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 OF A LAPTIMING TRANSPONDER, BRAND DE HAARDT, MODELNUMBERS EP-30 AND BP-60.

FCC ID: O8Z69112201

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

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MEASUREMENT/TECHNICAL REPORT

De Haardt Electronic Engineering B.V.

FCC ID: O8Z69112201

Date: September 20, 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			
Report prepared by:	Name	:	D.S. Sariredjo, B.Sc.E.E.
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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: September 20, 2000 Signature:

J.S. Sikkema, B.Sc.E.E.
Department EMC and Telecommunication

Table of contents

1 General Information.

1.1 Product description.

The product tested is part of an inductive laptiming system. The inductive laptiming system may include transponders, brand de Haardt, model number EP-30 and BP-60 and a decoding receiver.

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

-none

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
14277	Antennamast 4m	Heinrich Deisel	HD100
14278	Controller OATS	Heinrich Deisel	MA240
14340	Biconilog antenna 20MHz - 1100MHz	EMCO	3143
12473	Log-per antenna 200MHz - 1000MHz	Eaton	96005
12471	Biconical antenna 20MHz - 200MHz	Eaton	94455-1
12636	Plastic measurement room	Polyforce	-
13886	Open Area Test Site	Comtest	-
99108	Turntable OATS	Heinrich Deisel	HD050
15667	Measuring receiver 9kHz - 2750MHz	Rohde & Schwarz	ESCS30
12507	Artificial mains network 3-phase	Rohde & Schwarz	ESH2-Z5
13313	Impuls limiter	Rohde & Schwarz	ESH3Z2.357...
99115	Voltage probe	Schwarzbeck	TK9416
12470	Magnetic loop antenna 1kHz - 30MHz	Emco	model 6507
12510	FCC LISN	Emco	model 3725/2

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 label is (screen) printed on a plastic material, which is permanently fixed on the topside of the timing transponder. A separate exhibit will be provided to show details.

3 System test configuration.

3.1 Justification.

During all measurements the transponders were transmitting continously. The RF signal, generated by the transponder, is a CW signal. During radiated emission measurements the turntable was rotated in order to find the maximum radiated emission on each frequency.

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.

3.3.1 Transponder EP-30 and EP-60

Unit title	:	7.732 MHz RF Transponder for Laptiming
Model number	:	De Haardt EP-30 and BP-60
Part number	:	Not applicable
FCC ID number	:	O8Z69112201
Frequency range	:	7.732 MHz
Description/details	:	see section 3.1 of this report and exhibits to the application
Power supply	:	8.0 to 12.0 VDC via alternator on kart
Clock Oscillator(s)	:	7.732 MHz
Cabinet & Screening	:	Plastic
Interface Cable(s)	:	Not applicable
Method of screening	:	Not applicable
Method of grounding	:	Not applicable
Operating configuration	:	Transponder is continously transmitting
Applicant's representative	:	J. de Haardt
Company	:	De Haart Electronic Engineering B.V.
Address	:	Pascalweg 24
Postal code and city	:	6662 NX Elst (GLD)
Country	:	The Netherlands
Telephone number	:	+31 (0)481 361 315
Telefax number	:	+31 (0)481 361 356

4 Radiated measurement photos.

On pages 08 to 10 the radiated emission measurements photos are given:

Page 08: EP-30 / BP-60 (radiated emission, x-orientation)

Page 09: EP-30 / BP-60 (radiated emission, y-orientation)

Page 10: EP-30 / BP-60 (Radiated emission, z-orientation)

5 Radiated emission data.

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

5.1.1 EP-30 / BP-60

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
88.0 - 216.0	< 20.0	< 20.0	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 1

Results of the radiated field strength (E-field) measurements on the transponder 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 test report, are depicted in table 1. Measurement results are quasi-peak results.

