



**TEST REPORT CONCERNING THE COMPLIANCE
OF A 6.78 MHZ TRANSPONDER, BRAND AMB-IT,
MODEL PROCHIP WITH 47 CFR PART 15 (2006-02-01).**

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

TNO Electronic Products & Services (EPS) B.V.
P.O. Box 15
9822 ZG Niekerk (NL)
Smidshornerweg 18
9822 TL Niekerk (NL)

Telephone: +31 594 505005
Telefax: +31 594 504804

E-mail: info@eps.tno.nl



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

MEASUREMENT/TECHNICAL REPORT

AMB-IT holding B.V.

Model : Prochip transponder

FCC ID: NXYCHIPX

April 20, 2006

This report concerns:	Original grant/certification	Class 2 change	Verification
Equipment type:	DXX, Prochip transponder.		
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) ?	Yes	No	n.a.
Report prepared by:	Name	: J. Schuurmans, B.Sc.E.E.	
	Company name	: TNO Electronic Products & Services (EPS) B.V.	
	Address	: Smidshornerweg 18	
	Postal code/city	: 9822 ZG Niekerk	
	Mailing address	: P.O. Box 15	
	Postal code/city	: 9822 TL Niekerk	
	Country	: The Netherlands	
	Telephone number	: + 31 594 505 005	
	Telefax number	: + 31 594 504 804	
	E-mail	: info@eps.tno.nl	

The data taken for this test and report herein was done in accordance with 47 CFR Part 15 and the measurement procedures of ANSI C63.4-2003. 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: April 20, 2006

Signature:

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



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

Description of test item

Test item : 6.78 MHz transponder
Manufacturer : AMB-IT holding B.V.
Brand : AMB-IT
Model : Prochip
Serial number(s) : LS-58112, CZ-50994
Revision : Not applicable
Receipt date : April 7, 2006

Applicant information

Applicant's representative : Mr. M.H.C. Gielen
Company : AMB-IT holding B.V.
Address : Zuiderhoutlaan 4
Postal code : 2012 PJ
City : Haarlem
PO-box : --
Postal code : --
City : --
Country : --
Telephone number : +31 23 5291893
Telefax number : +31 23 5290156

Test(s) performed

Location : Niekerk
Test(s) started : April 12, 2006
Test(s) completed : April 13, 2006
Purpose of test(s) : Equipment Authorisation (Certification).

Test specification(s) : 47 CFR Part 15 (2006-02-01)

Test engineers : J. Schuurmans, B. Sc.E.E.

Report written by : J. Schuurmans, B.Sc.E.E.

Report date : April 20, 2006

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

This report shall not be reproduced, except in full, without the written permission of TNO Electronic Products & Services (EPS) B.V.
The test results relate only to the item(s) tested.



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

Table of contents

1	General information.....	5
1.1	Product description.....	5
1.1.1	Introduction.....	5
1.2	Related submittal(s) and/or Grant(s).....	5
1.3	Tested system details.....	5
1.3.1	Description of input and output ports.....	5
1.4	Test methodology.....	5
1.5	Test facility.....	6
1.6	Product labeling.....	6
2	System test configuration.....	7
2.1	Justification.....	7
2.2	EUT mode of operation.....	7
2.3	Special accessories.....	7
2.4	Equipment modifications.....	7
2.5	Block diagram of the EUT.....	7
2.6	Schematics of the EUT.....	7
2.7	Part list of the EUT.....	7
3	Radiated emission data.....	8
3.1	Radiated field strength measurements (30 MHz – 1 GHz, E-field).....	8
3.2	Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field).....	9
4	Conducted emission data.....	11
4.1	Conducted emission data of the EUT.....	11
5	List of utilized test equipment.....	12



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

1 General information.

1.1 Product description.

1.1.1 Introduction.

The EUT is part of a identification and timing system. It consists of a decoder, which transmits a 125 kHz signal via a loop antenna, which is typically buried under a finish line. The transmitted signal triggers a transponder, which sends an identification to the decoder. The decoder time stamps the reception of the transponder. The application is in sport events, such as auto racing and track and field. This test report concerns the transponder only. The decoder testst are reported in report with number 06032101.r01

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

Not applicable.

