telefication bv
The Netherlands
Chamber of Commerce
09076358
www.telefication.com

telefication

Test report

99381830

Based on:
FCC Part 15, Subpart C section 15.209

RF-IDtag / barcode reader
Opticon
PHL-2700-RFID-134.2

QUALIFIED BY STERLAB Reg.nr. L021

Contents

This report comprises of four modules. The total number of pages exclusive of the pages enclosed in the additional information module is: 24

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:1999. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

Ordering party:

Company name	:	Opticon Sensors Europe BV.
Address	:	Opaallaan 35
P.O. Box	:	2132 XV
City/town	:	Hoofddorp
Country	:	The Netherlands
Date of order	:	8 January 2003

2 Product

A sample of the following product was submitted for testing:

Product category	:	Intentional radiators - class C digital devices
Manufacturer	:	Opticon Sensors BV.
Trade mark	:	Opticon
Type designation	:	PHL-2700-RFID-134.2
Hardware version	:	2366.01
Software version	:	CNWV0101
Serial number	:	205942

3 Test schedule

Tests were carried out in accordance with the specification detailed in chapter 8 "Summary" of this report.

Tests were carried out at the following location:

- Telefication, Zevenaar

The sample of the product was received on:

- 3 February 2003

Tests were carried out on the following date:

- 3 February 2003 and 6 February 2003

4 Product information

4.1 Product description

The inductive RFID TAG reader device HPL 2700 is designed to function as ID reader for tagged items. Although the reader has a double reader capability (RFID and BARCODE), the focus of this report is on the intentional radiator. By placing the reader in the proximity of an ID tag, the id will be shown on the display.

4.2 Choice of operating frequency

The operating frequency of the RFID Tag reader is 134.2 kHz.

4.3 Operating principles

The inductive RFID Tag reader is a battery powered handheld device with integral antenna. The reader generates a RF-field at a frequency of 134.2 kHz (continuous carrier), which activates the electronics in the Tag. The activated Tag sends its information to the reader by modulating the RF-field. The modulation of the 134.2 kHz RF-field can be detected and the code is demodulated by the inductive tag reader.

4.4 Related submittal(s) or Grant(s)

Not applicable

4.5 Test methodology

The test methodology is based on the requirements of 47 CFR Part 15, issue of October 2002, sections 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 Full Anechoic Chamber. Below 30 MHz the radiated emissions test were carried out at a measurement distance of 3 meter.

4.6 Test facility

Al tests were carried out at Telefication Zevenaar.

4.7 Product labeling

In accordance with 47CFR Part 15.19(a)(3) the following text shell be placed on a label, which is attached to 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 that may cause undesired operation.

The FCC ID of the EUT must 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.

5 Product documentation

For production of this report the following product documentation was used:

Description	**Date**
Preliminary specifications	2003-01
User manual PHL 2700	2002-12

6 System test configuration

6.1 Justification

The system was configured for testing in a test mode. During all tests the EUT was set up to function in accordance with the manufacturer's instructions.

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

6.2 EUT operating mode

Radiated emission measurements were carried out when the EUT was active and generating a continuous transmitting signal.

6.3 Special accessories

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

6.4 Equipment modifications

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

6.5 Equipment technical specifications

Equipment utilization	: Dual mode Tag Reader (RFID and Barcode)
Model number	: PHL-2700-134.2
Part number	: n.a.
FCC-ID	: --
Frequency range	: 134.2 kHz, fixed frequency, continuous carrier
Description/details	: see section 4.1 of this test report
Power supply	: Battery powered 2x AA size Cell (3 volt Alkaline or 2.4 volt Ni-MH)
Clock oscillators	: 32.768 kHz, 11 MHz and 2 MHz,

6.6 Block diagram of the EUT

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

6.7 Schematics of the EUT

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

6.8 Partlist of the EUT

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

7 Observations and comments

This report concerns: Original grant/certification ~~Class 2 change~~ ~~Verification~~

The data taken for this test and report herein was done in accordance with 47 CFR Part 15 and the measurement data procedures of ANSI C63.4-1992. Telefication at Zevenaar certifies that the data is accurate and contains a true representation of the emission of the equipment under test (EUT) on the test as noted in this test report.

