
Model	:	--
Serial number	:	--
Remark	:	--
AUX5	:	RS485
Brand	:	Nedap
Model	:	--
Serial number	:	--
Remark	:	Connects to USB-port of a PC
AUX6	:	Input-Output Connection
Brand	:	Nedap
Model	:	--
Serial number	:	--
Remark	:	--
AUX7	:	Mains Power Supply Adapter
Brand	:	--
Model	:	S024EM1200150
Serial number	:	0929
Voltage input rating	:	100 – 240Vac~600mA, 50/60Hz
Voltage output rating	:	12Vdc / 1500mA
Remark	:	FCC approved
AUX8	:	Mains Power Supply Adapter
Brand	:	Power-WIN Technology Corp.
Model	:	AD-A9 12V
Serial number	:	--
Voltage input rating	:	94 – 264Vac~0.35-0.7A, 47/63Hz
Voltage output rating	:	12Vdc
Remark	:	--



Aux1



Aux2



Aux3

1.3.1 Description of input and output ports.

Number	Terminal	From	To	Remarks	
1	Mains	Mains	Power supply	Aux7 or Aux8	
2	+12/GND	Power supply	12Vdc Input	--	
3	RS485	RS485	USB port PC or laptop	Shielded cable	
4	INP/OUT	INP/OUT	Not connected	Shielded cable	
5	(L)ED	(L)ED	LED Indicator	Unshielded cable	
6	Ant	Ant	Aux1, Aux2 or Aux3	Shielded cable	

