EUROFINS PRODUCT SERVICE GMBH

ACCREDITED
TESTING CERT# 1983.01

RF-EXPOSURE ASSESSMENT

FCC 47 CFR 2.1091
IC RSS-102

Measurement probe for water analysis

LXG440

FCC ID: YCB-LXG440
IC: 5879A-LXG440

REPORT NUMBER: G0M-1107-1261-C-2

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TABLE OF CONTENTS

1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

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Operator:

Date	Eurofins-Lab.	Name	Signature
28.07.2011		C. Weber	C. Weber

Technical responsibility for area of testing:

Date	Eurofins	Name	Signature
28.07.2011		J. Zimmermann	J. Z

1.2 Testing laboratory

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DAkkS Accredited Testing Laboratory
DAkkS-Registration number: D-PL-12092-01-01

Recognized notified Body EMC
Registration number: BNetzA-bS EMV-07/61

Recognized notified Body R&TTE
Registration number: BNetzA-bS-02/51-53

FCC filed test laboratory
Reg.-No. 96970

A2LA Accredited Testing Laboratory
Certificate No. 1983.01

Bluetooth Qualification Test Facility (BQTF)
Accredited by Bluetooth Qualification Review Board

Industry Canada filed test laboratory
Reg. No. IC 3470

Test location, where different:

Name	: ./.
Street	: ./.
Town	: ./.
Country	: ./.
Telephone	: ./.
Fax	: ./.

1.3 Details of approval holder

Name	: HACH LANGE GmbH
Street	: Königsweg 10
Town	: 14163 Berlin
Country	: Germany
Telephone	: +49 30 80986.231
Fax	: +49 30 80986.283
Contact	: Herr Florian Eckelmann
Telephone	: +49 30 80986.231

Manufacturer:
(if applicable)

Name	: HACH LANGE GmbH
Street	: Königsweg 10
Town	: 14163 Berlin
Country	: Germany

1.4 Application details

Date of receipt of application	: 20.07.2011
Date of receipt of test item	: 20.07.2011
Date of assessment	: 20.07.2011

1.5 Acronyms and abbreviations

EUT	:	Equipment under Test
TX	:	Transmission
RX	:	Reception
RBW	:	Measurement Resolution Bandwidth
Pol	:	Measurement Polarization
N/A	:	Not applicable

1.6 Reference standards

Technical standards : **FCC 47 CFR 1.1310**
FCC 47 CFR 2.1091
FCC 47 CFR 2.1093

OET Bulletin 65 : ” ***Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Elec tromagnetic Fields*****” 1997**

RSS-102 Issue 4 : “*Radio Frequency (RF) Exposure Com pliance of Radiocommunication Apparatus (All Frequency Bands)*”, 2010

Safety Code 6: “*Limits of Human Exposure to Radiofre quency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz*”, 2009

IEEE C95.3 : “*IEEE Recommended Practice for Measure ments and Computations of Radio Frequency Electro magnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz–300 GHz*”, 2002

Health Canada : “*Technical Guide for Interpretation and Compliance Assessment of Health Canada’s Radiofre quency Exposure Guidelines*”, 2009

1.7 Test item

Description of test item	:	Measurement probe for water analysis
Type identification	:	LXG440
Serial Number	:	1386813 (old DC/DC-Converter Traco) 1386816 (new DC/DC-Converter Peak)
Hardware version	:	XMF785-E
Software version	:	DD 0.7 / AC 0.11
Radiation sources included	:	125kHz RFID
Equipment type	:	End product
Exposure Category	:	Uncontrolled / General public
Device type	:	Mobile

1.8 Referenced documents

None

1.9 Additional information

Two models have been tested and assessed. The model with serial number S/N:1386813 uses the old DC/DC-Converter Traco and the model with serial number S/N: 1386816 uses the new DC/DC-Converter Peak.

2 Exposure Assessment

2.1 Device Types

Fixed

A fixed device is defined as a device physically secured at one fixed location and cannot be easily relocated.

