



**FCC CFR47 PART 15 CERTIFICATION  
CLASS II PERMISSIVE CHANGE  
TEST REPORT**

**FOR**

**BLUETOOTH PROTOCOL ANALYZER and TEST GENERATOR**

**MODEL: BT004APA-X**

**FCC ID: KH7BT004APA-X**

**REPORT NUMBER: 02U1497-1**

**ISSUE DATE: SEPTEMBER 26, 2002**

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## 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** COMPUTER ACCESS TECHNOLOGY CORPORATION  
 2403 WALSH AVENUE  
 SANTA CLARA, CA 95051 USA

**EUT DESCRIPTION:** BLUETOOTH PROTOCOL ANALYZER AND TEST GENERATOR

**MODEL NAME:** BT004APA-X

**DATE TESTED:** SEPTEMBER 23-24, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	2.4GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 15 Subpart C

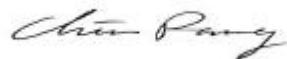
Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 15 Subpart C. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

**Note:** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:



Tested By:




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## 2. EUT DESCRIPTION

The CATC BTTracer/Trainer is a combination of Bluetooth Protocol Analyzer and Test Generator. This product is a wireless Frequency Hopping Spread Spectrum that operates on the 2400 – 2483.5 MHz band. BTTracer/Trainer is a development and test tool for products using the Bluetooth wireless technology. This unit provides a power output of –1.55 dBm (0.700 mW) and includes a 2.4 GHz OMNI Directional external antenna with a 2 dBi gain.

## 3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The only change filed under this application is:

Change #1: The Bluetooth analyzer plug-in module is used in a different base unit (model UPAS2500 instead of UPAS2500H). There are no changes to the plug-in which contains the only radio section of the design.

## 4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

## 5. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 6. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

## 6.1 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	 R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	 ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	 ELA-171
Taiwan	BSMI	CNS 13438	 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	 IC2324 A,B,C, and F

\*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government

## 7. CALIBRATION AND UNCERTAINTY

### 7.5. Measuring Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 7.6. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

<b>Radiated Emission</b>	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
<b>Power Line Conducted Emission</b>	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

## 7.7. Test and Measurement Equipment

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Quasi Peak Adapter	HP9K - 1GHz	85650A	2811A01155	5/16/03
Spectrum Display	HP	85662A	2816A16696	5/16/03
Spectrum Analyzer	HP 0.1K - 1.5GHz	8568B	2732A03661	5/16/03
Antenna, Bilog	Schaffner-Chase30M-2GHz	CBL6112B	2586	3/30/03
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P8)	2944A06589	8/10/02
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/17/03
LISN	Fischer 9k - 100MHz	C-LISN-50/250-2	114	9/6/03
Line Filter	Lindgren 10k - 10GHz	LMF-3489	497	N.C.R.

