CKC LABORATORIES, INC. Testing the Future

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PACIFIC BIOSCIENCE LABORATORIES, INC. TEST REPORT

FOR THE

ULTRASONIC BRUSH, CLARISONIC

FCC PART 15 SUBPART B SECTIONS 15.107 AND 15.109 CLASS B

COMPLIANCE

DATE OF ISSUE: OCTOBER 7, 2004

PREPARED FOR:

Pacific BioScience Laboratories, Inc.
3837 13th Ave. W., Suite 103
Seattle, WA 98119

P.O. No.: PBLRBMK3-193
W.O. No.: 82705

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: September 7-20, 2004

Report No.: FC04-077

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	September 7-20, 2004
DATE OF RECEIPT:	September 7, 2004
PURPOSE OF TEST:	To demonstrate the compliance of the Ultrasonic Brush, Clarisonic with the requirements for FCC Part 15 Subpart B Sections 15.107 and 15.109 Class B devices.
TEST METHOD:	ANSI C63.4 (2001)
FREQUENCY RANGE TESTED:	150 kHz-1 GHz
MANUFACTURER:	Pacific BioScience Laboratories, Inc. 3837 13th Ave. W., Suite 103 Seattle, WA 98119
REPRESENTATIVE:	John Pace
TEST LOCATION:	CKC Laboratories, Inc. 14797 NE 95th Redmond, WA 98052

SUMMARY OF RESULTS

As received, the Pacific BioScience Laboratories, Inc. Ultrasonic Brush, Clarisonic was found to be fully compliant with the following standards and specifications:

United States
- FCC Part 15 Subpart B Sections 15.107 and 15.109 Class B
- ANSI C63.4 (2001) method

FCC Site No. 933805

Canada

ICES-003 Class B using:
- FCC Part 15 Subpart C Sections 15.107 & 15.109 Class B
- ANSI C63.4 (2001) method

Industry of Canada File No. IC 4653

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

QUALITY ASSURANCE:

Steve Behm, Director of Engineering Services

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Stephen Anderson, EMC Test Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

Ultrasonic Brush
Manuf: Pacific BioScience Laboratories, Inc.
Model: Clarisonic
Serial: NA

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

SPECIFICATIONS AND REQUIREMENTS

The following summarizes the specifications and requirements for the emission tests performed on the EUT. If the actual test levels are higher or different than required, these levels are listed in the appropriate tables.

Test	Specification	Requirement
Conducted Emissions	FCC Part 15 Subpart B Section 15.107	Class B
Radiated Emissions	FCC Part 15 Subpart B Section 15.109	Class B

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: Six Highest Conducted Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Lisn dB	dB	dB	dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
0.504874	24.7	0.0				24.7	48.0	-23.3	W
0.510691	22.1	0.0				22.1	48.0	-25.9	W
0.789209	22.7	0.0				22.7	48.0	-25.3	W
0.851748	21.6	0.0				21.6	48.0	-26.4	W
0.936542	20.6	0.0				20.6	48.0	-27.4	W
1.004590	20.4	0.0				20.4	48.0	-27.6	W

Test Method: ANSI C63.4 (2001)
Spec Limit: FCC Part 15 Subpart B Section 15.107 Class A

NOTES: W = White Lead
A = Average Reading
B = Black Lead

COMMENTS: Brush is charging in cradle.

Table 2: Six Highest Radiated Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN DB	NOTES
30.094	30.7	18.4	-26.4	0.7		23.4	40.0	-16.6	V
30.674	31.5	18.1	-26.4	0.7		23.9	40.0	-16.1	H
30.794	31.1	18.1	-26.4	0.7		23.5	40.0	-16.5	H
30.851	31.0	18.0	-26.4	0.7		23.3	40.0	-16.7	H
983.518	29.1	23.5	-26.8	5.3		31.1	54.0	-22.9	H
995.379	30.1	23.5	-26.7	5.3		32.2	54.0	-21.8	H

Test Method: ANSI C63.4 (2001)
Spec Limit: FCC Part 15 Subpart B Section 15.107 Class B
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization

COMMENTS: See individual data sheets for test conditions.

