



CERTIFICADO DE CONFORMIDAD

con los requisitos de la norma FCC 47 CFR Parte 15, Subparte B (Ed. 22/07/2003)

Certificate of Conformity

with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (2003/07/22 Ed.)

Nº.: 19807CAB.001

Certificado solicitado por Holder of Certificate	: BLUEGIGA TECHNOLOGIES OY.
Fabricante Manufacturer	: BLUEGIGA TECHNOLOGIES OY
Informe(s) técnico(s), fecha Technical report(s), date	: Informe de ensayo de EMC / EMC Test Report: 19807REM.001 (2003/05/31)
Identificación del producto Product identification	: MODULO BLUETOOTH B2B. MODELO: WRAP THOR 2022-1-b2b. BLUETOOTH BOARD TO BOARD MODULE. MODEL: WRAP THOR 2022-1-b2b.

Este Certificado de Conformidad se ha emitido de acuerdo con la decisión Nº 3/2000 de la Comisión Mixta establecida bajo los Acuerdos de Reconocimiento Mutuo entre la Unión Europea y Estados Unidos de América. Mediante esta decisión, CETECOM puede actuar como Organismo de Aseguramiento de la Conformidad (CAB) en materia de Compatibilidad Electromagnética. Este certificado se aplica a las muestras referidas en los informes técnicos mencionados.

This certificate of conformity was issued in accordance with the decision Nº 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, CETECOM can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

Málaga, 2004.05.31

Fdo. / Signed:
Francisco A. Broissin
Director Laboratorios / Laboratory Manager

CETECOM
CENTRO DE TECNOLOGIA
DE LAS COMUNICACIONES, S. A.

TEST REPORT

Report No.: 19807REM.001**TEST NAME: ELECTROMAGNETIC COMPATIBILITY TESTS**

Product : BLUETOOTH BOARD-TO-BOARD MODULE
Trade Mark : BLUEGIGA
Model/ type Ref. : WRAP THOR 2022-1-b2b
Manufacturer : BLUEGIGA TECHNOLOGIES OY
Requested by : BLUEGIGA TECHNOLOGIES OY
Other identification of the product : A bluetooth plug 'n' play Class 1 module with integrated antenna and physical connector.
Prototype
Standard(s) : On the sample S/02:
ELECTROMAGNETIC EMISSION.
- FCC Rules and Regulations 47 CFR Part 15, Subpart B (2003/07/22 Ed.); Continuous Conducted Emission (Class B).

This test report includes 1 annex and therefore, the total number of pages is 15.

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Date: 2004-05-31	Test operator: Rafael López 	Revised by: Date: 2004.05.31 Antonio Rojas Area Manager	Approved by: Date: 2004.05.31 Francisco Broissin Division Director	Page: 1 of 7
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1. COMPETENCE AND GUARANTEES

This certificate of conformity was issued in accordance with the decision N° 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, CETECOM can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

CETECOM is a testing laboratory competent to carry out the tests described in this report.

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

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

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

2. GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on 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 previous written permission of CETECOM.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of CETECOM and the Accreditation Bodies.

3. CHARACTERISTICS OF THE TEST

3.1. SERVICES REQUESTED

The ordered services were to carry out the following tests:

1. Continuous conducted emission, power leads:
Standard: FCC Rules and Regulations 47 CFR Part 15
Limit: Class B
Method: FCC Rules and Regulations 47 CFR Part 15, Subpart B

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3.2. REQUIREMENTS AND METHOD

The test has been carried out according to the following documents and standards:

1. FCC Rules and Regulations 47 CFR Part 15, Subpart B: Limits and methods of measurements for radio frequency devices, Unintentional radiators.

The testing procedures used are:

1. PEEM001: Medida de la tensión perturbadora en bornes de alimentación según EN 55022.

Uncertainty (factor k=2) was calculated according to the following CETECOM's internal documents:

1. PODT000: Procedimiento para el cálculo de incertidumbres de medida
2. FEM12_07: Formato de cálculo de incertidumbre a aplicar en la medida de la tensión perturbadora en bornes de alimentación según EN 55022.

