Nederlands Meetinstituut

Testing and certification of, consultancy and research concerning, electronic and electric appliances, systems, installations and telecommunication systems

EMISSION MEASUREMENTS IN ACCORDANCE WITH FCC PART 15 AND ANSI C63.4-1992 ON A BEACON FOR LAPTIMING ON RACE TRACKS, BRAND AMB PRODUCTS, TYPE ACTIVE LOOP.

FCC report layout endorsed by the FCC by Public Notice of March 11, 1992.

Accredited by	:STERLAB accreditation number L029 D.A.R., TTI-P-G.127/96-00
Competent body	:Article 10-2 EMC Directive
Notified body nr. 0122	:Article 10-5 EMC Directive Low Voltage Directive TTE Directive
Certification body	:Electrical Products Safety regulation, Hong Kong
Designated laboratory	:TTE Directive
Notified test service	:Automotive Directive
FCC listed	:31040/SIT
VCCI registered	:R-592 C-607

Nederlands Meetinstituut
P.O. Box 15
9822 ZG Niekerk (NL)
Smidshornerweg 18
9822 TL Niekerk (NL)

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

E-mail: NMi@NMi.nl

NMi B.V. (Chamber of Commerce Haaglanden No. 27228701)

Offices:
Delft, Bergum, Dordrecht, Niekerk, Utrecht, Tinton Falls NJ (USA), Kawasaki (Japan), Hortolândia SP (Brazil)

Subsidiary companies:
NMi Certin B.V. (27233418)
NMi Van Swinden Laboratorium B.V. (27228703)
NMi International B.V. (27239176)

MEASUREMENT/TECHNICAL REPORT

AMB i.t. Holding B.V.

FCC ID: NXYACTIVE

Date: April 4, 2000

This report concerns: ~~Verification~~ / ~~Notification~~ / Certification Equipment type: Intentional radiator			
Deferred grant requested per 47 CFR 0.457(d)(1)(ii) No If yes defer until: not applicable			
Transition Rules Request per 15.37: No If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR (10-01-93 Edition) provision.			
Report prepared by:	Name	:	J.S. Sikkema
	Company name	:	NMi Certin B.V.
	Address	:	Smidshornerweg 18
	Telephone number	:	+ 31 594 505005
	Telefax number	:	+ 31 594 504804
	Mailing address	:	P.O. Box 15
	City/Place/Postal cd.	:	9822 ZG NIEKERK
	Country	:	The Netherlands
	Email	:	et-desk@nmi.nl

The data taken for this test and report herein was done in accordance with FCC Part 15 and ANSI C63.4-1992 measurements. NMi Certin B.V.. location 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 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 4, 2000 Signature:

P.A.J.M. Robben, B.Sc.E.E.
Department EMC and Telecommunication

Table of contents

1 General Information.

1.1 Product description.

The product tested is a beacon for laptiming on race tracks, brand AMB, type Active Loop. This beacon is intended to function as a 125 kHz beacon for use in kart races to trigger a laptimer fitted to a kart passing the detection loop. The loop (wires 60 cm/ 2 feet apart) are embedded about 2.5 cm/ 1 inch deep in the track surface.

The beacon for laptiming on race tracks, brand AMB, type Active Loop will be used to trigger the AMB DisplayIT mounted on a kart. The AMB DisplayIT itself is not a part of the system and therefore not included in this testreport.

The beacon for laptiming on race tracks, brand AMB, type Active Loop can also be included in an existing AMB TranX detection loop. Special Active Loop upgrade is designed to let an existing AMB TranX detection loop function normally, but function as well as a beacon for the AMB DisplayIT.

1.2 Related Submittal(s)/grant(s).

The beacon for laptiming on race tracks, brand AMB, type Active Loop can also be included in an existing AMB TranX detection loop system. The related submittals/grants for the detection loop system are: FCC ID: NXYTRANX (Transponder TranX 160/260), FCC ID: NXYTRANKART (Transponder TranX 120) and FCC ID: NXYTRANXREC (TranX decoder).