EMISSIONS

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The radiated and conducted emissions data was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS

	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect the radiated and conducted emissions data. For radiated measurements from 30 to 1000 MHz, the biconilog antenna was used.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual was followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

CONDUCTED EMISSIONS

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT was located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50 µH-/+50 ohms. Above 150 kHz, a 0.15 µF series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

RADIATED EMISSIONS

During the preliminary radiated scan, the EUT was powered up and operating in its defined test mode. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable and raising and lowering the antenna from one to four meters as needed. The test engineer maximized the readings with respect to the table rotation, antenna height and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

APPENDIX A

TEST SETUP PHOTOGRAPHS

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS

Mains Conducted Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View

APPENDIX B

TEST EQUIPMENT LIST

Emissions

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN	9408-1004	7/1/2003	7/1/2005	2124
Preamp	2944A08601	7/13/2004	7/13/2006	01517
Spectrum Analyzer	3346A00225	7/16/2004	7/16/2006	783
Bilog	2452	3/16/2004	3/16/2004	1996

APPENDIX C

MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B COND**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Conducted Emissions** Time: 1:55:10 PM
Equipment: **Ultrasonic Brush** Sequence#: 9
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic 120V 60Hz
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

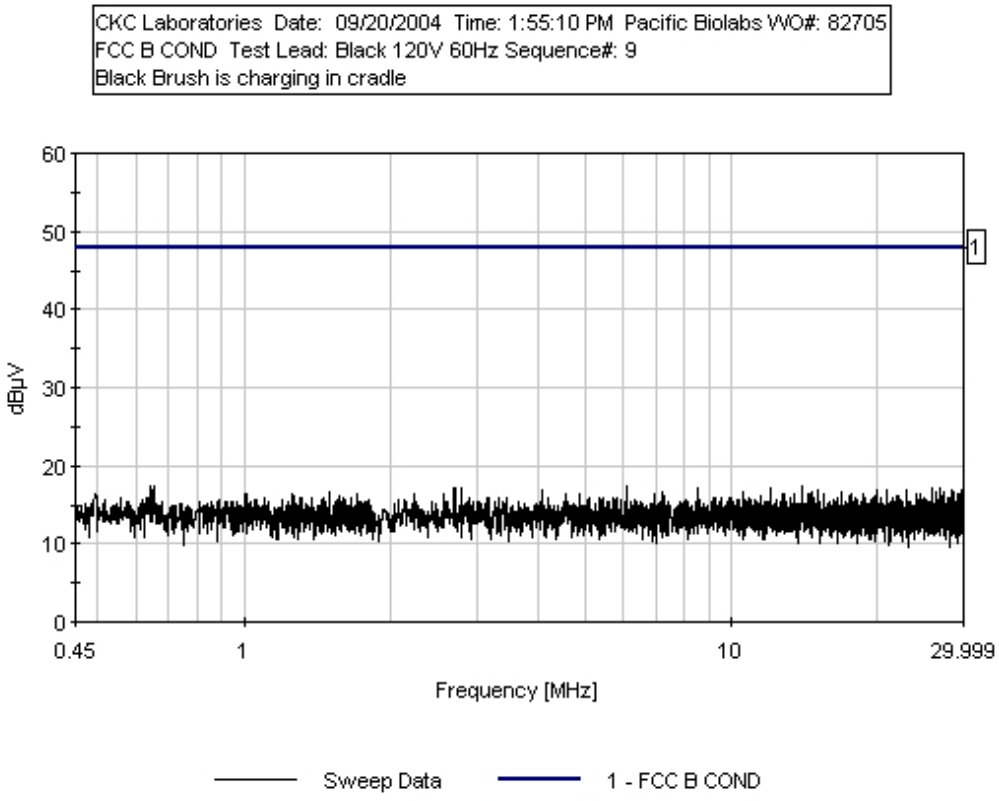
Brush is charging in cradle

Transducer Legend:

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	656.100k	17.5					+0.0	17.5	48.0	-30.5	Black
2	13.939M	17.5					+0.0	17.5	48.0	-30.5	Black
3	640.986k	17.4					+0.0	17.4	48.0	-30.6	Black
4	6.116M	17.3					+0.0	17.3	48.0	-30.7	Black
5	2.783M	17.2					+0.0	17.2	48.0	-30.8	Black
6	8.497M	17.2					+0.0	17.2	48.0	-30.8	Black
7	12.083M	17.2					+0.0	17.2	48.0	-30.8	Black
8	25.857M	17.2					+0.0	17.2	48.0	-30.8	Black
9	2.699M	17.1					+0.0	17.1	48.0	-30.9	Black
10	26.810M	17.1					+0.0	17.1	48.0	-30.9	Black
11	19.884M	17.0					+0.0	17.0	48.0	-31.0	Black
12	28.267M	17.0					+0.0	17.0	48.0	-31.0	Black
13	29.614M	17.0					+0.0	17.0	48.0	-31.0	Black