4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

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

4.1. APPLICANT

Name / Company: Bluegiga Technologies Oy

V.A.T. Registration number / Passport number: F-10934238

Address: Sinikalliontie, 11, Espoo, P.C.: 02631

Country: Finland

Telephone: +358 40 848 3339

Fax: +358 9 4124 0452

Contact person: Mikael Björkas

4.2. TEST SAMPLES SUPPLIER

The same as the applicant.

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

4.3. 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 address: Sinikalliontie 11, Espoo

Other identification remarks : Prototype.

Description: A bluetooth plug 'n' play Class 1 module with integrated antenna and physical connector.

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5. USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS

5.1. USAGE OF SAMPLES

Sample S/02 is composed of 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 module with shielding	Wrap Thor 2022-1-b2b	Prototype	10/02/04
19807/19	BTBM Test board 2	---	20030813	23/02/04
19456/02	AC/DC Adapter	FW7207/08	----	07/11/03

During the tests were used next ancillary equipment:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
19786/11	AC/DC Adapter	PSA11R-120	----	10/02/04
19786//18	Bluetooth Access Server	Wrap 2293	0401200036	10/02/04
19807/12	Battery	----	----	19/02/04
19807/15	Wireless Remote Access Platform	Wrap 2280	0304290031	19/02/04
----	Portatil computer	TravelMate 212T	9140R01R0S14 00002EK000	----

Different samples were used in the following way:

1. Sample S/02 has undergone to the following test(s):
 1. Continuous conducted emission, power leads

5.2. TESTING PERIOD

The performed test started on 2004/02/27 and finished the same day.

The tests have been performed at CETECOM.

5.3. ENVIROMENTAL CONDITIONS

Environmental conditions:

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 80 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ

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Reference resistance to earth	< 0,5 Ω
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In the semianechoic chamber (21 meters x 11 meters x 8 meters), the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k Ω
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< 14 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. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k Ω
Reference resistance to earth	< 0,5 Ω

6. TEST RESULTS

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

P	Pass
F	Fail
NA	not applicable
NM	not measured

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6.1. RESULTS FOR ELECTROMAGNETIC EMISSION

See Annex: A

MEASURING RESULTS FOR ELECTROMAGNETIC EMISSION	VERDICT			
	NA	P	F	NM
Continuous conducted emission, power leads Class B.		P		

7. REMARKS AND COMMENTS

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 150 kHz to 30 MHz is 1 ± 3 dB for quasi-peak measurements, $1 \pm 2,8$ dB for peak measurements ($k = 2$).

8. SUMMARY

Considering 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 established in section "4.3. IDENTIFICATION OF ITEM/ITEMS TESTED" of this document, as presented for test on the date(s) shown in section 5, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

ANNEX A

MEASURING RESULTS FOR ELECTROMAGNETIC EMISSION

For the sample under test, named S/02, and that was formed by the elements described in the clause "Identification of the tested item/items" of this test report.

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1. - CONTINUOUS CONDUCTED EMISSION, POWER LEADS	2
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1. - CONTINUOUS CONDUCTED EMISSION, POWER LEADS

LIMITS OF INTERFERENCE

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (2003/07/22 Ed.) in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0,15 to 0,5	66-56	56-46
0,5 to 5	56	46
5 to 30	60	50

TEST METHOD

According to Part 15, Subpart B of FCC Rules (2003/07/22 Ed.)

OPERATING MODES OF EUT

Different tested operating modes (OM)

- OM#01: EUT ON. Stand by. Idle mode.
- OM#02: EUT ON. Communication bluetooth established.

TEST RESULTS

CCmmnnxx: CC, Conduction condition^a; mm: sample number; nn: operation mode; xx: wire.

- OM#01.