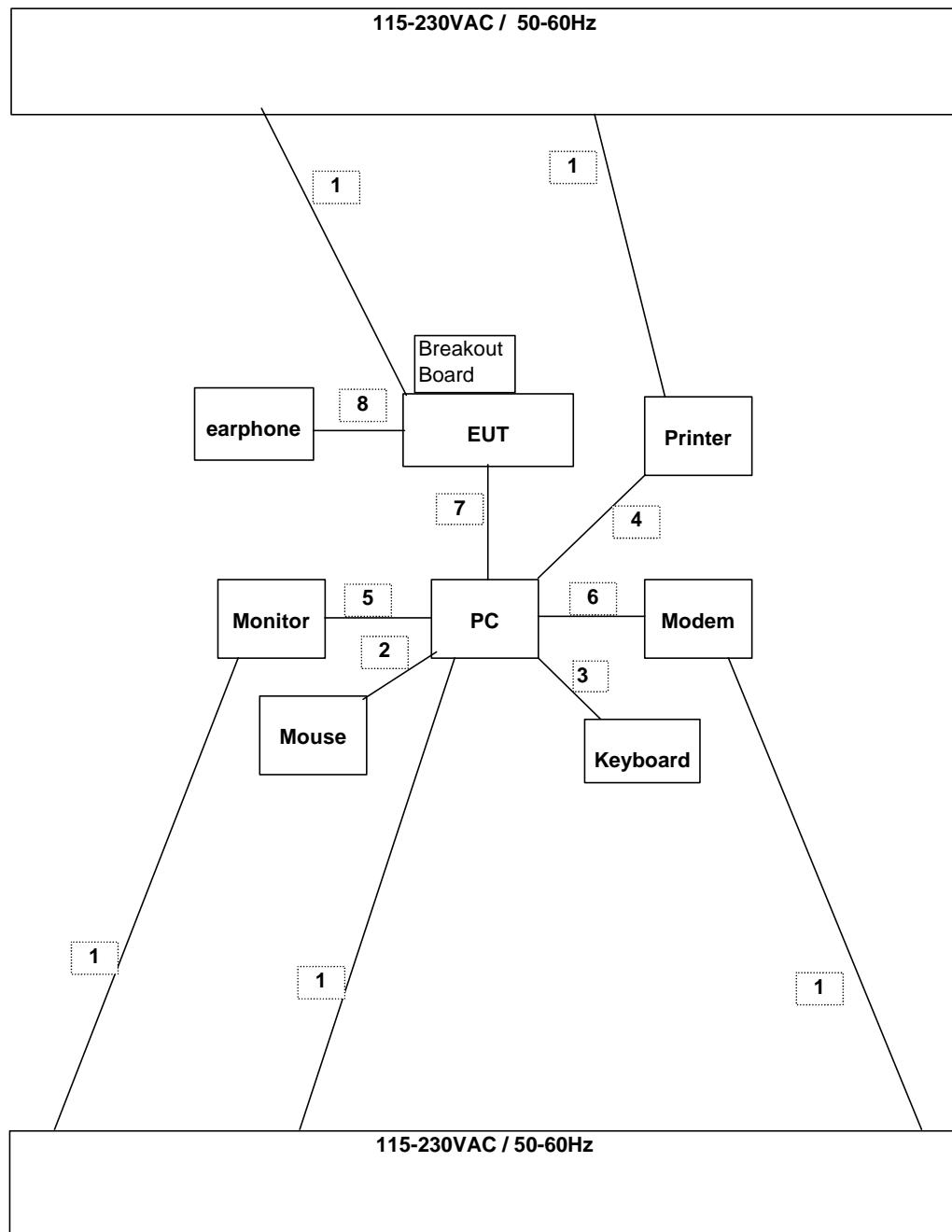
## 8. SUPPORT EQUIPMENT / EUT SETUP

The following peripheral support equipment was utilized to operate the equipment under test:

\* Was use for ITE devices minimum configuration requirement:

TEST PERIPHERALS				
Device Type	Manufacturer	Model Number	Serial Number	FCC ID
PRINTER	HP	2225C	2930S52614	DSI6XU2225
Modem	ACEEX	1414	9013537	IFAXDM1414
MOUSE	HP	M-S34	LZB75062022	DZL211029
Keyboard	IBM	KB-8923	3464873	E8HKB-5923
Monitor	Dell	E551	D82CGN c/o MY	DoC
Breakout Board	CATC	PCA 210-0042-00	NA	NA
EarPhone	CATC	NA	NA	NA

The following setup was used to operate the equipment under test:

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS

I/O CABLES

TEST I/O CABLES								
Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	AC	5	US 115V	Un-shielded	2m	No	No	Bundle only for LC Test
2	Mouse	1	PS/2	Un-shielded	2m	Yes	No	N/A
3	KB	1	PS/2	Un-shielded	2m	Yes	No	N/A
4	Parallel	1	DB25	Un-shielded	2m	Yes	Yes	N/A
5	Video	1	DB15	Shielded	2m	Yes	Yes	One Torroid on Each End
6	Serial	1	DB9	Un-shielded	1m	Yes	No	N/A
7	USB	1	USB	Un-shielded	1m	Yes	No	NA
	Data in/out	1	Audio	Un-shielded	1m	No	No	NA

## 9. APPLICABLE RULES

### §15.207- CONDUCTED LIMITS

(a) For an intentional radiator, which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

The frequency 0.150 - 30 MHz was investigated.