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.

Test item	: 6.78 MHz transponder
Manufacturer	: AMB-IT holding B.V.
Brand	: AMB-IT
Model	: Prochip
Serial number	: LS-58112, CZ-50995
Voltage input rating	: 3.0 VDC
Antenna	: Integral, ferrite core with windings
Frequency	: 6.78 MHz
Remarks	: none

1.3.1 Description of input and output ports.

There are no wired connections to the EUT

1.4 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (2006-02-01), sections 15.205, 15.207, and 15.209.

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 1 and/or 3 meters and/or 10 meters. To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the calculation in appendix 1 has been applied.

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.



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

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>.

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.

A label, in accordance with 47 CFR Part 15.19 (b)(1)(i), shall be 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)(1), 47 CFR Part 15.19 (b)(2) and 47 CFR Part 15.19 (b)(4).



Test specification(s):	47 CFR Part 15 (2006-02-01)
Description of EUT:	6.78 MHz transponder
Manufacturer:	AMB-IT holding B.V.
Brand mark:	AMB-IT
Model:	Prochip
FCC ID:	NXYCHIPX

2 System test configuration.

2.1 Justification.

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 transmits a 6.78 MHz signal. Upon reception of a 125 kHz signal the transponder triggers and sends out a message containing the encrypted transponder number. BPSK is used to modulate the information.

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 Block diagram of the EUT.

The block diagram is available in the technical documentation package which will be submitted to the Commission.

2.6 Schematics of the EUT.

The schematics are available in the technical documentation package which will be submitted to the Commission.

2.7 Part list of the EUT.

The part list is available in the technical documentation package which will be submitted to the Commission.



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

3 Radiated emission data.

3.1 Radiated field strength measurements (30 MHz – 1 GHz, 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	
33.90	19.4	17.4	40.0	-20.6	-22.6	PASS
54.25	19.8	8.3	40.0	-20.2	-31.7	PASS
67.80	17.8	8.3	40.0	-22.2	-31.7	PASS
81.36	14.4	9.4	40.0	-25.6	-30.6	PASS
115.31	18.1	13.6	43.5	-25.5	-30.0	PASS
149.25	16.7	13.7	43.5	-26.8	-29.8	PASS
162.88	14.9	12.9	43.5	-28.6	-30.6	PASS
176.43	12.2	12.2	43.5	-31.3	-31.3	PASS
189.93	8.9	11.9	43.5	-34.6	-31.6	PASS
223.91	14.2	13.2	46.0	-31.8	-32.8	PASS
237.47	14.8	14.8	46.0	-31.2	-31.2	PASS

Table 1: Radiated emissions of the EUT.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, section 15.209, with the EUT tested in active mode.

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. Up to the 10th harmonic of the fundamental emission frequency is investigated, in accordance with 47 CFR 15.33 (a)(1).

Test engineer

signature : 

Name : J. Schuurmans

Date : April 13, 2006



Test specification(s): 47 CFR Part 15 (2006-02-01)
 Description of EUT: 6.78 MHz transponder
 Manufacturer: AMB-IT holding B.V.
 Brand mark: AMB-IT
 Model: Prochip
 FCC ID: NXYCHIPX

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
	1 meters	3 meters				
0.009 - 0.490	<10.0	n.a.	20.5	1	-	48.5 – 13.8 (300 m)
0.490 - 1.705	<10.0	n.a.	19.5	1	-	33.8 - 22.9 (30 m)
1.705 – 30.0	< 10.0	n.a.	19.5	1	-	40 (30 m)
6.78	17.4	6.6	19.6	1	17.3	23.5 (30 m)

Table 2 Radiated emissions of the EUT.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15, sections 15.205 and 15.209, with the EUT operating in continuous transmit mode on 125 kHz, are depicted in table 2.