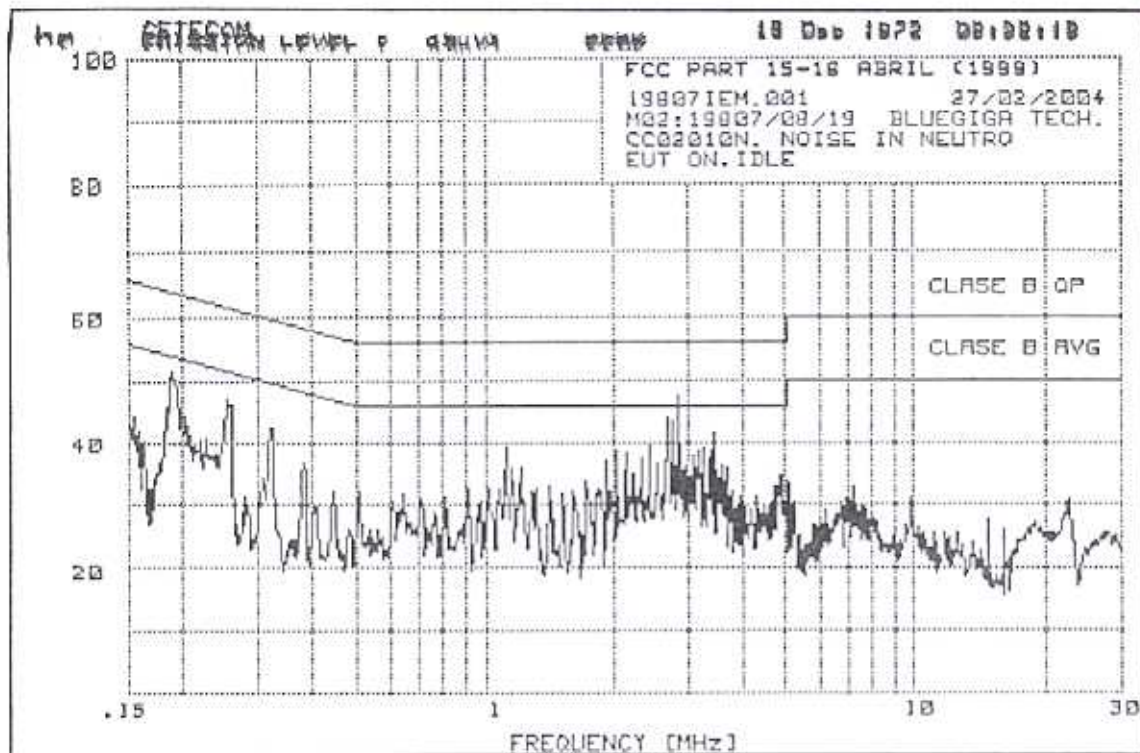
CDmmnnxx	Description	Result
CC02010N	Interference voltage on N wire	PASS
CC0201L1	Interference voltage on L1 wire	PASS

- OM#02.

CDmmnnxx	Description	Result
CC02020N	Interference voltage on N wire	PASS
CC0202L1	Interference voltage on L1 wire	PASS