8 Summary

The product is intended for use in the following application area:

Intentional radiator, low power, digital device

The sample was tested according to the following specification:

FCC Part 15, Subpart C section 15.209

9 Conclusions

The sample of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 8 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication does not accept any responsibility for the results stated in this report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : H.H. Lodewijk

function : Test Engineer

signature :

Review of test methods and report by:

name : ing. P.A. Suringa

function : Senior Engineer Radio / EMC

signature :

The following signatory has verified the above conclusions:

date : 20 March 2003

name : J.P. van de Poll

function : Co-ordinator Test Group

signature :

Test results module

1 Summary

According to FCC Part 15; subpart C; section 15.209 the following tests are performed:

Port	Reference	Result
Radiated emission data	Section 15.209	P

Results:

P	=	Pass	NA	=	Not Applicable
F	=	Fail	NP	=	Not Performed

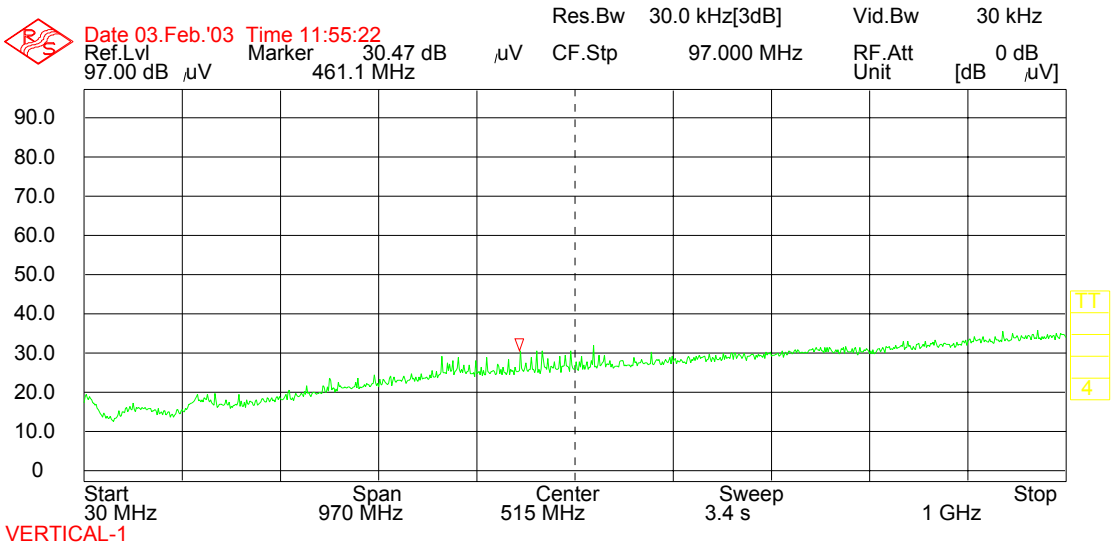
2 Emission tests

2.1 Radiated field strength measurement (30 - 1000 MHz, E-field)

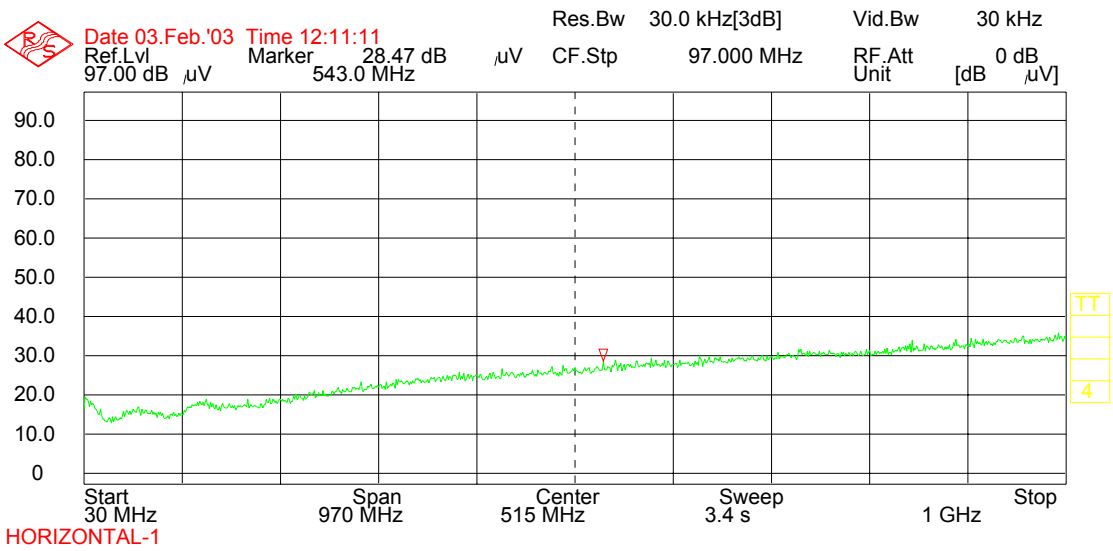
2.1.1 Pre-compliance

Port : Enclosure
Configuration : --
Pre compliance test : Radiated Emission measurements at 3 m distance in a Fully Anechoic Chamber (FAC) have been carried out to determine on which frequencies the sample radiates.

