EXHIBIT D

CKC TEST REPORT

DZL201252

CKC LABORATORIES, INC. Testing the Future

ACCREDITED

CERTIFICATION TEST REPORT

FOR THE

CORDLESS KEY BOARD, Y-RB6

FCC PART 15 SUBPART C

COMPLIANCE

DATE OF ISSUE: JUNE 10, 1999

PREPARED FOR:

Logitech Inc.
6505 Kaiser Drive
Fremont, CA 94555

P.O. No:
W.O. No: 71742

Report No: FC99-021

PREPARED BY:

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

Date of test: May 26, 1999

DOCUMENTATION CONTROL:

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	May 26, 1999
PURPOSE OF TEST:	To demonstrate the compliance of the Cordless Key Board, Y-RB6, with the requirements for FCC Part 15 Subpart C devices.
MANUFACTURER:	Logitech Inc. 6505 Kaiser Drive Fremont, CA 94555
REPRESENTATIVE:	Bharat Shah
TEST LOCATION:	CKC Laboratories, Inc. 1653 Los Viboras Road Hollister, CA 95023
TEST PERSONNEL:	Wes Norris
TEST METHOD:	ANSI C63.4 1992
FREQUENCY RANGE TESTED:	27 MHz - 1000 MHz
EQUIPMENT UNDER TEST:	**Cordless Key Board** Manuf: Logitech, Inc. Model: Y-RB6 Serial: SLA-3 FCC ID: DZL201252 (pending)

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SUMMARY OF RESULTS

The Logitech Inc. Cordless Key Board, Y-RB6, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15 Subpart C.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15 Subpart C. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Cordless keyboard.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ±4dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 27.145 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

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PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Cordless Desktop Transceiver
Manuf: Logitech
Model: C-RC3-KBD
Serial: DVT 103
FCC ID: DZLXXXXX

Printer
Manuf: HP
Model: DeskJet 340
Serial:
FCC ID:

Modem
Manuf: Cardinal
Model: 020-0470
Serial:
FCC ID:

Monitor
Manuf: HP
Model: D5258A
Serial: DK73795774
FCC ID: C5F7NFCMC1516X

PC
Manuf: HP
Model: 8180
Serial: US73553464
FCC ID:

AC Adaptor
Manuf: HP
Model: 0950-2435
Serial:
FCC ID:

AC Adaptor
Manuf: AMIGO
Model: AM-9300
Serial:
FCC ID:

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REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the Cordless Key Board, Y-RB6. All readings taken are peak readings unless otherwise noted by a "Q" or "A". The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Six Highest Fundamental Emission Levels

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS Maglp dB	dB	Cable dB	Dist dB	CORRECTED READING DBμV/m	SPEC LIMIT DBμV/m	MARGIN dB	NOTES
27.031	32.2	7.5				39.7	80.0	-40.3	V
27.177	58.6	7.5				66.1	80.0	-13.9	V
27.227	58.2	7.5				65.7	80.0	-14.3	V
27.237	58.9	7.5				66.4	80.0	-13.6	V
27.383	31.2	7.5				38.7	50.0	-11.3	V
27.625	27.8	7.4				35.2	50.0	-14.8	V

Test Method: ANSI C63.4 1992
Spec Limit : FCC 15.209/15.227
Test Distance: 3 Meters

NOTES:
H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: This test is to FCC C, Paragraph 15.227, and 15.209, IAW ANSI C63.4. The EUT is a cordless Keyboard and communicates with the PC by means of a transmitted RF signal. The fundamental frequency of this signal is 27.145MHz. The PC is fitted with a Cordless Desktop Receiver to detect and decode the signal. The PC is running a special 'Test Software' which causes the EUT to transmit a continuous stream of the letter I, in lower-case. A monitor is connected to the PC and displays status information. A modem, printer, and mouse are connected to the PC, but are not operating in this 'Keyboard Test' Mode.

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Table 2: Six Highest Spurious Emission Levels

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS Ant dB	Amp dB	cab3 dB	Dist dB	CORRECTED READING DBμV/m	SPEC LIMIT DBμV/m	MARGIN dB	NOTES
54.353	47.3	9.5	-26.6	1.1		31.3	40.0	-8.7	H
81.504	42.4	6.7	-26.6	1.8		24.3	40.0	-15.7	H
108.646	40.8	12.0	-26.6	1.5		27.7	43.5	-15.8	H
135.781	35.7	14.5	-26.4	1.6		25.4	43.5	-18.1	H
271.954	34.0	19.4	-25.9	2.5		30.0	46.0	-16.0	V
299.219	41.0	20.3	-26.0	2.5		37.8	46.0	-8.2	H

Test Method: ANSI C63.4 1992
Spec Limit : FCC 15.209/ 15.227
Test Distance: 3 Meters

NOTES:
H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: This test is to FCC C, Paragraph 15.227, and 15.209, IAW ANSI C63.4. The EUT is a cordless Keyboard and communicates with the PC by means of a transmitted RF signal. The fundamental frequency of this signal is 27.145MHz. The PC is fitted with a Cordless Desktop Receiver to detect and decode the signal. The PC is running a special 'Test Software' which causes the EUT to transmit a continuous stream of the letter I, in lower-case. A monitor is connected to the PC and displays status information. A modem, printer, and mouse are connected to the PC, but are not operating in this 'Keyboard Test' Mode.