1.3 Test Methodology.

The Test methodology of ANSI C63.4-1992 has been applied to provide adequate measuring data.

Complete data of the tested model has been recorded.

According to FCC Part 15, § 101 the EUT shall be classified as an intentional radiator and is therefore subject to certification.

1.4 Test facility.

The FCC has per Public Notice declared that the measurement facilities located at the NMi Certin B.V. testsite Niekerk, Smidshornerweg 18, The Netherlands, have been reviewed and found to be in compliance with the requirements of section 2.948 (previously section 15.38) of the FCC rules per August 4, 1994.

The description of the measuring facilities have been filed with reference 31040/SIT, 1300B3 at the FCC's Offices.

1.5 List of measurement equipment.

NMi number	Description	Marketing name	Type
12471	Biconical antenna 20MHz - 200MHz	Eaton	94455-1
12473	Log-per antenna 200MHz - 1000MHz	Eaton	96005
12507	Artificial mains network 3-phase	Rohde & Schwarz	ESH2-Z5
12636	Plastic measurement room	Polyforce	--
13313	Impuls limiter	Rohde & Schwarz	ESH3Z2.357...
13886	Open Area Test Site	Comtest	--
14277	Antennamast 4m	Heinrich Deisel	HD100
14278	Controller OATS	Heinrich Deisel	MA240
14340	Biconilog antenna 20MHz - 1100MHz	EMCO	3143
15667	Measuring receiver 9kHz - 2750MHz	Rohde & Schwarz	ESCS30
15453	Magnetic loop	Chase	--
99108	Turntable OATS	Heinrich Deisel	HD050
99115	Voltage probe	Schwarzbeck	TK9416

1.6 Bandwidth and antenna factors.

The utilized measuring equipment is stated in § 1.5. The bandwidth of the receiver switches automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. Also the antennafactors are included in the testreceiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate correction factor for the cable loss. The total correction is automatically added to the measured value.

2 Product labelling.

The following text shall be attached to the EUT, by means of a label, or -in case the enclosure is too small- on a prominent location in the users manual.

FCC ID: NXYACTIVE
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.

The dimensions of the label, the location of the label and the type of font can be found in the FCC regulation book CFR 47, parts 0 to 19, revised as per October 1, 1993.

3 System test configuration.

3.1 Justification.

During all measurements the beacon was transmitting continously. The RF signal, generated by the beacon, is a CW signal.

In accordance with § 11.2.4. of ANSI C63.4-1992 the placing and manipulation of interface cables has been carried out.

3.2 Equipment modifications.

Not applicable.

3.3 Description of tested EUT.

Unit title	:	125 kHz beacon
Model number	:	Active Loop
Part number	:	Not applicable
FCC ID number	:	NXYACTIVE
Frequency range	:	125 kHz
Description/details	:	see section 3.1 of this report and exhibits to the application
Power supply	:	AC/DC adapter
Clock Oscillator(s)	:	8 MHz Xtal
Cabinet & Screening	:	Plastic
Interface Cable(s)	:	+13.6 VDC power supply cord, coax cable to decoder, loop wire (antenna loop)
Method of screening	:	Not applicable
Method of grounding	:	Not applicable
Operating configuration	:	beacon is continously transmitting

Applicant's representative	:	F. Hin
Company	:	AMB i.t. B.V.
Address	:	Herenweg 29A
Postal code and city	:	2105 MB HEEMSTEDE
Country	:	The Netherlands
Telephone number	:	+31 (0)23 5291893
Telefax number	:	+31 (0)23 5290156

4 Conducted and radiated measurement photos.

On pages 9,10 and 11 the conducted and radiated emission measurements photos are given:

Page 9 & 10: Active Loop (radiated emission, front/back)
Page 11: Active Loop (conducted emission, front/back)