Notes: -

- A example of a calculated measurement result can be found in Appendix 1.
- Frequency range: 9-90 kHz Average detector used during measurements
- Frequency range: 110-490 kHz Average detector used during measurements
- Frequency range 1.76 – 10 MHz Average detector used to measure the fundamental frequency of the emission.
- The limit for emission is 460/6.78 microvolts per meter, because the band width of the emission is less than 10% of the center frequency. See figure 1 on the next page.
- n.a. indicates that no field strength values could be measured on the listed frequencies or in the listed frequency range
- Field strength values of radiated emissions at frequencies not listed in table 3 are more than 20 dB below the applicable limit
- The EUT was varied in three positions, the loop antenna was varied in two orientations. The reported value is the worst case found at the reported frequency.
- The emissions up to the 10th harmonic were investigated, in accordance with 47 CFR 15.33 (a)(1).
- The fundamental frequency component of the emission remains unaffected in frequency when varying supply voltage in accordance with 47 CFR 15.31 (e)

Test engineer

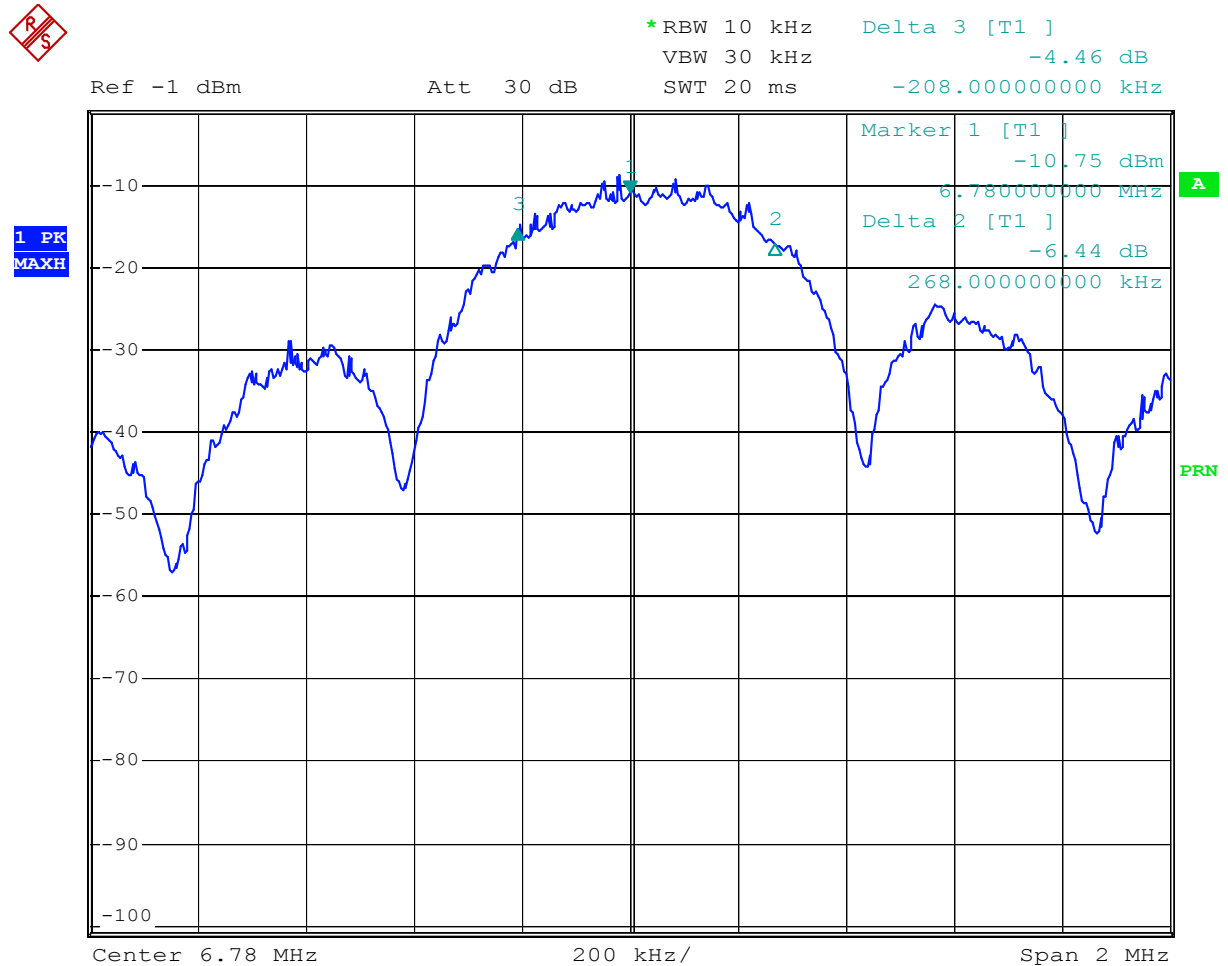
Signature

Name : J. Schuurmans

Date : April 12, 2005



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX



Date: 13.APR.2006 10:46:03

Figure 1: Band with of the emission (determined at the points 6 dB down from the modulated, in accordance with 47 CFR 15.223 (a)) is 460 kHz.



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

4 Conducted emission data.

4.1 Conducted emission data of the EUT.

The conducted emission measurement is not applicable since the EUT is battery operated only

Test engineer

Signature : 

Name : J. Schuurmans

Date : April 13, 2006



Test specification(s): 47 CFR Part 15 (2006-02-01)