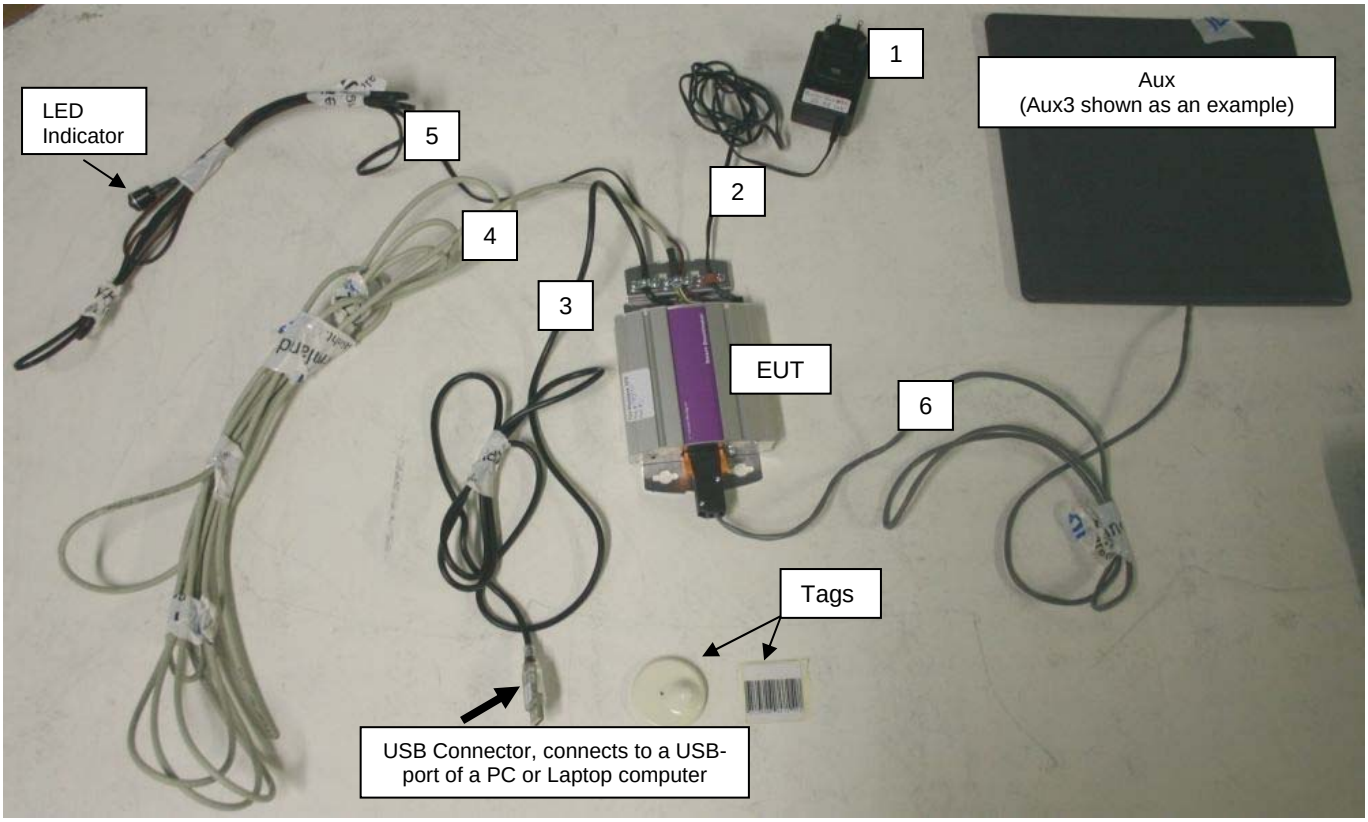


Photo 1: Basic testsetup and connections

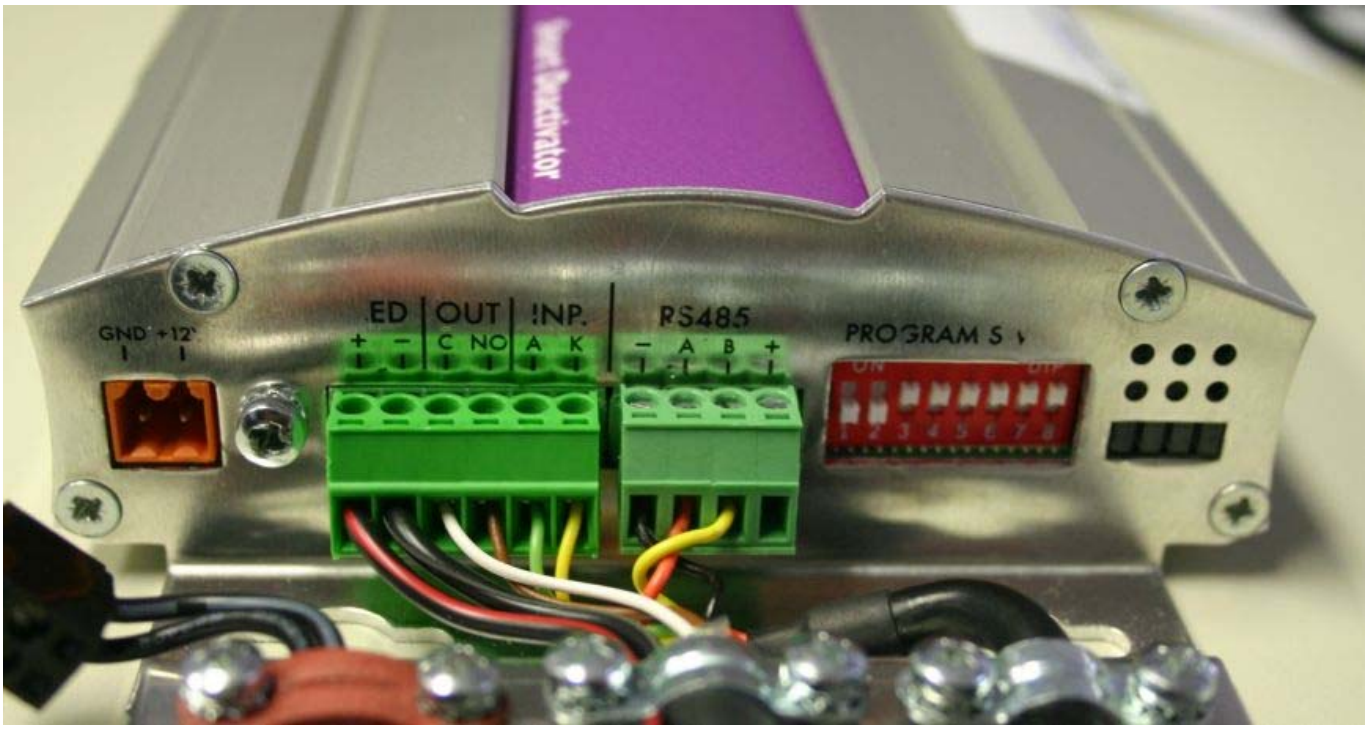


Photo 2a and 2b: Input & Output ports connections

1.4 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (july 10, 2008), sections 15.31, 15.207,15.209 and 15.223.

The test methods, which have been used, are based on ANSI C63.4: 2003.

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.

1.5 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(10-1-08 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.

1.6 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 115VAC/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 is 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 fashion (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: 2003.

2.2 EUT mode of operation.

The EUT has been tested in passive(stand-by)- and active mode, i.e. the EUT is ready to detect a tag. To assess the behavior of the EUT while reading the tag, the EUT is tested with a tag presented such that it continuously reads the tag. The tests have been performed with a complete functioning EUT and interconnections.

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 Radiated emission data.