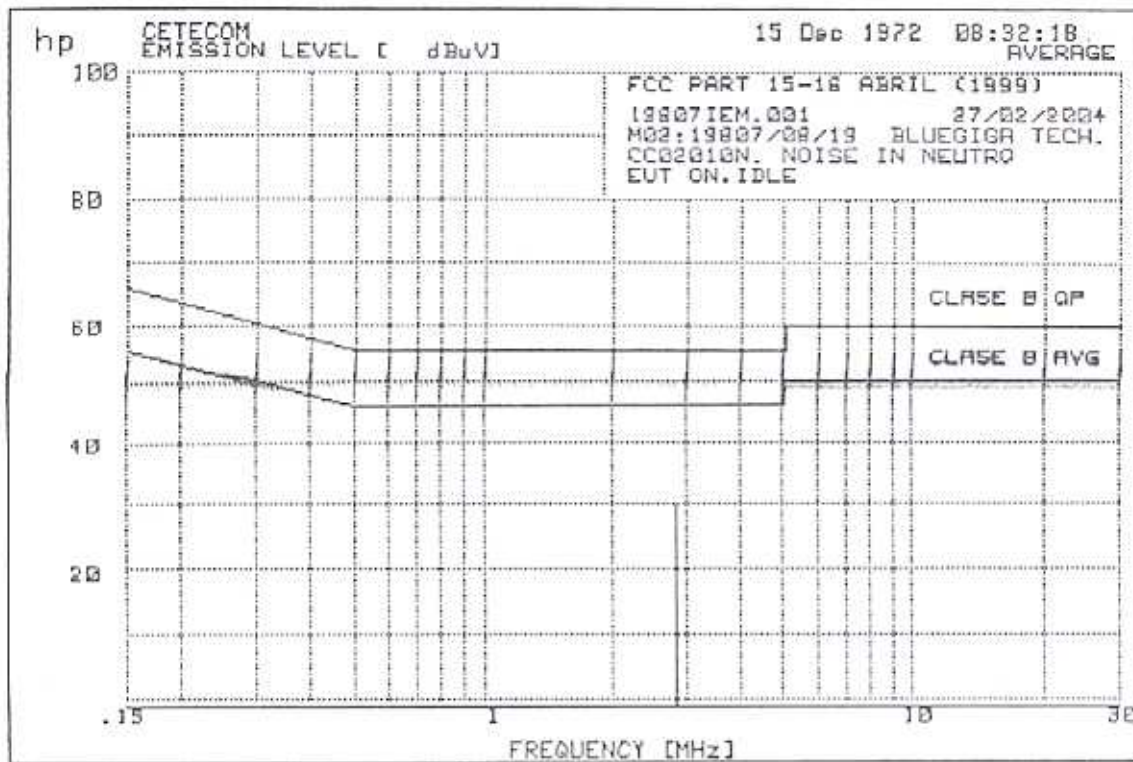
2. - GRAPH RESULTS

See next pages.



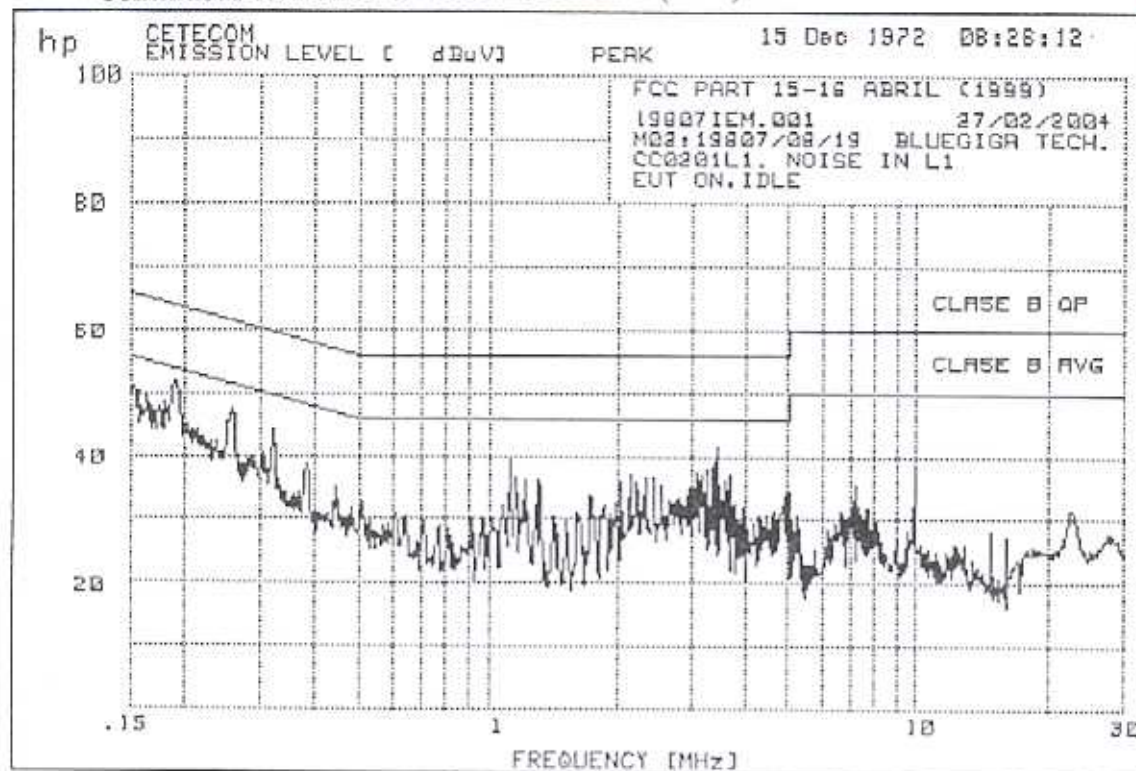
Peaks above -10 dB of Limit Line #1
 peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	2.846	47.4	-8.6