5 Conducted emission data.

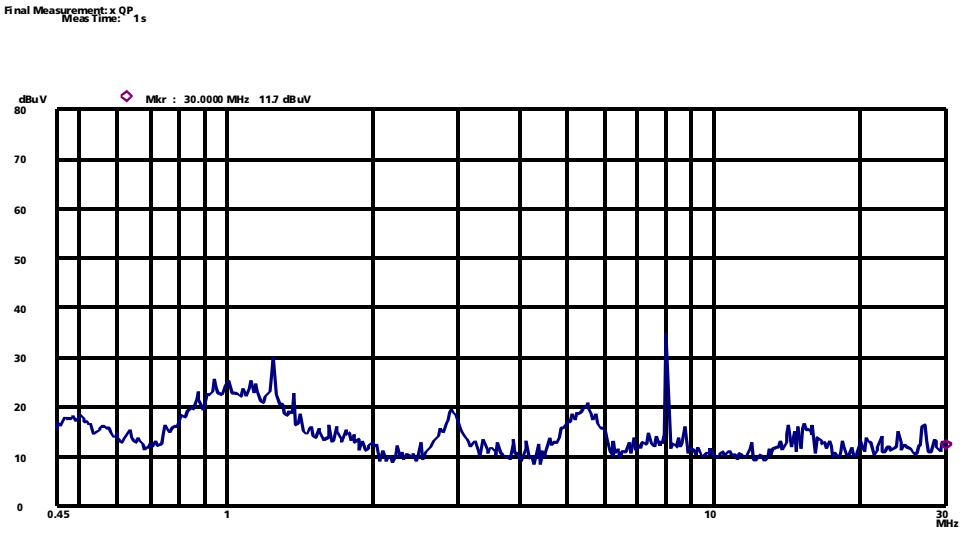


Figure 1

QP = Quasi-peak

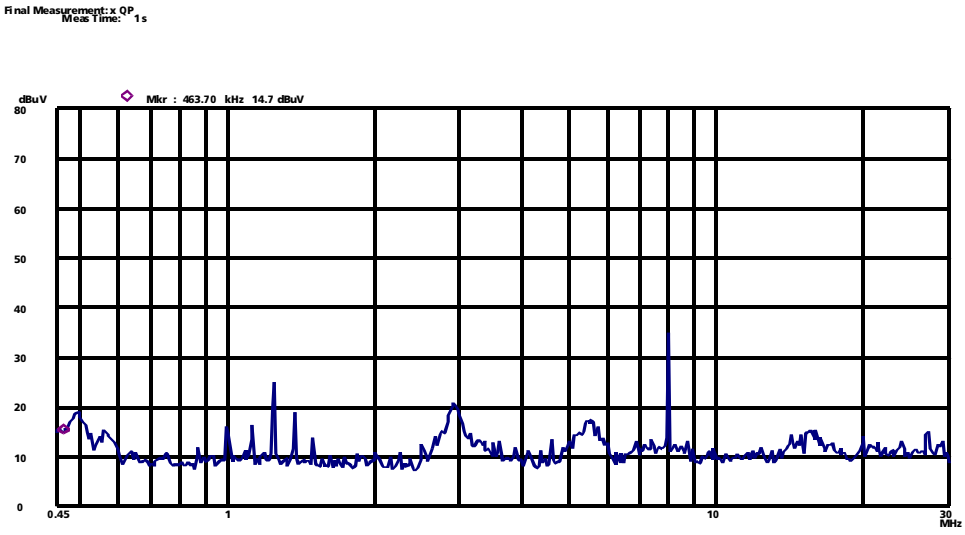


Figure 2

QP = Quasi-peak

Frequency (MHz)	Measurement results dB(µV) Line 1	Measurement results dB(µV) Line 2	Limits dB(µV) section 207	Result
	QP	QP	QP	
0.45 – 8.01	< 30.0	< 30.0	48.0	PASS
8.01	35.2	36.1	48.0	PASS
8.01 – 30.0	<20.0	<20.0	48.0	PASS

QP = Quasi-peak
Measured levels on frequencies not stated in this report have been measured more than 15 dB below the applicable limit.