Mobile

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. (47 CFR 2.1091)

Portable

A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. (47 CFR 2.1093)

2.2 Exposure Categories

Occupational / Controlled Exposure

In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks.

General Public / Uncontrolled Exposure

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

2.3 MPE Limits

IC Limits for maximum permissible exposure (MPE)				
Frequency range [MHz]	**Electric field strength [V/m]**	**Magnetic field strength [A/m]**	**Power density [W/m^2]**	**Averaging time [min]**
Limits for Occupational / Controlled Exposure				
0.003 – 1.0	600	4.9		6
1 – 10	600/f	4.9/f		6
10 – 30	60	4.9/f		6
30 – 300	60	0.163	10.0*	6
300 – 1500	$3.54 \cdot f^{0.5}$	$0.0094 \cdot f^{0.5}$	f/30	6
1500 – 15000	137	0.364	50	6
15000 – 150000	137	0.364	50	$616000/f^{0.5}$
150000 – 300000	$0.354 \cdot f^{0.5}$	$9.4 \cdot 10^{-4} \cdot f^{0.5}$	$3.33 \cdot 10^{-4} \cdot f$	$616000/f^{0.5}$
Limits for General Population / Uncontrolled Exposure				
0.003 – 1.0	280	2.19		6
1 – 10	280/f	2.19/f		6
10 – 30	28	2.19/f		6
30 – 300	28	0.073	2.0*	6
300 – 1500	$1.585 \cdot f^{0.5}$	$0.0042 \cdot f^{0.5}$	f/150	6
1500 – 15000	61.4	0.163	10	6
15000 – 150000	61.4	0.163	10	$616000/f^{0.5}$
150000 – 300000	$0.158 \cdot f^{0.5}$	$4.21 \cdot 10^{-4} \cdot f^{0.5}$	$6.67 \cdot 10^{-5} \cdot f$	$616000/f^{0.5}$

* = Power density is applicable at frequencies greater than 100MHz
f in MHz

FCC Limits for maximum permissible exposure (MPE)				
Frequency range [MHz]	**Electric field strength [V/m]**	**Magnetic field strength [A/m]**	**Power density [mW/cm^2]**	**Averaging time [min]**
Limits for Occupational / Controlled Exposure				
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1842/f	4.89/f	(900/f^2)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500			f/300	6
1500 – 100000			5.0	6
Limits for General Population / Uncontrolled Exposure				
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	842/f	2.19/f	(180/f^2)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500			f/1500	30
1500 – 100000			1.0	30