14	4.098M	16.9	+0.0	16.9	48.0	-31.1	Black
15	15.128M	16.9	+0.0	16.9	48.0	-31.1	Black
16	20.821M	16.8	+0.0	16.8	48.0	-31.2	Black
17	22.848M	16.8	+0.0	16.8	48.0	-31.2	Black
18	27.364M	16.7	+0.0	16.7	48.0	-31.3	Black
19	29.871M	16.6	+0.0	16.6	48.0	-31.4	Black



Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B COND**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Conducted Emissions** Time: 2:09:27 PM
Equipment: **Ultrasonic Brush** Sequence#: 10
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic 120V 60Hz
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

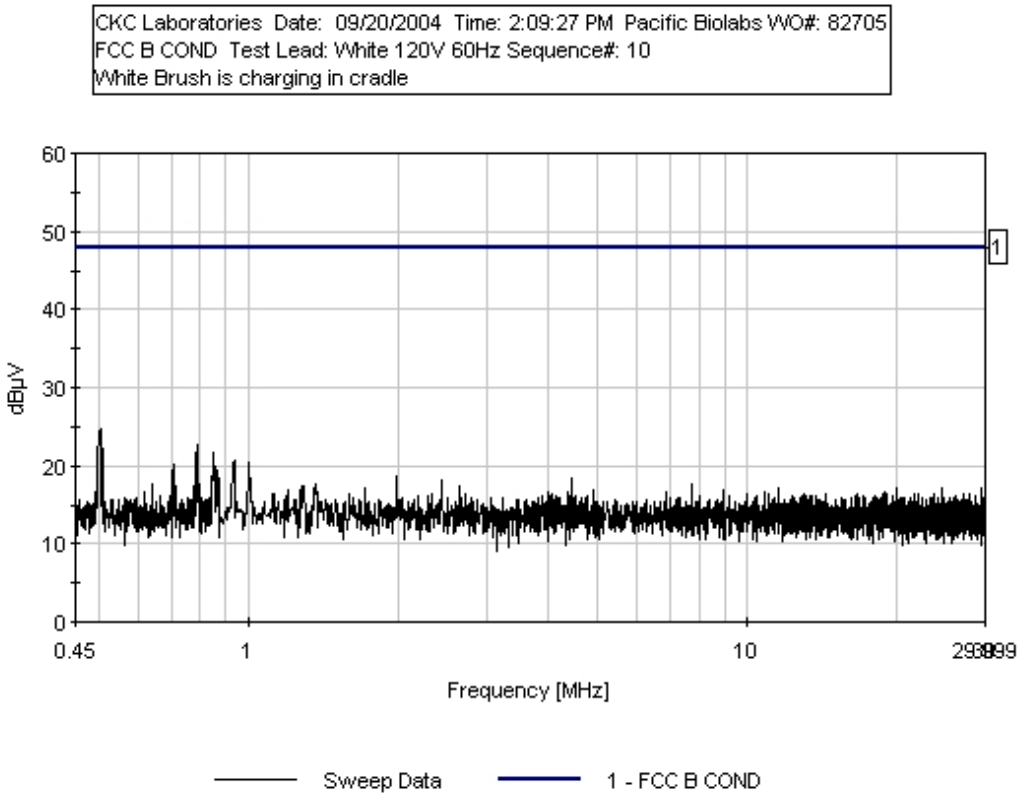
Test Conditions / Notes:

Brush is charging in cradle

Transducer Legend:

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	504.874k	24.7					+0.0	24.7	48.0	-23.3	White
2	789.209k	22.7					+0.0	22.7	48.0	-25.3	White
3	510.691k	22.1					+0.0	22.1	48.0	-25.9	White
4	851.748k	21.6					+0.0	21.6	48.0	-26.4	White
5	936.542k	20.6					+0.0	20.6	48.0	-27.4	White
6	1.005M	20.4					+0.0	20.4	48.0	-27.6	White
7	707.035k	20.1					+0.0	20.1	48.0	-27.9	White
8	866.292k	19.4					+0.0	19.4	48.0	-28.6	White
9	864.110k	19.3					+0.0	19.3	48.0	-28.7	White
10	1.979M	18.7					+0.0	18.7	48.0	-29.3	White


CKC Laboratories Date: 09/20/2004 Time: 2:09:27 PM Pacific Biolabs WO#: 82705
FCC B COND Test Lead: White 120V 60Hz Sequence#: 10
White Brush is charging in cradle
60
50
40
30
20
10
0
dBµV
0.45
1
10
Frequency [MHz]
1
Sweep Data
1 - FCC B COND

Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B RADIATED**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Maximized Emissions** Time: 11:32:00
Equipment: **Ultrasonic Brush** Sequence#: 6
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Brush is in recharging cradle. Brush is off.