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TABLE A

LIST OF TEST EQUIPMENT

Hollister Lab

1. Spectrum Analyzer, Hewlett Packard, Model No. 8568B, S/N 2601A02378 (rf Unit). Calibration date: September 18, 1998. Calibration due date: September 18, 1999

2. Preamp, Hewlett Packard, Model No. 8447D, S/N 2944A06739. Calibration date: June 8, 1998. Calibration due date: June 8, 1999.

3. Quasi-Peak Adapter, Hewlett Packard, Model No. 85650A, S/N 2811A01065. Calibration date: September 18, 1998. Calibration due date: September 18, 1999

4. Biconical Antenna, EMCO, Model No. 3104, S/N 2683. Calibration date: April 22, 1999. Calibration due date: April 22, 2000.

5. Log Periodic Antenna, A & H Systems, Model No. SAS 200/512, S/N 288. Calibration date: April 23, 1999. Calibration due date: April 23, 2000.

6. Magnetic Loop Antenna, EMCO, Model No. 6502, S/N 2078. Calibration date: June 1, 1998. Calibration due date: June 1, 1999

7. Hollister site B. Calibration date: June 12, 1998. Calibration due date: June 12, 1999.

8. Test software, EMI Test 2.91.

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EUT SETUP

The equipment under test (EUT) and the peripheral(s) listed were set up in a manner that represented their normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Table 1 for fundamental radiated emissions and Table 2 for spurious emissions. Additionally, a complete description of all the ports and I/O cables is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

I/O cables were connected to the EUT and peripherals in the manner required for normal operation of the system. Excess cabling was bundled in the center in a serpentine fashion using 30-40 centimeter lengths.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect the radiated emissions data for the Cordless Key Board, Y-RB6. For radiated measurements below 30 MHz the magnetic loop antenna was used. For frequencies of 30 – 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. All antennas were located at a distance of 3 meters from the edge of the EUT.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. 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
RADIATED EMISSIONS	150 kHz	30 MHz	9kHz
RADIATED EMISSIONS	27 MHz	1000 MHz	120 kHz

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SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 & 2 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 six 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 for the Cordless Key Board, Y-RB6.

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 were followed.

Average

When the frequencies are below 30 MHz, 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.

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TEST METHODS

The radiated emissions data of the Cordless Key Board, Y-RB6, 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 the "Sample Calculations". The corrected data was then compared to the FCC Part 15, Subpart C emissions limits to determine compliance.

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

Radiated Emissions Testing

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode with the I/O cables and line cords facing the antenna. The frequencies below 30 MHz were scanned using the magnetic loop antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks which were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned with the biconical antenna in the same manner, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with its I/O and power cables facing the antenna. A thorough scan of all frequencies was manually made using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, antenna height and configuration of the peripherals and cables. Maximizing of the cables was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

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FCC Part 15.215(c) - Occupied Bandwidth Measurements

In accordance with Part 15.215(c), the fundamental frequency was kept within the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the emissions readings in Tables 1 & 2. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula:

Meter reading (dBμV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
- Distance Correction (dB)
- Pre-amplifier Gain (dB)

= Corrected Reading(dBμV/m)

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

#	Freq MHz	Rdng dBuV	Cab3	Amp.	Ant	Maglp	Dist	Corr dBuV/m	Spec	Margin	Polar

means reading number
Freq MHz is the frequency in MHz of the obtained reading.
Rdng dBuV is the reading obtained on the spectrum analyzer in dBμV.
Amp. is short for the preamplifier factor or gain in dB.
Ant is either the biconical or log periodic antenna factor in dB.
maglp is the magnetic loop antenna factor in dB.
Cab3 is the cable loss in dB of the coaxial cable on the OATS.
Dist is the distance factor (in dB). It is used when testing at a different test distance than the one stated in the spec.
Corr dBμV/m is the corrected reading which is now in dBμV/m (field strength).
Spec is the specification limit (dB) stated in the agency's regulations.
Margin is the closeness to the specified limit in dB; + is over and - is under the limit.
Polar is the Polarity of the antenna with respect to earth.