3.1 Radiated field strength measurements (30 MHz – 1 GHz, E-field) with Aux1

Frequency (MHz)	Measurement results @3m Vertical (dBuV/m)	Measurement results @3m Horizontal (dBuV/m)	Limits @3m (dBuV/m)	Pass/Fail
30 – 88	<20	<20	40.0	Pass
Except:				
32.6	11	10	40.0	Pass
49.22	11	10	40.0	Pass
54.29	10	10	40.0	Pass
88 – 216	<23	<23	43.5	Pass
Except:				
136.02	26.1	<26	43.5	Pass
152.026	26.6	<26.6	43.5	Pass
216 – 960	<26	<26	46.0	Pass
272	20	18	46.0	Pass
304	20	18	46.0	Pass
960 - 1000	<34	<34	54.0	Pass

Table 1a Radiated emissions of the EUT in combination with Aux1

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.223 with the EUT operating in active mode while detecting a tag are depicted in table 1a. The system is tested as in whole, being the worst case situation. So with all equipment as shown in Photo.1 in place and functioning.

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. Measurement uncertainty is ±5.0dB
3. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux1 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.
5. A Quasi-peak and Peak detector was used with a resolution bandwidth of 120 kHz.
6. Values noted are from the Peak detector which already are within limits for Quasi-peak.
7. Values noted in Table 1a are applicable for both Power Supplies (Aux7 and Aux8), no difference in measurement data observed between these two power supplies.
8. In the range 216 – 1000 MHz no specific signals that can be related to the EUT can be detected.

Test engineer

Signature : 

Name : Richard van der Meer

Date : October 14, 2009

3.2 Radiated field strength measurements (30 MHz – 1 GHz, E-field) with Aux2

Frequency (MHz)	Measurement results @3m Vertical (dBuV/m)	Measurement results @3m Horizontal (dBuV/m)	Limits @3m (dBuV/m)	Pass/Fail
30 – 88	<20	<20	40.0	Pass
Except:				
32.6	11	11	40.0	Pass
49.22	11	11	40.0	Pass
54.29	20.3	<20	40.0	Pass
88 – 216	<23	<23	43.5	Pass
Except:				
136.02	27.1	<23	43.5	Pass
152.026	28.6	<23	43.5	Pass
216 – 960	<26	<26	46.0	Pass
272	20	18	46.0	Pass
304	20	18	46.0	Pass
960 - 1000	<34	<34	54.0	Pass

Table 1b Radiated emissions of the EUT in combination with Aux2

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.223 with the EUT operating in active mode while detecting a tag are depicted in table 1b. The system is tested as in whole, being the worst case situation. So with all equipment as shown in Photo.1 in place and functioning.

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. Measurement uncertainty is ±5.0dB
3. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux2 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.
5. A Quasi-peak and Peak detector was used with a resolution bandwidth of 120 kHz.
6. Values noted are from the Peak detector which already are within limits for Quasi-peak.
7. Values noted in Table 1b are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
8. In the range 216 – 1000 MHz no specific signals that can be related to the EUT can be detected

Test engineer

Signature : 

Name : Richard van der Meer

Date : October 14, 2009

3.3 Radiated field strength measurements (30 MHz – 1 GHz, E-field) with Aux3

Frequency (MHz)	Measurement results @3m Vertical (dBuV/m)	Measurement results @3m Horizontal (dBuV/m)	Limits @3m (dBuV/m)	Pass/Fail
30 – 88	<20	<20	40.0	Pass
Except:				
32.6	11	10	40.0	Pass
49.2	11	10	40.0	Pass
54.29	25.3	<25	40.0	Pass
88 – 216	<23	<23	43.5	Pass
Except:				
136.02	26.1	<26	43.5	Pass
152.026	28.6	<29	43.5	Pass
216 – 960	<26	<26	46.0	Pass
272	20	18	46.0	Pass
304	20	18	46.0	Pass
960 - 1000	<34	<34	54.0	Pass

Table 1c Radiated emissions of the EUT in combination with Aux3

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.223 with the EUT operating in active mode while detecting a tag are depicted in table 1c. The system is tested as in whole, being the worst case situation. So with all equipment as shown in Photo.1 in place and functioning.

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. Measurement uncertainty is ±5.0dB
3. The reported field strength values are the worst case values at the indicated frequency. The receiving antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux3 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.
5. A Quasi-peak and Peak detector was used with a resolution bandwidth of 120 kHz.
6. Values noted are from the Peak detector which already are within limits for Quasi-peak.
7. Values noted in Table 1c are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
8. In the range 216 – 1000 MHz no specific signals that can be related to the EUT can be detected

Test engineer

Signature : 

Name : Richard van der Meer

Date : October 14, 2009

3.4 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Average values, with Aux1.