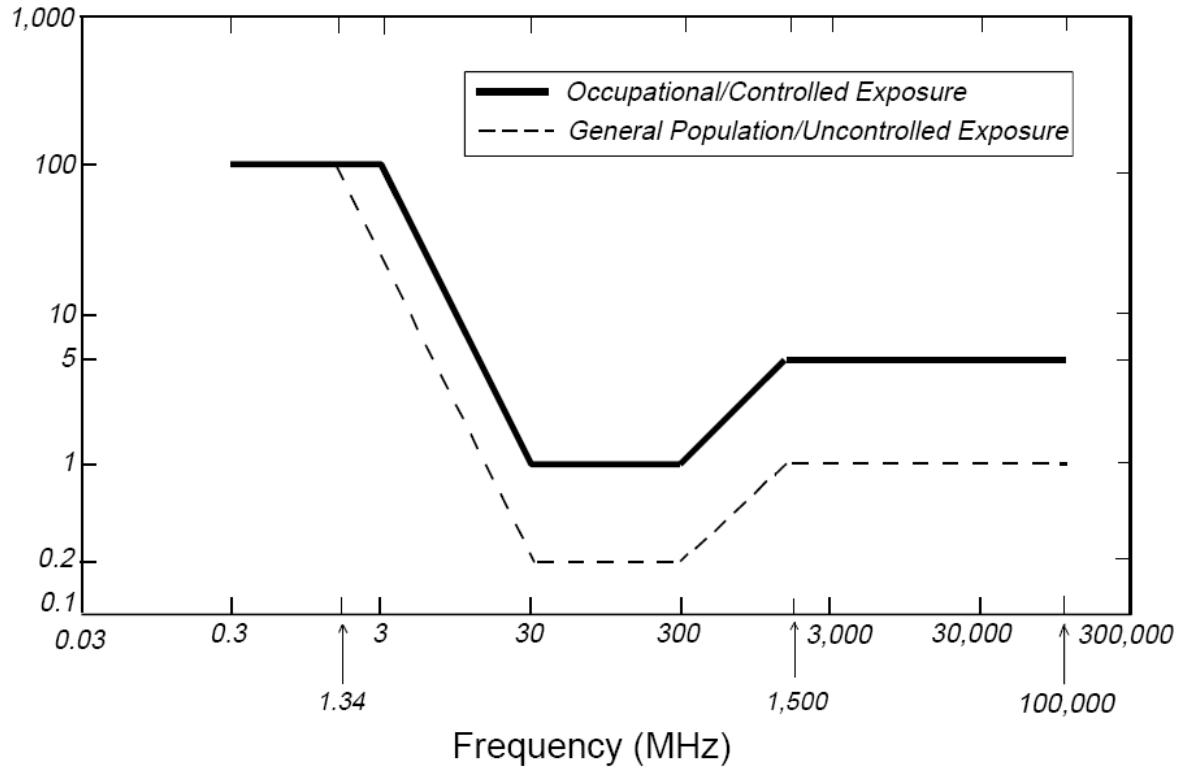
* = Plane-wave equivalent power density
f in MHz
47 CFR 1.1310

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can execise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Figure 1. *FCC Limits for Maximum Permissible Exposure (MPE)*

Plane-wave Equivalent Power Density



2.4 Transmission modes

125kHz RFID	
TX frequency range	125kHz
Channels	1
Modulation	Amplitude
Antenna type	Integrated

2.5 Field strength measurement

The EUT is placed in an anechoic chamber and a field probe is used to scan the vicinity of the device at a separation distance of 20cm. The electric and magnetic field strength levels are measured in peak and average mode. The maximum field strength levels are recorded.

2.6 Test equipment utilized

Measurement Equipment List					
No.:	**Measurement device:**	**Type:**	**Manufacturer:**	**Last Cal.**	**Next Cal.**
ETS 0538	Laser data E-field probe	HI-6105	Holaday Ind.	20.06.2011	20.06.2012
ETS 0309	Fully anechoic chamber	AC 2	Frankonia	12.04.2010	12.04.2013

2.7 Exposure assessment

IC RSS-102 :

Electric Field strength	
DEVICE S/N:1386813	
TX frequency	125kHz
Separation distance	20cm
Max. peak field strength	1.40V/m
Max. avg field strength	0.91V/m
Exposure limit	280V/m
Verdict	**The field strength of the EUT at 20cm is below the IC MPE limit**
DEVICE S/N:1386816	
TX frequency	125kHz
Separation distance	20cm
Max. peak field strength	2.47V/m
Max. avg field strength	1.54V/m
Exposure limit	280V/m
Verdict	**The field strength of the EUT at 20cm is below the IC MPE limit**

Magnetic Field strength	
DEVICE S/N:1386813	
TX frequency	125kHz
Separation distance	20cm
Max. peak field strength	0.037A/m
Max. avg field strength	0.025A/m
Exposure limit	2.19A/m
Verdict	**The field strength of the EUT at 20cm is below the IC MPE limit**
DEVICE S/N:1386816	
TX frequency	125kHz
Separation distance	20cm
Max. peak field strength	0.057A/m
Max. avg field strength	0.036A/m
Exposure limit	2.19A/m
Verdict	**The field strength of the EUT at 20cm is below the IC MPE limit**

FCC 47 CFR 2.1310 :

There are no RF-Exposure limits for frequencies below 300kHz. Since both EUTs operates below 300kHz no restrictions according to the FCC are applicable.