Test results : Graph for vertical polarization (units in dBµV/m).



Test results: Graph for horizontal polarization (units in dBµV/m)



Measurement equipment : 12, 27, 28
(The numbers listed refer to the module ‘Used test equipment module’.)

2.1.2 Compliance

Standard : FCC Part 15; subpart C; section 15.209.
Port : Enclosure
Configuration : Continuous carrier
Compliance test :

Test results :

Freq (MHz)	Pol. (V/H)	RCVD Signal (dBµV/m)	Dist. Corr. (dB)	Field Strength (dBµV/m) @ 3 meter	Limit (dBµV/m)	Margin (dB)
283.500	V	28.8	6	34.8	46.0	11.2

Remark: Because of the low levels measured at the pre- compliance test no OATS measurement was performed. From the well-known relation between the Full Anechoic chamber and Open Area Test Site, emissions can be increased by 6 dB to get the worst-case level. Therefore the presented value is calculated.

Measurement equipment : 78, 79, 80
(The numbers listed refer to the module 'Used test equipment module'.)

2.2 Radiated field strength measurement (0.009 – 30 MHz, H-field)

Standard : FCC Part 15; subpart C; section 15.209 and 15.225(a)
Port : Enclosure
Configuration : Continuous carrier
Compliance test : Tested at 3 meter

Test results :

Freq (MHz)	RCVD Signal (dBµV/m) @ 3 meter	Dist. Corr. (dB)	Field Strength (dBµV/m) @300 meter (calculated)	Limit (dBµV/m)
0.009 - 0.1342	<10	80	<0	48.5 - 25.1 (300m)
0.1342	73	80	-7	25.1 (300m)
0.2684	<10	80	<0	19.0 (300m)
0.4026	42	80	-38	15.5 (300m)
0.4026 - 0.490	<10	80	<0	15.5 - 13.8 (300m)
0.490 - 1.705	<10	40	<0	33.8 – 23.0 (30m)
1.705 - 30.00	<10	40	<0	29.5 (30m)

Remark:
1. Measurements in the frequency range 9 - 490 kHz were carried out using an average detector.
2. Because of the low radiation levels the measurement distance used was 3 meter.

Measurement equipment : 81, 82
(The numbers listed refer to the module 'Used test equipment module'.)

Used test equipment module

This module contains the total list of test equipment used.

The following measurement equipment is used at Telefication:

Ref	Description	ID	Manufacturer	Model
1	EFT generator	TE 00760	Keytek	E411
2	EFT/surge coupler	TE 00759	Keytek	E4551
3	Capacitive clamp	TE 00761	Keytek	CCL-4/S
4	Controller (A07)	TE 00023	Keytek	E103
5	ESD simulator	TE 00516	Keytek	MZ-15/EC
6	ESD air discharge tip	TE 00755	Keytek	TPA-2
7	ESD contact discharge tip	TE 00709	Keytek	TPC-2
8	Surge comb. wave generator	TE 00757	Keytek	E501A
9	Surge telecom wave gen.	TE 00022	Keytek	E502A
10	Surge coupler/decoupler	TE 00758	Keytek	E571
11	Logper/bow-tie antenna (Anec)	TE 00700	EMCO	3143
12	Biconical antenna	TE	Schwarzbeck	BBA 9106
13	RF amplifier	TE 00750	Kalmus	737FC
14	RF generator	TE 00474	Adret	7200A
15	Isotropic field sensor	TE 00748	Holaday	HI-4422
16	Fibre optic RS232 interface	--	Holaday	HI-4413G
17	System readout	TE 00749	Holaday	HI-4416
18	Antenna tower	--	HD	AS 620p
19	Turntable	--	HD	DS 412
20	Turntable controller	--	HD	HD 050
21	RF voltmeter	TE 00707	Boonton	9200B
22	40 dB coupler	TE 00752	Kalmus	DC100HHR
23	RF probe (2x)	TE 00753 TE 00754	Boonton	952001B
24	Artificial mains network	TE 00208	R & S	ESH2-Z5