FCC Limits

Frequency range MHz	Limits dB(µV)
0.45 to 30	Quasi-peak 48

CISPR 22 Limits

Frequency range MHz	Limits dB(µV)	
	Quasi-peak	Average
0.15 to 0.50	<b>66 to 56</b>	<b>56 to 46</b>
0.50 to 5	<b>56</b>	<b>46</b>
5 to 30	<b>60</b>	<b>50</b>

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

Note: CISPR 22 limits were used for the tests documented in this report.

*Spec limit: As specified above.*

## **§15.209- RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS**

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table below, the tighter limit applies at the band edges.

FCC Limits  
measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB( $\mu$ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54

**NOTES**

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

CISPR 22 Limits at measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB( $\mu$ V/m)
30 to 230	30
230 to 1000	37

**NOTES**

1. The lower limit shall apply at the transition frequency.

Note: CISPR 22 limits were used for the tests documented in this report.

***Spec limit: As specified above.***

## 10. TEST SETUP, PROCEDURE AND RESULT

### 10.1. RADIATED EMISSION

#### 10.1.1. RADIATED EMISSION AND RESTRICTED BAND EDGE

##### TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	<input checked="" type="checkbox"/> Peak <input checked="" type="checkbox"/> Quasi Peak	<input checked="" type="checkbox"/> 100 KHz <input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 100 KHz <input checked="" type="checkbox"/> 1 MHz
Above 1000	<input checked="" type="checkbox"/> Peak <input checked="" type="checkbox"/> Average	<input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 1 MHz <input checked="" type="checkbox"/> 10 Hz