Test engineer : O. H. Hoekstra Date: July 14, 2000

Tester signature :

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

5.2.1 Radiated field strength x-orientation

Frequency	Measurement results (QP, 10m)	Antenna factor	Cable loss	Measurement results (QP, 30 m.)	Limits FCC Part 15 section 209
(MHz)	dBµV/m	dB	dB	(dBµV/m)	(dBµV/m)
0.009 - 0.490	< -30.0	17	1	< -40.0	48.5 - 13.8 (300 m.)
0.490 - 1.705	< -30.0	17	1	< -40.0	33.8 - 22.9 (30 m.)
1.705 – 7.732	< -30.0	17	1	< -40.0	29.5 (30 m.)
7.732	19.8	17	1	-5.0	29.5 (30 m.)
7.732 – 15.460	< -30.0	17	1	< -40.0	29.5 (30 m.)
15.460	-18.2	17	1	< -40.0	29.5 (30 m.)
15.460 – 23.200	< -30.0	17	1	< -40.0	29.5 (30 m.)
23.200	-21.8	17	1	< -40.0	29.5 (30 m.)
23.200 – 30.000	< -30.0	17	1	< -40.0	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 2

Results of the radiated field strength (H-field) measurements, carried out in accordance with FCC Part 15, section 209 (Edition 10-1-97) and ANSI C63.4-1992, are depicted in table 2.

Orientation of the transponder during measurement was x-orientation.

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 10 and 30 metres.

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

Test engineer : O. H. Hoekstra Date: July 14, 2000

Tester signature :

5.2.2 Radiated field strength y-orientation

Frequency	Measurement results (QP, 10m)	Antenna factor	Cable loss	Measurement results (QP, 30 m.)	Limits FCC Part 15 section 209
(MHz)	dBµV/m	dB	dB	(dBµV/m)	(dBµV/m)
0.009 - 0.490	< -30.0	17	1	< -40.0	48.5 - 13.8 (300 m.)
0.490 - 1.705	< -30.0	17	1	< -40.0	33.8 - 22.9 (30 m.)
1.705 – 7.732	< -30.0	17	1	< -40.0	29.5 (30 m.)
7.732	21.3	17	1	-4.3	29.5 (30 m.)
7.732 – 15.460	< -30.0	17	1	< -40.0	29.5 (30 m.)
15.460	-17.9	17	1	< -40.0	29.5 (30 m.)
15.460 – 23.200	< -30.0	17	1	< -40.0	29.5 (30 m.)
23.200	-19.1	17	1	< -40.0	29.5 (30 m.)
23.200 – 30.000	< -30.0	17	1	< -40.0	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 10-1-97) and ANSI C63.4-1992, are depicted in table 3. Orientation of the transponder during measurement was y-orientation.

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 10 and 30 metres.

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

Test engineer : O. H. Hoekstra Date: July 14, 2000

Tester signature :

5.2.3 Radiated field strength z-orientation

Frequency	Measurement results (QP, 10m)	Antenna factor	Cable loss	Measurement results (QP, 30 m.)	Limits FCC Part 15 section 209
(MHz)	dBµV/m	dB	dB	(dBµV/m)	(dBµV/m)
0.009 - 0.490	< -30.0	17	1	< -40.0	48.5 - 13.8 (300 m.)
0.490 - 1.705	< -30.0	17	1	< -40.0	33.8 - 22.9 (30 m.)
1.705 – 7.732	< -30.0	17	1	< -40.0	29.5 (30 m.)
7.732	20.1	17	1	-6.2	29.5 (30 m.)
7.732 – 15.460	< -30.0	17	1	< -40.0	29.5 (30 m.)
15.460	-18.7	17	1	< -40.0	29.5 (30 m.)
15.460 – 23.200	< -30.0	17	1	< -40.0	29.5 (30 m.)
23.200	-21.3	17	1	< -40.0	29.5 (30 m.)
23.200 – 30.000	< -30.0	17	1	< -40.0	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 4

Results of the radiated field strength (H-field) measurements, carried out in accordance with FCC Part 15, section 209 (Edition 10-1-97) and ANSI C63.4-1992, are depicted in table 4. Orientation of the transponder during measurement was z-orientation.

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 10 and 30 metres.