Description of EUT: 6.78 MHz transponder
Manufacturer: AMB-IT holding B.V.
Brand mark: AMB-IT
Model: Prochip
FCC ID: NXYCHIPX

5 List of utilized test equipment.

inventory nr.	description	brand	model	serial	date last cal	date cal due
12476	Tripod	Emco	TR3	-	00/01/1900	00/01/1900
12491	Measuring receiver	Rohde & Schwarz	ESH3	891806/004	11/03/2005	12/03/2006
12493	Spectrum monitor ESH3	Rohde & Schwarz	EZM	891979/018	-	-
12512	LISN FCC 50 uH / 50 ohm	Emco	3725/2	8812-2027	29/11/2005	01/12/2007
12605	Calibrated Dipole	Emco	3121c	300	11/09/2002	15/09/2007
12636	OATS plastic cover	Polyforce	11088	-	-	-
13313	Pulse limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	22/02/2006	23/02/2007
15633	Biconilog OATS	Chase	CBL6111B	1278	14/07/2005	15/07/2006
15667	Measuring receiver	Rohde & Schwarz	ESCS30	123987	21/03/2005	22/03/2006
99055	Support 1 m	NMi Certin B.V.	-	-	-	-
99061	Support 150cm	NMi Certin B.V.	Support 150	-	-	-
99077	Variac 250V 6A	RFT	LTS006	831347	-	-
99112	Tripod	Chase	CAS6012	-	-	-
99538	Spectrum analyzer	Rohde & Schwarz	FSP40	100007	09/02/2006	10/02/2007



Appendix 1

Calculated measurements results radiated field strength, H-Field

General Formula:

d_1 = short distance

d_2 = long distance

So: $(d_1/d_2)^n = H_{d2}/H_{d1}$
 $n \log(d_1/d_2) = \log(H_{d2}/H_{d1})$

Measured field strength at 125 kHz:

$$H_{1m} = 38.0 \text{ dB}\mu\text{V/m} = 79.4 \text{ }\mu\text{V/m}$$

$$H_{3m} = 27.2 \text{ dB}\mu\text{V/m} = 22.9 \text{ }\mu\text{V/m}$$

$$n = \log(H_{d2}/H_{d1}) / \log(d_1/d_2)$$

$$n = \log(22.9/79.4) / \log(1/3)$$

$$n = 1.03$$

Calculated field strength at 6780 kHz (3m --> 30m):

$$H_{300m} = H_{d2}, H_{10m} = H_{d1}$$

$$n \log(d_1/d_2) = \log(H_{d2}/H_{d1}) \Rightarrow H_{d2} = H_{d1} (d_1/d_2)^n$$

$$H_{300} = 7.37 \text{ }\mu\text{V/m} = 17.3 \text{ dB}\mu\text{V/m}$$