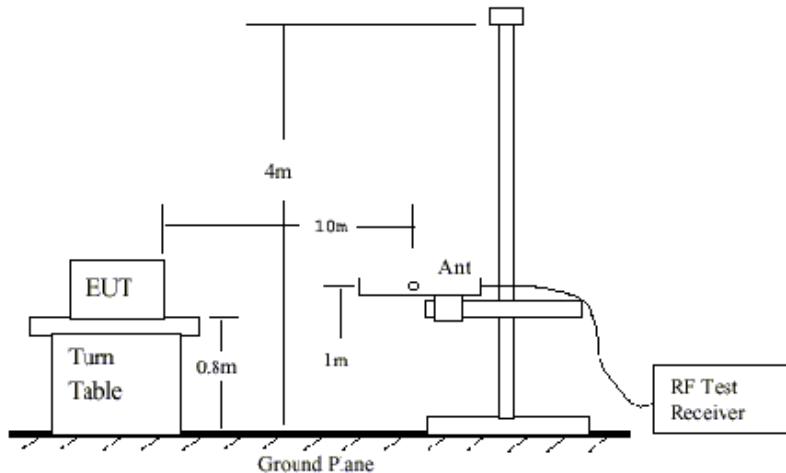


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

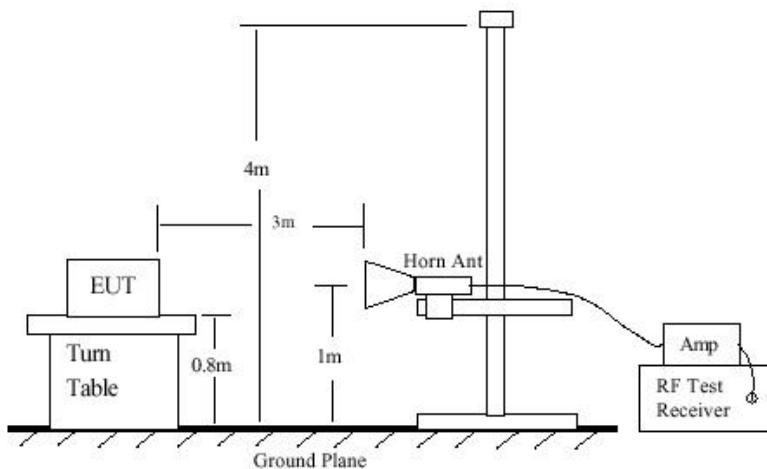


Fig 2: Radiated Emission Above 1000 MHz

### TEST PROCEDURE

1. The EUT was placed on the turntable 0.8 meter above ground in 3 meter open area test site.
2. Set the resolution bandwidth to 100KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turntable and stop at the angle where the measurement device has maximum reading.
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak.
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures (3)~(6). If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.
8. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures (3)~(6) for frequency band from 1 GHz to 10 times carrier frequency.
9. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 10Hz. Repeat procedures (3)~(6). If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

**RESULT***No non-compliance noted. See data below.*

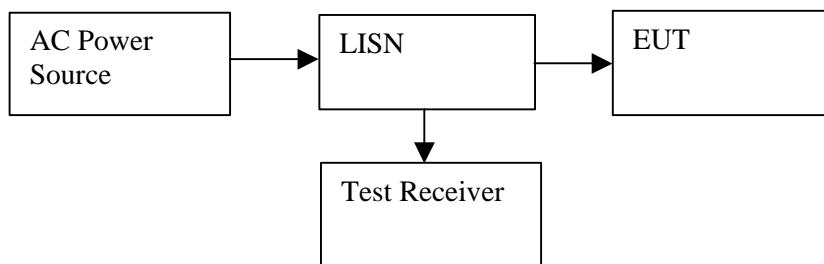
 FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP		Project #: 02U1497-1 Report #: 020923B1 Date& Time: 09/23/02 4:08 PM Test Engr: Chin Pang									
561F MONTEREY ROAD, SAN JOSE, CA 95037-9001 PHONE: (408) 463-0885 FAX: (408) 463-0888											
Company: Computer Access Technology Corporation EUT Description: 2.4GHz Bluetooth Protocol Analyzer Test Configuration: EUT/PC/Monitor/KB/Mouse/Head Phone/Printer/Modem Type of Test: EN55022 Class B Mode of Operation: Tx on Mid Channel (With parallel cable removed)											
<a href="#">&lt;&lt; Main Sheet</a>											
Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit EN_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
182.00	44.00	8.91	3.34	28.21	28.04	30.00	-1.96	10mV	0.00	1.00	P
494.00	40.50	17.23	5.64	28.81	34.56	37.00	-2.44	10mH	0.00	2.00	P
144.00	41.30	10.78	2.93	28.30	26.71	30.00	-3.29	10mV	0.00	1.00	P
494.00	39.50	17.23	5.64	28.81	33.56	37.00	-3.44	10mV	0.00	1.00	P
338.00	43.00	14.06	4.57	28.14	33.49	37.00	-3.51	10mH	0.00	2.00	P
442.00	40.00	16.47	5.30	28.66	33.11	37.00	-3.89	10mH	0.00	2.00	P
6 Worst Data											

## 10.2. POWER LINE CONDUCTED EMISSION

### TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
450 KHz to 30 MHz	<input type="checkbox"/> Peak <input checked="" type="checkbox"/> Quasi Peak	<input checked="" type="checkbox"/> 10 KHz	<input checked="" type="checkbox"/> 10 KHz



### TEST PROCEDURE

1. The EUT was placed on a wooden table 80 cm above the horizontal ground plane and 40 cm away from the vertical ground plane. The EUT was set to transmit / receive in a continuous mode.
2. Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.150 - 30 MHz was investigated.