Frequency (MHz)	Measurement results (dBµV)	Detector	Antenna factor	Cable loss	Measurement results (calculated)	Limits
	3 meters		dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<20	Av	20.1	1	n.i	48.5 down to 13.8 @300m
0.490 - 1.705	<20	Qp	19.7	1	n.i	33.8 down to 22.9 @30m
1.705 – 10.0	<25	Av	19.5	1	<5.5	40 @30m
Except:						
7.2	32	Av	19.6	1	12.6	40 @30m
7.3	30	Av	19.6	1	10.6	40 @30m
7.4	30	Av	19.6	1	10.6	40 @30m
7.5	21	Av	19.6	1	1.6	40 @30m
7.6	15	Av	19.6	1	n.i.	40 @30m
7.7	14	Av	19.6	1	n.i.	40 @30m
7.8	13	Av	19.6	1	n.i.	40 @30m
7.9	15	Av	19.6	1	n.i.	40 @30m
8.0	24	Av	19.6	1	4.6	40 @30m
8.1	25	Av	19.6	1	5.6	40 @30m
8.2	25	Av	19.6	1	5.6	40 @30m
8.3	18	Av	19.6	1	n.i.	40 @30m
8.4	18	Av	19.6	1	n.i.	40 @30m
8.5	17	Av	19.6	1	n.i.	40 @30m
8.6	21	Av	19.6	1	1.6	40 @30m
8.7	26	Av	19.6	1	6.6	40 @30m
8.8	15	Av	19.6	1	n.i.	40 @30m
10 -30	<15	Qp	20.0	1	<20	29.5 @30m

Table 2a Radiated emissions of the EUT in combination with Aux1

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

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.2 MHz: 32dBuv + 19.6dB + 1dB - 40dB= 12.6 dBuV/m.
2. A resolution bandwidth of 9kHz was used during testing
3. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
4. Field strength values of radiated emissions at frequencies not listed in table 2a are more than 20 dB below the applicable limit
5. 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.
6. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux1 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.

7. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).
8. Values noted in Table 2a are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
9. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

3.5 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Peak values, with Aux1.

Frequency (MHz)	Measurement results (dBµV)	Antenna factor	Cable loss	Measurement results (calculated)	Limits Part 15.209/223
	3 meters	dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<40	20.1	1	<21.1	68.5 – 33.8 (300 m)
0.490 - 1.705	<40	19.7	1	<20.7	53.8 - 42.9 (30 m)
1.705 – 10.0	<40	19.6	1	<20.6	60 (30 m)
Except:					
7.2	50	19.6	1	30.6	60 (30 m)
7.3	48	19.6	1	28.6	60 (30 m)
7.4	48	19.6	1	28.6	60 (30 m)
7.5	39	19.6	1	19.6	60 (30 m)
7.6	33	19.6	1	13.6	60 (30 m)
7.7	32	19.6	1	12.6	60 (30 m)
7.8	31	19.6	1	11.6	60 (30 m)
7.9	33	19.6	1	13.6	60 (30 m)
8.0	42	19.6	1	22.6	60 (30 m)
8.1	43	19.6	1	23.6	60 (30 m)
8.2	43	19.6	1	23.6	60 (30 m)
8.3	36	19.6	1	16.6	60 (30 m)
8.4	36	19.6	1	16.6	60 (30 m)
8.5	35	19.6	1	15.6	60 (30 m)
8.6	39	19.6	1	19.6	60 (30 m)
8.7	34	19.6	1	14.6	60 (30 m)
8.8	33	19.6	1	13.6	60 (30 m)
10 -30	<30	20.0	1	<21	49.5 (30m)

Table 2b Radiated emissions of the EUT in combination with Aux1

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

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.2 MHz: 50dBuv + 19.6dB + 1dB - 40dB= 30.6 dBuV/m.
2. A Peak detector was used during testing.
3. A resolution bandwidth of 9kHz was used during testing
4. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
5. Field strength values of radiated emissions at frequencies not listed in table 2b are more than 20 dB below the applicable limit
6. 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.
7. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux1 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted
8. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).

9. Values noted in Table 2b are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
10. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

3.6 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Average values, with Aux2.

Frequency (MHz)	Measurement results (dBµV)	Detector	Antenna factor	Cable loss	Measurement results (calculated)	Limits
	3 meters		dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<20	Av	20.1	1	n.i	48.5 down to 13.8 @300m
0.490 - 1.705	<20	Qp	19.7	1	n.i	33.8 down to 22.9 @30m
1.705 – 10.0	<20	Av	19.5	1	n.i.	40 @30m
Except:						
7.3	28	Av	19.6	1	8.6	40 @30m
7.4	27	Av	19.6	1	7.6	40 @30m
7.5	17	Av	19.6	1	n.i.	40 @30m
7.6	15	Av	19.6	1	n.i.	40 @30m
7.7	15	Av	19.6	1	n.i.	40 @30m
7.8	14	Av	19.6	1	n.i.	40 @30m
7.9	13	Av	19.6	1	n.i.	40 @30m
8.0	18	Av	19.6	1	n.i.	40 @30m
8.1	16	Av	19.6	1	n.i.	40 @30m
8.2	15	Av	19.6	1	n.i.	40 @30m
8.3	16	Av	19.6	1	n.i.	40 @30m
8.4	16	Av	19.6	1	n.i.	40 @30m
8.5	18	Av	19.6	1	n.i.	40 @30m
8.6	19	Av	19.6	1	n.i.	40 @30m
8.7	33	Av	19.6	1	13.6	40 @30m
8.8	17	Av	19.6	1	n.i.	40 @30m
10 -30	<15	Qp	20.0	1	<20	29.5 @30m

Table 2c Radiated emissions of the EUT in combination with Aux2

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

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.3 MHz: 28dBuv + 19.6dB + 1dB - 40dB= 8.6 dBuV/m.
2. A resolution bandwidth of 9kHz was used during testing
3. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
4. Field strength values of radiated emissions at frequencies not listed in table 2a are more than 20 dB below the applicable limit
5. 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.
6. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux2 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.
7. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).