Ref	Description	ID	Manufacturer	Model
25	Test receiver	TE 00205	R & S	ESH3
26	Pulse limiter	TE 00227	R & S	ESH3-Z2
27	Spectrum analyzer	TE 00094 TE 00095	R & S	FSB Display
28	Test receiver	TE 00091	R & S	ESV(P)
29	Antenna mast	--	EMCO	1070
30	Turn table	--	EMCO	1060-2M
31	Absorbing clamp	TE 00777	R & S	MDS 21
32	Anechoic chamber	--	Euroshield	RFD-F-100
33	Open Area Test Site	--	Telefication	--
34	Power/Arb waveform source	TE 00711	Keytek	EP72
35	Reference impedance	TE 00712	Keytek	ERI-1
36	Power analyzer	TE 00763	Xitron Technologies	2501AH
37	AC power simulator	TE 00762	Kikusui	PCR4000L
38	Signal generator	TE 00413	Marconi	2042
39	RF amplifier	TE 00515	Amplifier Research	25A250A
40	T-network	TE 00026	R & S	ESH3-Z4
41	Mains coupl./dec. network	TE 00766	Telefication	9403S1
42	Power meter	TE 00414	R & S	NRVS
43	Measurement probe	TE 00415	R & S	URV5-Z4
44	Attenuator 6 dB	TE 00514	Narda	766-6
45	Pulse generator	TE 00225	HP	8012 B
46	Coaxial coupl./dec. network	TE 00766	Telefication	CDN-S1
47	Voltage Swell/DIP/interrupt source	TE 00710	Keytek	EP62

Ref	Description	ID	Manufacturer	Model
48	Digital multimeter	TE 00329	Fluke	Fluke 87
49	--	--	--	--
50	EM clamp	TE 00764	Lüthi	EM101
51	Ferrite tube	TE 00765	Lüthi	FTC101
52	Distortion meter	TE 00416	HP	HP 8903 B
53	Artificial Mains Network	TE	Telefication	JOZ191194
54	Attenuator 3 dB, 100 W	TE 00751	Tenuline	8343-030
55	Logperiodic antenna	TE 00744	EMCO	3147
56	Modulation analyzer	TE 00412	R & S	FAM
57	Audio amplifier	TE 00517	Solar Electronics	6552-1A
58	Acoustic Pipe Coupler	TE 00775	Telefication	JOZ110395
59	Antenna	--	Kathrein	K 51164
60	Pulse modulator	TE 00708	Schaffner	CPM9830
61	RF power amplifier	TE 00714	Schaffner	CBA9546
62	Adjustable transformer	--	KSL	RU8
63	100 µF decoupling capacitor	TE 00769	Telefication	JOZ
64	Mains coupling/decoupling Network	TE 00767	Telefication	CDN-M2/M3
65	Coupling/decoupling device for screened cables	TE 00771	MEB	CDN-S25
66	Audio isolation transformer	TE 00772	Solar	6220-2
67	Current probe	TE 00773	Eaton	93686-2
68	Triple loop antenna	TE	Telefication	--
69	Pre-amplifier	TE 00344	R&S	ESV-Z3

Ref	Description	ID	Manufacturer	Model
70	800 mm strip line	--	Telefication	--
71	Measurement probe	TE 00009	R & S	URV5-Z2
72	Standard gain horn antenna	TE 00602	Scientific Atlanta	12-1.7
73	Frequency doubler	TE 00569	HP	11721A
74	Microwave amplifier	TE 00124	HP	8349A
75	Preamplifier	TE 00092	HP	8449B
76	Spectrum analyzer	TE 00481	HP	8563E
77	Controller (A010)	TE 00713	Keytek	E103
78	EMI test receiver	827864/001	R & S	ESVS 10
79	Biconilog antenna	EMC 116983	Schwarzbeck	VULB9161
80	Open Area Test Site Kema	--	--	--
81	Measurement receiver	TE 00066	R & S	ESH-2
82	Loop antenna 9 kHz - 30 MHz	TE 00746	R & S	HFH2-Z2

Photographs module

Photograph 1: *General view*

Photograph 2: *Internal view*