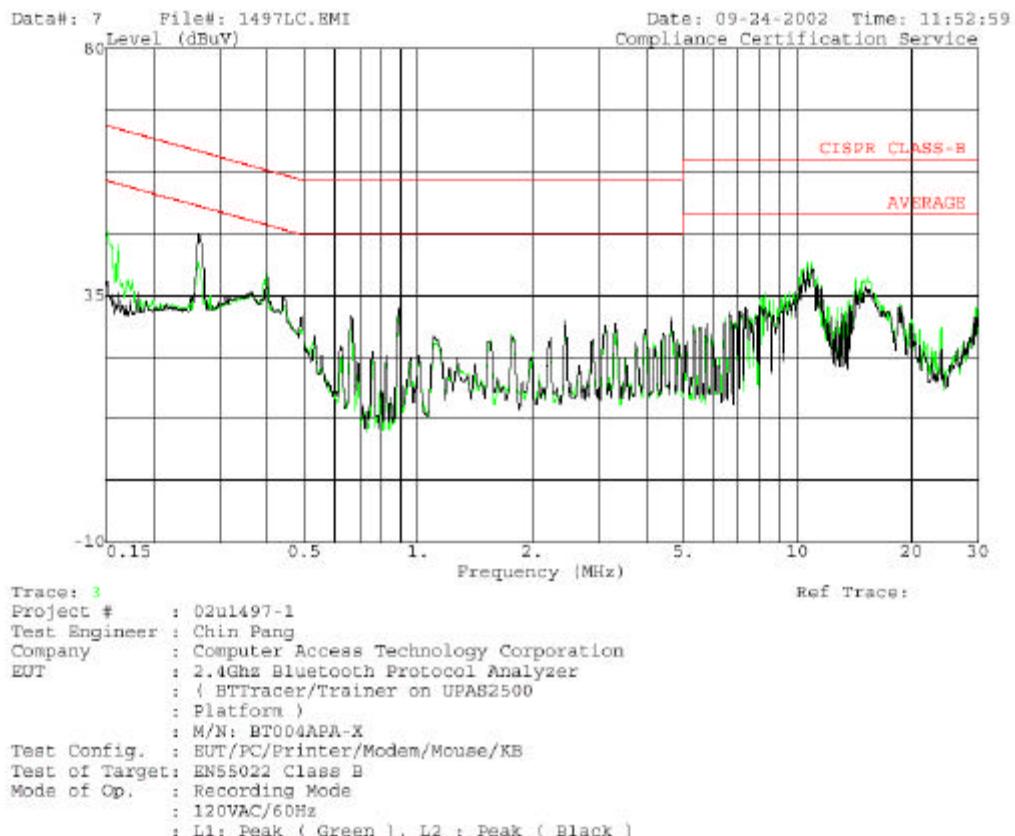
### RESULT

*No non-compliance noted. See Line Conduction plot*

CONDUCTED EMISSIONS DATA (115VAC 60Hz)								
Freq. (MHz)	Reading			Closs (dB)	Limit QP	EN_B AV	Margin QP (dB)	Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)					
0.15	46.72	--	--	0.00	65.94	55.94	-19.22	-9.22 L1
0.26	40.98	--	--	0.00	62.77	52.77	-21.79	-11.79 L1
10.85	41.32	--	--	0.00	60.00	50.00	-18.68	-8.68 L1
0.26	46.22	--	--	0.00	62.77	52.77	-16.55	-6.55 L2
0.40	38.57	--	--	0.00	58.74	48.74	-20.17	-10.17 L2
10.90	41.00	--	--	0.00	60.00	50.00	-19.00	-9.00 L2
6 Worst Data								



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### 10.3. SETUP PHOTOS

**Radiated Emission**



**Conducted Emission measurement****END OF REPORT**