8. Values noted in Table 2c are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
9. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

3.7 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Peak values, with Aux2.

Frequency (MHz)	Measurement results (dBµV)	Antenna factor	Cable loss	Measurement results (calculated)	Limits Part 15.209/223
	3 meters	dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<40	20.1	1	<21.1	68.5 – 33.8 (300 m)
0.490 - 1.705	<40	19.7	1	<20.7	53.8 - 42.9 (30 m)
1.705 – 10.0	<30	19.6	1	<10.6	60 (30 m)
Except:					
7.3	47	19.6	1	27.6	60 (30 m)
7.4	46	19.6	1	26.6	60 (30 m)
7.5	36	19.6	1	16.6	60 (30 m)
7.6	34	19.6	1	14.6	60 (30 m)
7.7	34	19.6	1	14.6	60 (30 m)
7.8	33	19.6	1	13.6	60 (30 m)
7.9	32	19.6	1	12.6	60 (30 m)
8.0	37	19.6	1	17.6	60 (30 m)
8.1	35	19.6	1	15.6	60 (30 m)
8.2	34	19.6	1	14.6	60 (30 m)
8.3	35	19.6	1	15.6	60 (30 m)
8.4	35	19.6	1	15.6	60 (30 m)
8.5	37	19.6	1	17.6	60 (30 m)
8.6	38	19.6	1	18.6	60 (30 m)
8.7	52	19.6	1	22.6	60 (30 m)
8.8	26	19.6	1	6.6	60 (30 m)
10 -30	<40	20.0	1	<21	49.5 (30m)

Table 2d Radiated emissions of the EUT in combination with Aux2

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

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.3 MHz: 47dBuv + 19.6dB + 1dB - 40dB= 27.6 dBuV/m.
2. A Peak detector was used during testing.
3. A resolution bandwidth of 9kHz was used during testing
4. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
5. Field strength values of radiated emissions at frequencies not listed in table 2b are more than 20 dB below the applicable limit
6. 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.
7. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux2 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted

8. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).
9. Values noted in Table 2d are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
10. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

3.8 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Average values, with Aux3.

Frequency (MHz)	Measurement results (dBµV)	Detector	Antenna factor	Cable loss	Measurement results (calculated)	Limits
	3 meters		dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<20	Av	20.1	1	n.i	48.5 down to 13.8 @300m
0.490 - 1.705	<20	Qp	19.7	1	n.i	33.8 down to 22.9 @30m
1.705 – 10.0	<20	Av	19.6	1	n.i.	40 @30m
Except:						
7.4	31	Av	19.6	1	11.6	40 @30m
7.5	35	Av	19.6	1	15.6	40 @30m
7.6	13	Av	19.6	1	n.i.	40 @30m
7.7	12	Av	19.6	1	n.i.	40 @30m
7.8	14	Av	19.6	1	n.i.	40 @30m
7.9	16	Av	19.6	1	n.i.	40 @30m
8	24	Av	19.6	1	4.6	40 @30m
8.2	24	Av	19.6	1	46	40 @30m
8.3	15	Av	19.6	1	n.i.	40 @30m
8.4	16	Av	19.6	1	n.i.	40 @30m
10 -30	<20	Qp	20.0	1	n.i.	29.5 @30m

Table 2e Radiated emissions of the EUT in combination with Aux3

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

Notes:

1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.5 MHz: 35dBuv + 19.6dB + 1dB - 40dB= 15.6 dBuV/m.
2. A resolution bandwidth of 9kHz was used during testing
3. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
4. Field strength values of radiated emissions at frequencies not listed in table 2e are more than 20 dB below the applicable limit
5. 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.
6. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux3 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted.
7. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).

8. Values noted in Table 2e are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
9. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

3.9 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Peak values, with Aux3.

