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NUMBER: 905266

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**CENTRO DE  
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## TEST REPORT

**Report No.: 19807RET.101**

**TEST NAME:** FCC PART 15.247 TESTING FOR BLUETOOTH RADIO DEVICE

<b>Product</b>	: BLUETOOTH BOARD-TO-BOARD MODULE
<b>Trade Mark</b>	: BLUEGIGA
<b>Model/type Ref.</b>	: WRAP THOR 2022-1-b2b
<b>Manufacturer</b>	: BLUEGIGA TECHNOLOGIES OY
<b>Requested by</b>	: BLUEGIGA TECHNOLOGIES OY
<b>Other identification of the product</b>	: Unique Product Number (UPN): 20221B2B FCC ID: QOQWRAP2022-1-B2B
<b>Standard(s)</b>	: USA FCC Part 15.247, 15.205, 15.209, 15.109 CANADA RSS-210

This test report includes 2 annexes and therefore the total number of pages is 61.

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Date: 2004-05-31	Test operator	Revised by:	Approved by:
	A. Llamas 	Date: 2004.06.02 A. Rojas EMC Manager	Date: Jun 2nd, 2004 E. Broissin Area Director
 <b>CENTRO DE TECNOLOGÍA DE LAS COMUNICACIONES, S. A.</b>			
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## 1. COMPETENCE AND GUARANTEES

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621.

In order to assure the traceability to other national and international laboratories, CETECOM has a calibration and maintenance programme for its measuring equipment.

CETECOM guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at CETECOM at the time of execution of the test.

CETECOM is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

## 2. GENERAL CONDITIONS

1. This report only refers to the item that has undergone the test.
2. This report does not constitute or imply by its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without written approval of CETECOM.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of CETECOM and the Accreditation Bodies.

## 3. CHARACTERISTICS OF THE TEST

### 3.1 TEST REQUESTED

Measurements for frequency hopping spread spectrum equipment (Bluetooth) operating in the 2400 MHz -2483.5 MHz band and using, according to FCC Part 15.247.

### 3.2 REQUIREMENTS AND METHOD

The test has been carried out according to FCC parts 15.33, 15.35, 15.109, 15.205, 15.209, 15.247 and the document DA 00-705:"Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems".

The testing was performed according to the procedure in ANSI C63.4 (1992). Radiated testing was performed in Cetecom's semi-anechoic chamber. This site has been fully described in a report submitted to the FCC and was accepted in a letter dated July 25, 2002.

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The instrumentation used to perform the testing is listed below:

1. Semianechoic Absorber Lined Chamber IR 11. BS.
2. Control Chamber IR 12.BC.
3. Spectrum Analyzer HP 8566 B.
4. RF Preselector HP 85685A.
5. Quasi-peak adaptor HP 85650A.
6. RF linear amplifier HP 8447.F
7. Antenna mast EM 1072 NMT.
8. Rotating table EM 1084-4. ON.
9. Mast controller EM 1053-22.
10. Rotating table controller EM 1064-4023.
11. Process controller HP 98581C.
12. Harddisk HP 9153.
13. Peripheral unit HP 9153 C.
14. Measurement software HP 85879A.
15. 3 dB attenuator HP 8491A.
16. Bilog antenna CHASE CBL6111.
17. Bilog antenna CHASE CBL6111.
18. Antenna tripod EMCO 11968C.
19. Double-ridge Guide Horn antenna 1-18 GHz HP 11966E.
20. Double-ridge Guide Horn antenna 18-40 GHz Agilent 119665J.
21. Switch Unit with RF pre-amplifiers R&S TS8930SU.
22. RF pre-amplifier Miteq JS4-12002600-30-5A.
23. EMI Test Receiver R&S ESIB26.

#### 4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

Identification data in this section has been supplied by the client.