Table 1

The results of the disturbance voltage level measurements at the AC mains connection terminal **LINE and NEUTRAL** of the beacon for laptiming on race tracks, brand AMB, type Active Loop, carried out in accordance with FCC Part 15, section 207 and ANSI C63.4-1992, are plotted in figure 1 and 2 and are depicted in table 1. Measurement results are quasi-peak results.

Test engineer : J.S. Sikkema

Tester signature : Date: February 10, 1999

6 Radiated emission data.

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

Frequency (MHz)	Measurement results dB(µV)/m 3 metres QP		Limits dB(µV)/m @ 3 metres QP
	Vertical	Horizontal	section 209
30.0 - 88.0	< 20.0	< 20.0	40,0
100.0	31.1	< 20.0	43.5
140.0	27.2	28.1	43,5
180.0	25.0	20.1.	43,5
216.0 - 425.0	< 20.0	< 20.0	46.0
425.0 - 630.0	< 25.0	< 25.0	46.0
630.0 - 960.0	< 30.0	< 30.0	46.0
960.0 - 1000.0	< 31.0	< 31.0	54.0

QP = Quasi-peak
Measured levels on frequencies not stated in this report have been measured more than 20 dB below the applicable limit.

Table 2

Results of the radiated field strength (E-field) measurements on the beacon for laptiming on race tracks, brand AMB, type Active Loop, carried out in accordance with FCC Part 15, section 209 and ANSI C63.4-1992 in the configuration and operation mode(s) as stated in this testreport, are depicted in table 2. Measurement results are quasi-peak results.

Test engineer : J.S. Sikkema

Tester signature : Date: February 10, 1999

6.2 Radiated field strength measurement (9 kHz - 30 MHz, H-field)

Frequency	Measurement results (QP) 3m	Measurement results (QP) 10m	Antenna factor	Cable loss	Measurement results (QP)	Limits FCC Part 15 section 209
(MHz)	dBµV	dBµV	dB	dB	(dBµV/m)	(dBµV/m)
0.009 – 0.125	<10.0	< 5.0	20.9 – 20.1	1	<10.0 @ 300 m	48.5 – 19.2 (300 m.)
0.125	120.1	86.6	20.1	1	13.2 @ 300 m	25.7 (300 m.)
0.375	62.3	30.0	20.0	1	<10.0 @ 300 m	16.1 (300 m.)
0.375 – 0.490	<10.0	< 5.0	20.0	1	<10.0 @ 300 m	16.1 – 13.8 (300 m.)
0.490 – 1.705	<10.0	<5.0	19.9 – 19.7	1	<10.0 @ 30 m	33.8 - 22.9 (30 m.)
1.705 – 30.000	<10.0	<5.0	19.7 – 19.4	1	<10.0 @ 30 m	29.5 (30 m.)

QP = Quasi-peak
Measured levels on frequencies not stated in this report have been measured more than 20 dB below the applicable limit.

Table 3

Results of the radiated field strength (H-field) measurements, carried out in accordance with FCC Part 15, section 209 (Edition 10-1-93) and ANSI C63.4-1992, on a the beacon for laptiming on race tracks, brand AMB, type Active Loop, are depicted in table 3.

Notes: -Frequency range: 9-90 kHz Average detector used during measurements
110-490 kHz Average detector used during measurements

-The radiated field strengths were measured at a distance of 3 and 10 metres.

-The calculation for determining field strength @ 300 metres can be found in appendix B.

-A plot of the carrier bandwidth can be found in appendix A.