Frequency (MHz)	Measurement results (dBµV)	Antenna factor	Cable loss	Measurement results (calculated)	Limits Part 15.209/223
	3 meters	dB	dB	dB(µV)/m	dB(µV)/m
0.009 - 0.490	<40	20.1	1	<21.1	68.5 – 33.8 (300 m)
0.490 - 1.705	<40	19.7	1	<20.7	53.8 - 42.9 (30 m)
1.705 – 10.0	<40	19.6	1	<20.6	60 (30 m)
Except:					
7.4	34	19.6	1	14.6	60 (30 m)
7.5	38	19.6	1	18.6	60 (30 m)
7.6	39	19.6	1	19.6	60 (30 m)
7.7	44	19.6	1	24.6	60 (30 m)
7.8	47	19.6	1	27.6	60 (30 m)
7.9	39	19.6	1	19.6	60 (30 m)
8	39	19.6	1	19.6	60 (30 m)
8.2	34	19.6	1	14.6	60 (30 m)
8.3	33	19.6	1	13.6	60 (30 m)
8.4	31	19.6	1	11.6	60 (30 m)
10 -30	<40	20.0	1	<21	49.5 (30m)

Table 2f Radiated emissions of the EUT in combination with Aux3

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

Notes:

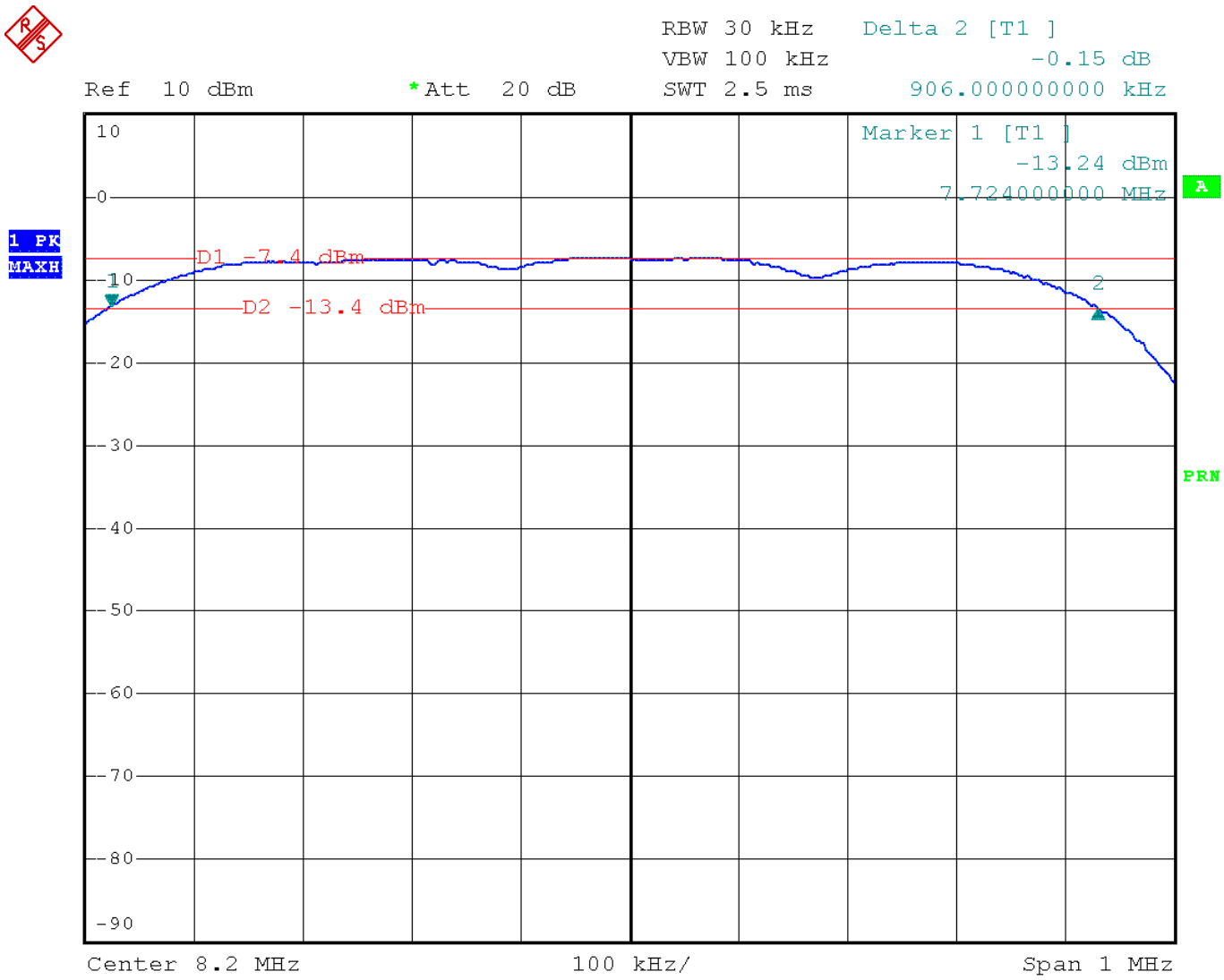
1. Calculated measurement results are obtained by using the 40dB/decade factor (antenna factor and cable loss is included). i.e at 7.8 MHz: 47dBuv + 19.6dB + 1dB - 40dB= 27.6 dBuV/m.
2. A Peak detector was used during testing.
3. A resolution bandwidth of 9kHz was used during testing
4. n.i. Indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range. N.m. means not measured.
5. Field strength values of radiated emissions at frequencies not listed in table 2f are more than 20 dB below the applicable limit
6. 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.
7. The EUT was tested in horizontal and vertical orientations but showed no difference between these orientations. The Aux3 antenna was tested in horizontal and vertical orientations, with the vertical showing the highest values. Worst case values noted
8. The EUT was tested in both normal mode (i.e. without a tag in its proximity) and in activated mode (i.e. with a tag in its proximity).
9. Values noted in Table 2f are applicable for both Power Supply (Aux7 and Aux8) no difference in measurement data observed between these two power supplies.
10. Measurement uncertainty is ±5.0dB