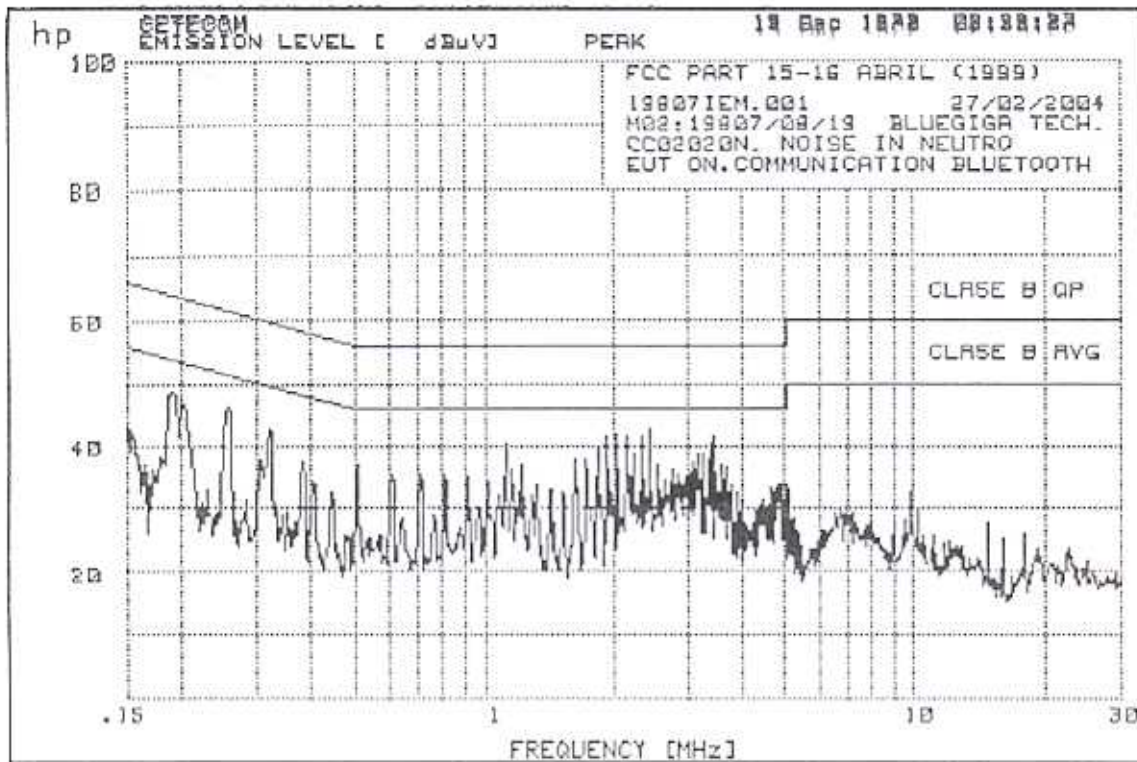
No Avg Peaks above -10 dB of Limit Line #2