##### 4.1 APPLICANT

**Name or Company:** BLUEGIGA TECHNOLOGIES OY

**V.A.T.:** F10934238-1

**Address:** Sinikalliontie, 11

**City:** Espoo

**Postal code:** 02631

**Country:** FINLAND

**Telephone:** +358 408483339

**Fax:** +358 941240452

##### 4.2 REPRESENTATIVE

**Name:** Mikael Björkas

##### 4.3 TEST SAMPLES SUPPLIER

**Name or Company:** Same as indicated in point 4.1.

Samples undergoing test have been selected by: **the client.**

##### 4.4 IDENTIFICATION OF ITEM/ITEMS TESTED

**Product:** BLUETOOTH BOARD-TO-BOARD MODULE

**Trade mark:** BLUEGIGA

**Model:** WRAP THOR 2022-1-b2b

**Manufacturer:** BLUEGIGA TECHNOLOGIES OY

**Country of manufacture:** FINLAND

**Manufacture site:** Data not available

**Description:** Bluetooth plug and play Class 1 module with integrated antenna and physical connector.

## 5. USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS

### 5.1 USAGE OF SAMPLES

Sample M/01 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
19807/08	Bluetooth Headset with integral antenna	WRAP THOR 2022-1-b2b	---	10/02/04

Sample M/02 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
19807/03	Bluetooth Headset with antenna connector	WRAP THOR 2022-1-b2b	---	10/02/04

1. Sample M/01 has undergone following test(s).  
Radiated measurements indicated in annex A.
2. Sample M/02 has undergone following test(s).  
All tests indicated in annex A, except radiated measurements.

### 5.2 PERIOD OF TESTING

The performed test started on 2004-02-17 and finished on 2004-02-25.

The tests as detailed in this report have been performed at CETECOM.

### 5.3 ENVIROMENTAL CONDITIONS

In the control chamber the following limits were not exceeded during the test:

Temperature	Min. = 24.8 °C Max. = 25.0 °C
Relative humidity	Min. = 41.1 % Max. = 42.0 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters) the following limits were not exceeded during the test.

Temperature	Min. = 18.8 °C Max. = 19.0 °C
Relative humidity	Min. = 47.4 % Max. = 47.5 %
Air pressure	Min. = 1008 mbar Max. = 1010 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k $\Omega$
Reference resistance to earth	< 0,5 $\Omega$
Normal site attenuation (NSA)	< $\pm 4$ dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	Min. = 26 °C Max. = 27 °C
Relative humidity	Min. = 52 % Max. = 53 %
Air pressure	Min. = 1008 mbar Max. = 1010 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k $\Omega$
Reference resistance to earth	< 0,5 $\Omega$



## 6. TEST RESULTS

Abbreviations used in the VEREDICT column of the following tables are:

<b>P</b>	Pass
<b>F</b>	Fail
<b>NA</b>	not applicable
<b>NM</b>	not measured

FCC PART 15 PARAGRAPH	VERDICT			
	NA	P	F	NM
15.247 Subclause (a) (1). 20 dB Bandwidth and Carrier frequency separation		P		
15.247 Subclause (a) (1) (iii). Number of hopping channels		P		
15.247 Subclause (a) (1) (iii). Time of occupancy (Dwell Time)		P		
15.247 Subclause (b). Maximum peak output power and antenna gain		P		
15.247 Subclause (c). Band-edge of conducted emissions (Transmitter)		P		
15.247 Subclause (c). Emission limitations conducted (Transmitter)		P		
15.247 Subclause (c). Emission limitations radiated (Transmitter)		P		
15.109. Receiver spurious radiation		P		

## 7. REMARKS AND COMMENTS

None.

## 8. SUMMARY

Based on the results of the performed test, stated in annex A the item under test is **IN COMPLIANCE** with the specifications listed in section 3.1 "TEST REQUESTED".

NOTE: The results presented in this Test Report apply only to the particular item under test declared in section 4.4 "IDENTIFICATION OF ITEM/ITEMS TESTED" of this document, as presented for test on the date(s) declared in section 5, "USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS".

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# ANNEX A

## TEST RESULTS

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Annex A

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