Test engineer

Signature : 

Name : R. van der Meer
Date : October 14, 2009

4 6 dB bandwidth.



Date: 26.OCT.2009 14:39:19

Plot 1: 6 dB Bandwidth = 906 kHz of the EUT , which is more than 10% of the carrier frequency

5 Conducted emission data.

5.1 Conducted emission data of the EUT with Aux1

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0.150	57	33	57	38	66.0	56.0	PASS
0.166	48	28	47	38	65.5	55.5	PASS
0.194	48	31	48	38	64.0	54.0	PASS
0.226	45	35	46	33	62.8	52.8	PASS
0.254	43	34	42	34	61.8	51.8	PASS
0.278	38	26	38	33	60.8	50.8	PASS
0.498	44	38	43	37	56	46	PASS
7.678	28	21	28	22	60	50	PASS
12.318	28	20	29	23	60	50	PASS
15.542	41	38	35	29	60	50	PASS

Table 3a Conducted emission measurements.

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0.318	38	10	38.2	12	59.7	49.7	PASS
0.474	48	26	48.0	27	56.5	46.5	PASS
1.274	39	35	41.1	33	56	46	PASS
1.298	36	31	39.4	30	50	40	PASS
1.478	38	33	40.8	30	56	46	PASS
1.646	38	21	41.4	31	56	46	PASS
1.67	38	25	41.9	22	56	46	PASS
8.034	41	19	42.4	17	60	50	PASS
8.046	40	12	42.6	14	60	50	PASS
8.058	40	18	43.0	13	60	50	PASS
8.318	40	16	38	15	60	50	PASS
8.402	37	18	38	15	60	50	PASS
8.47	39	18	41	17	60	50	PASS
8.538	42	16	36	18	60	50	PASS

Table 3b Conducted emission measurements.

The results of the conducted emission tests in the range of 150 kHz up to 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.207 at the 115 Volts AC mains connection terminals of the AC/DC power supply which was connected to the EUT, are depicted in table 3a and 3b. The EUT was tested in both passive and active mode (while detecting a tag). Maximum values recorded. The system is tested as in whole, so with all equipment as shown in Photo 1 in place and functioning. Being the worst case situation.

Notes:

1. Measurement uncertainty is ±3.5dB
2. The resolution bandwidth used was 9 kHz.
3. Values of conducted emissions at frequencies not listed in table 3a and 3b are more than 20 dB below the applicable limit.
4. Tested with Power Supply Adapter Aux7, see Table 3a.
5. Tested with Power Supply Adapter Aux8, see Table 3b.

Test engineer

Signature : 

Name : R. van der Meer

Date : October 19, 2009

5.2 Conducted emission data of the EUT with Aux2

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0.506	44	38	43	38	56	46	PASS
0.930	35	28	34	28	56	46	PASS
1.15	28	20	26	17	56	46	PASS
1.178	29	22	27	21	56	46	PASS
7.47	27	19	27	20	60	50	PASS
8.158	31	19	31	20	60	50	PASS
13.858	36	30	31	20	60	50	PASS
15.438	42	37	36	31	60	50	PASS
17.046	35	26	31	24	60	50	PASS
24.498	26	2	26	4	60	50	PASS
24.506	26	2	26	3	60	50	PASS

Table 4a Conducted emission measurements.

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0..510	47	34	48	36	56	46	PASS
0.722	37	20	34	21	56	46	PASS
0.806	35	21	34	17	56	46	PASS
1.858	40	32	38	34	56	46	PASS
7.882	33	16	34	17	60	50	PASS
7.902	33	15	35	18	60	50	PASS
15.922	27	12	27	14	60	50	PASS
15.946	27	11	29	13	60	50	PASS
23.794	28	12	28	9	60	50	PASS
24.938	27	14	27	11	60	50	PASS

Table 4b Conducted emission measurements.

The results of the conducted emission tests in the range of 150 kHz up to 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.207 at the 115 Volts AC mains connection terminals of the AC/DC power supply which was connected to the EUT, are depicted in table 4a and 4b. The EUT was tested in both passive and active mode (while detecting a tag). Maximum values recorded. The system is tested as in whole, so with all equipment as shown in Photo.1 in place and functioning. Being the worst case situation.