Continuous conducted emission: CC0201L1 (Peak)

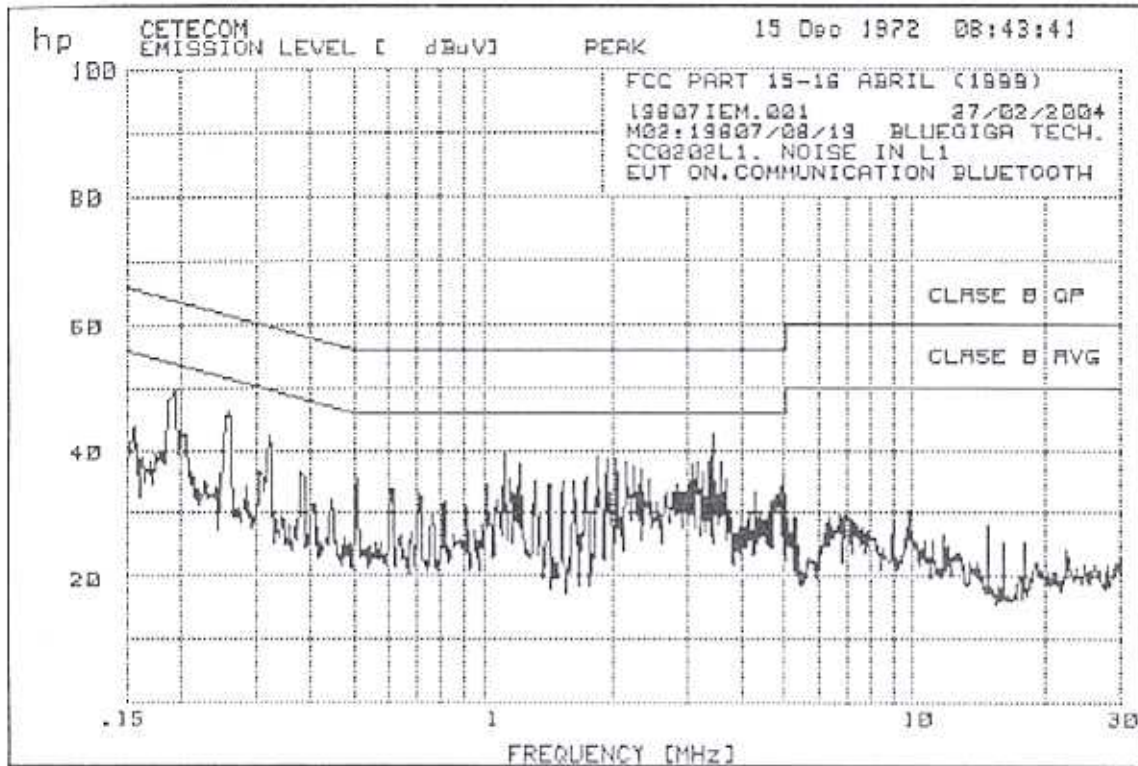


Peaks above -10 dB of Limit Line #2
peak criteria = 6 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.1893	51.8	-2.2
2	.2574	47.4	-4.1
3	.3197	44.3	-5.4
4	.3848	38.7	-9.4
5	1.121	39.4	-6.6
6	1.157	36.7	-9.3
7	1.22	36.1	-9.9
8	1.314	36.2	-9.8
9	2.138	37.1	-8.9
10	2.327	36.6	-9.4
11	2.428	36.6	-9.4
12	3.081	37.4	-8.6
13	3.163	37.1	-8.9
14	3.248	37.7	-8.3
15	3.318	38.4	-7.6
16	3.407	41.4	-4.6
17	3.554	36.1	-9.9
18	3.649	37.2	-8.8



No Peaks above -10 dB of Limit Line #1



No Peaks above -10 dB of Limit Line #1

3. - EQUIPMENT UNDER TEST PICTURES