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

Test engineer : O. H. Hoekstra Date: July 14, 2000

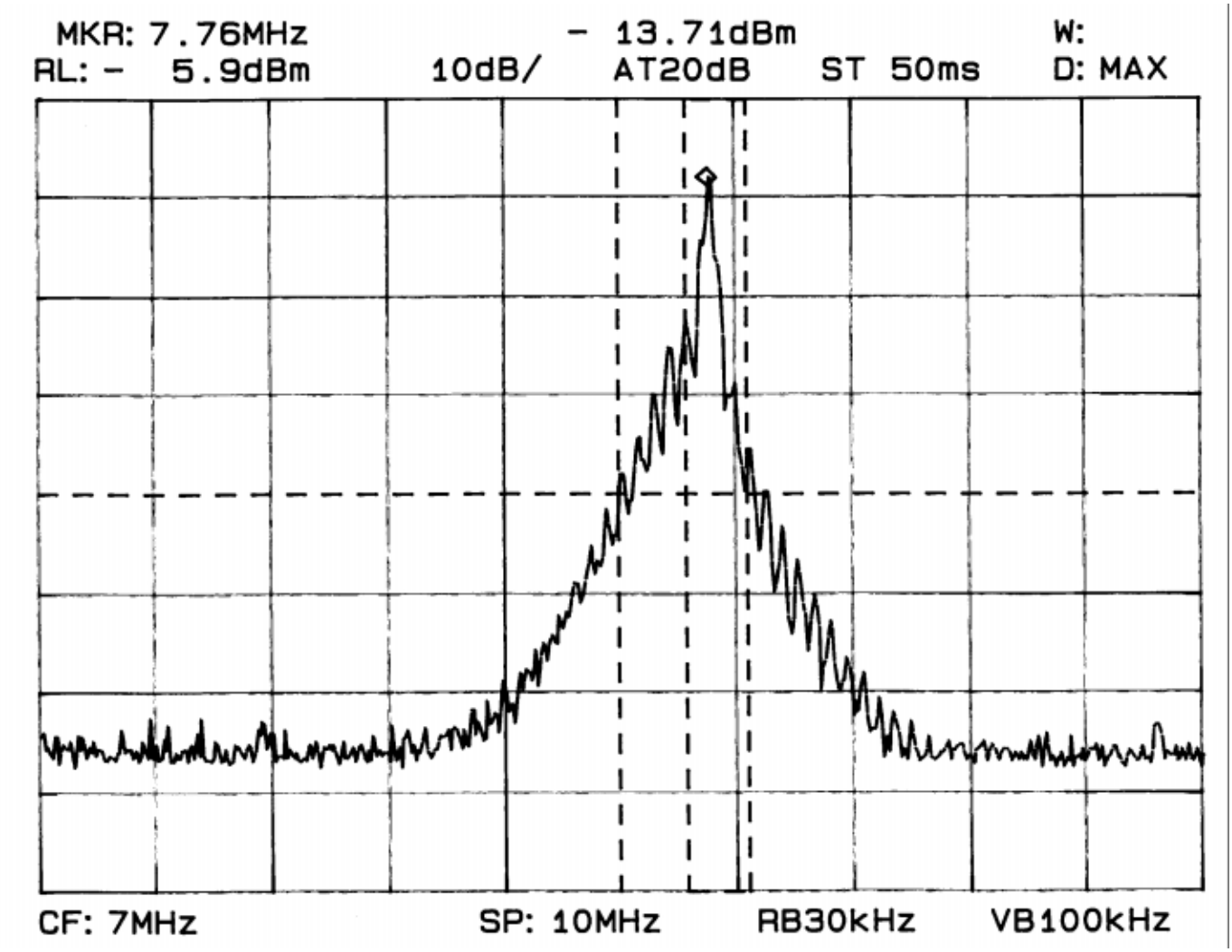
Tester signature :

6 Photos of tested EUT.

Photo's of exterior and interior are included in separate exhibit.

APPENDIX A

Plots of carrier bandwidth



Plot 1 - Carrier bandwidth