Notes:

1. Measurement uncertainty is ±3.5dB
2. The resolution bandwidth used was 9 kHz.
3. Values of conducted emissions at frequencies not listed in table 6a and 6b are more than 20 dB below the applicable limit.
4. Tested with Power Supply Adapter Aux7, see Table 4a.
5. Tested with Power Supply Adapter Aux8, see Table 4b.

Test engineer

Signature : 

Name : R. van der Meer

Date : October 19, 2009

5.3 Conducted emission data of the EUT with Aux3

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0.150	55	38	58	40	66.0	56.0	PASS
0.174	50.6	36	53	38	65.0	55.0	PASS
0.202	50	38	51	39	63.6	53.6	PASS
0.230	44	33	45	32	62.4	52.4	PASS
0.254	44	31	44	30	61.8	51.8	PASS
0.286	38	26	39	27	60.5	50.0	PASS
0.314	38	23	37	23	60.0	50.0	PASS
0.418	36	29	36.5	29	57.4	47.4	PASS
0.446	35	27	36	28	56.9	46.9	PASS
0.502	44	38	45	39	56.0	46.0	PASS
1.17	27	20	29	23	56.0	46.0	PASS
6.274	26	19	27	18	60.0	50.0	PASS
7.478	35	20	35	20	60.0	50.0	PASS
7.498	33	19	36	20	60.0	50.0	PASS
7.51	34	20	36	21	60.0	50.0	PASS
8.898	32	20	35	19	60.0	50.0	PASS
8.914	32	19	34	19	60.0	50.0	PASS
10.498	28	21	27	20	60.0	50.0	PASS
13.698	30	25	33	28	60.0	50.0	PASS
15.318	35	30	43	39	60.0	50.0	PASS
16.874	31	26	34	29	60.0	50.0	PASS

Table 5a Conducted emission measurements.

Frequency (MHz)	Measurement results dB(µV) Neutral		Measurement results dB(µV) Line 1		Limits dB(µV)		Result
	QP	AV	QP	AV	QP	AV	
0.514	47	30	48	36	56	46	PASS
0.742	45	41	33	29	56	46	PASS
0.914	42	31	41	31	56	46	PASS
2.01	37	31	37	29	56	46	PASS
6.994	34	18	34	18	60	50	PASS
7.002	33	19	33	20	60	50	PASS
7.014	33	17	33	17	60	50	PASS
7.769	48	17	48	20	60	50	PASS
7.82	52	17	50	18	60	50	PASS
7.925	56	17	55	18	60	50	PASS
8.327	50	17	48	13	60	50	PASS
8.346	52	17	48	15	60	50	PASS
9.934	30	16	29	15	60	50	PASS

Table 5b Conducted emission measurements.

The results of the conducted emission tests in the range of 150 kHz up to 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.207 at the 115 Volts AC mains connection terminals of the AC/DC power supply which was connected to the EUT, are depicted in table 5a and 5b. The EUT was tested in both passive and active mode (while detecting a tag). Maximum values recorded. The system is tested as in whole, so with all equipment as shown in photo.1 in place and functioning. Being the worst case situation.

Notes:

1. Measurement uncertainty is ±3.5dB
2. The resolution bandwidth used was 9 kHz.
3. Values of conducted emissions at frequencies not listed in table 7a and 7b are more than 20 dB below the applicable limit.
4. Tested with Power Supply Adapter Aux7, see Table 5a.
5. Tested with Power Supply Adapter Aux8, see Table 5b.

Test engineer

Signature : 

Name : R. van der Meer

Date : October 19, 2009

6 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
12503	LISN	R&S	ESH2-Z5	01/2008	01/2010
12512	LISN	EMCO	3625/2	01/2008	01/2010
15453	Active loopant. 60 cm	Chase	HLA6120	05/2009	05/2010
15633	Biconilog Testantenna	Chase	CBL 6111B	02/2009	02/2010
99069	Coax 5m RG213 OATS	NMi Certin B.V.	KABEL 5M OATS	11/2008	11/2009
99070	Coax 15m RG213 OATS	NMi Certin B.V.	KABEL 15M OATS	11/2008	11/2009
99071	Coax OATS ground	NMi Certin B.V.	KABEL GROND OATS	11/2008	11/2009
99107	Controller OATS	Heinrich Deisel	4630-100	NA	NA
99161	Variac 250V 6A	RFT	LTS006	NA	NA
99538	Spectrum analyzer	R&S	FSP	04/2009	04/2010
99547	Temperature-Humiditymeter	Europe supplies	WS-7082	10/2008	10/2009
99580	OATS	Comtest	FCC listed: 90828	08/2008	08/2011
99608	Controller (OATS)	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	11/2008	11/2009

NA= Not Applicable