Test engineer : J.S. Sikkema

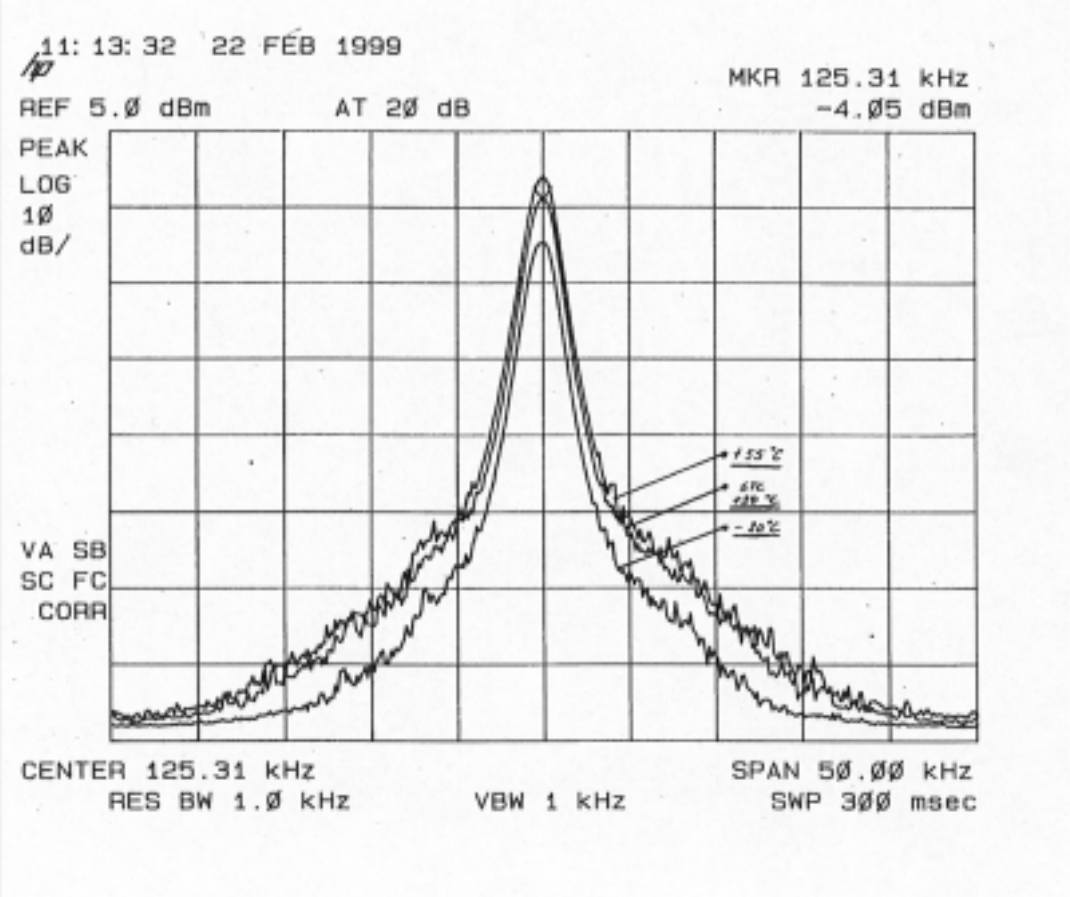
Tester signature : Date: February 10, 1999

7 Photos of tested EUT.

Not applicable, see § 4 of this report.

APPENDIX A

Plots of carrier bandwidth



Plot 1 - Carrier bandwidth beacon, type Active Loop

APPENDIX B

Method of field strength calculations

General formula:

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

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

Measured field strength at 125 kHz:

H_{3m} = 141.2 dBµV/m = 11481536.2 µV/m

H_{10m} = 107.7 dBµV/m = 242661.0 µV/m

n = 3.2

Calculated field strength at 125 kHz (10m --> 300m):

H_{300m} = 4.6 µV/m = 13.2 dBµV/m