Transducer Legend:

T1=Bilog CKC 1994 T2=HP8477D-A AN151721July2003
T3=RG214 set TFS chamber

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	30.674M	31.5	+18.1	-26.4	+0.7		+0.0 359	23.9	40.0	-16.1	Horiz 100
2	983.518M	29.1	+23.5	-26.8	+5.3		+0.0	31.1	54.0	-22.9	Horiz 100
3	410.927M	29.6	+16.4	-26.7	+3.1		+0.0	22.4	46.0	-23.6	Horiz 101
4	65.486M	31.5	+6.4	-26.4	+1.1		+0.0 360	12.6	40.0	-27.4	Horiz 103
5	142.218M	28.5	+11.6	-26.3	+1.7		+0.0 1	15.5	43.5	-28.0	Horiz 104

Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B RADIATED**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Maximized Emissions** Time: 11:11:42
Equipment: **Ultrasonic Brush** Sequence#: 5
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Brush is in recharging cradle. Brush is on.

Transducer Legend:

T1=Bilog CKC 1994 T2=HP8477D-A AN151721July2003
T3=RG214 set TFS chamber

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	30.094M	30.7	+18.4	-26.4	+0.7		+0.0	23.4	40.0	-16.6	Vert 126
2	387.681M	30.2	+15.7	-26.4	+3.0		+0.0 359	22.5	46.0	-23.5	Vert 120
3	70.902M	35.0	+6.1	-26.5	+1.2		+0.0 359	15.8	40.0	-24.2	Vert 120
4	102.561M	33.7	+10.2	-26.5	+1.4		+0.0 359	18.8	43.5	-24.7	Vert 120
5	102.562M	33.0	+10.2	-26.5	+1.4		+0.0 359	18.1	43.5	-25.4	Vert 120
6	100.720M	31.6	+10.0	-26.5	+1.4		+0.0	16.5	43.5	-27.0	Vert 120

Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B RADIATED**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Maximized Emissions** Time: 12:06:41
Equipment: **Ultrasonic Brush** Sequence#: 7
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Brush is laying on table. Brush is on.

Transducer Legend:

T1=Bilog CKC 1994 T2=HP8477D-A AN151721July2003
T3=RG214 set TFS chamber

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	30.794M	31.1	+18.1	-26.4	+0.7		+0.0 360	23.5	40.0	-16.5	Horiz 100
2	152.229M	29.0	+11.7	-26.2	+1.8		+0.0	16.3	43.5	-27.2	Horiz 102
3	394.625M	21.4	+15.8	-26.5	+3.1		+0.0 360	13.8	46.0	-32.2	Horiz 102
4	998.148M	19.5	+23.5	-26.7	+5.3		+0.0	21.6	54.0	-32.4	Horiz 103

Test Location: CKC Laboratories •9461 Willows Rd • Redmond Washington 98052 •

Customer: **Pacific Biolabs**
Specification: **FCC B RADIATED**
Work Order #: **82705** Date: 09/20/2004
Test Type: **Maximized Emissions** Time: 13:47:01
Equipment: **Ultrasonic Brush** Sequence#: 8
Manufacturer: Pacific BioLabs Tested By: Stephen Anderson
Model: Clarisonic
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Ultrasonic Brush*	Pacific BioLabs	Clarisonic	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Brush is laying on table. Brush is on.

Transducer Legend:

T1=Bilog CKC 1994 T2=HP8477D-A AN151721July2003
T3=RG214 set TFS chamber

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	30.851M	31.0	+18.0	-26.4	+0.7		+0.0	23.3	40.0	-16.7	Horiz 106
2	995.379M	30.1	+23.5	-26.7	+5.3		+0.0 359	32.2	54.0	-21.8	Horiz 101
3	385.496M	30.2	+15.6	-26.4	+3.0		+0.0	22.4	46.0	-23.6	Horiz 104
4	144.750M	29.0	+11.7	-26.3	+1.7		+0.0 359	16.1	43.5	-27.4	Horiz 103