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APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

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INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	**Key board is constantly emitting " I "**
CRT was displaying:	**A series of " I " are on CRT**
Power Supply Manufacturer:	**N/A**
Power Supply Part Number:	**N/A**
AC Line Filter Manufacturer:	**N/A**
AC Line Filter Part Number:	**N/A**
Line voltage used during testing:	**2 AA Batteries**

I/O PORTS	
Type	#
	1

CRYSTAL OSCILLATORS	
Type	Freq In MHz
Crystal	13.5725 MHz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
		13.5725 MHz	2	

REQUIRED EUT CHANGES TO COMPLY:
None.

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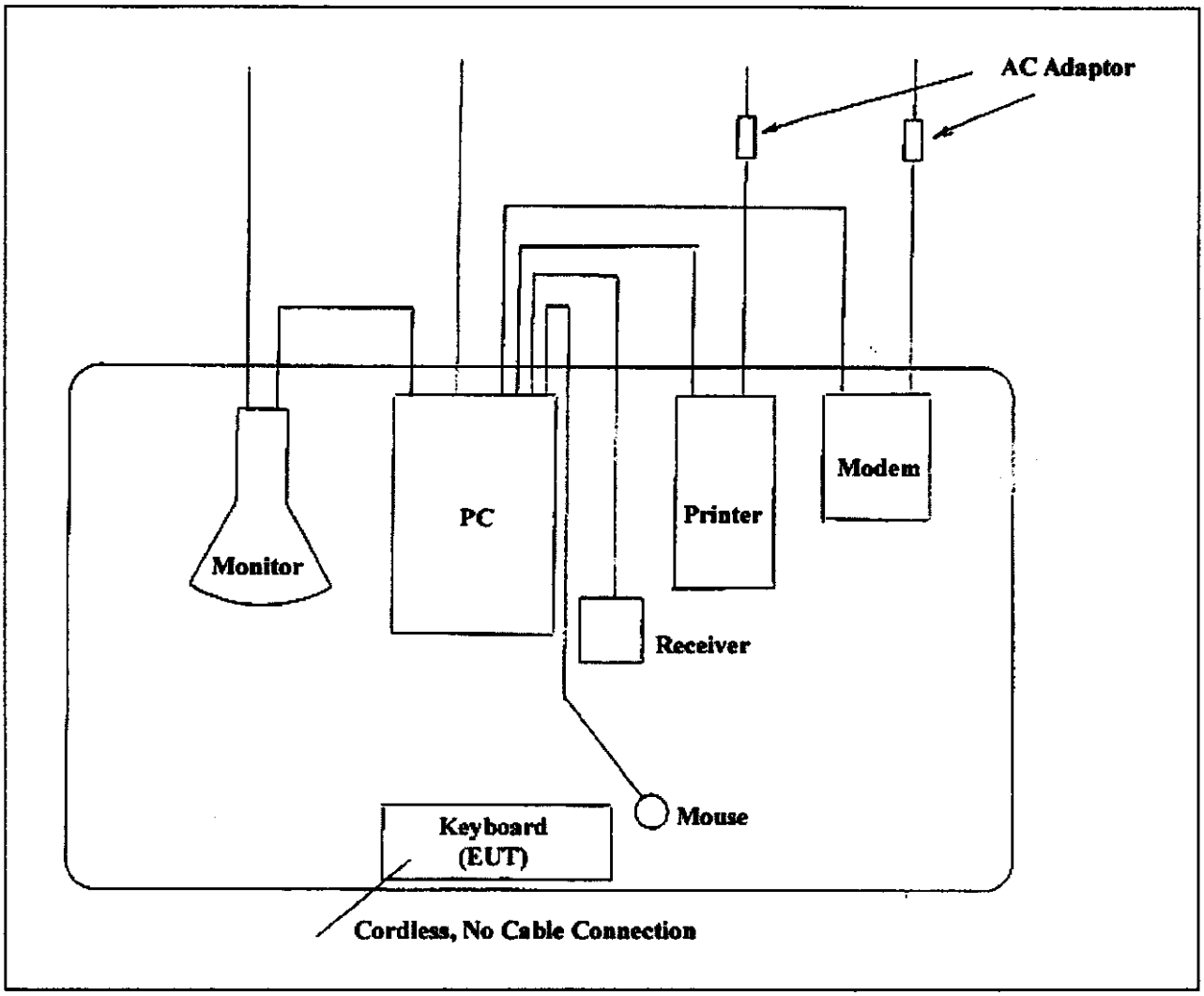
EQUIPMENT CONFIGURATION BLOCK DIAGRAM



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APPENDIX B

MEASUREMENT DATA SHEETS

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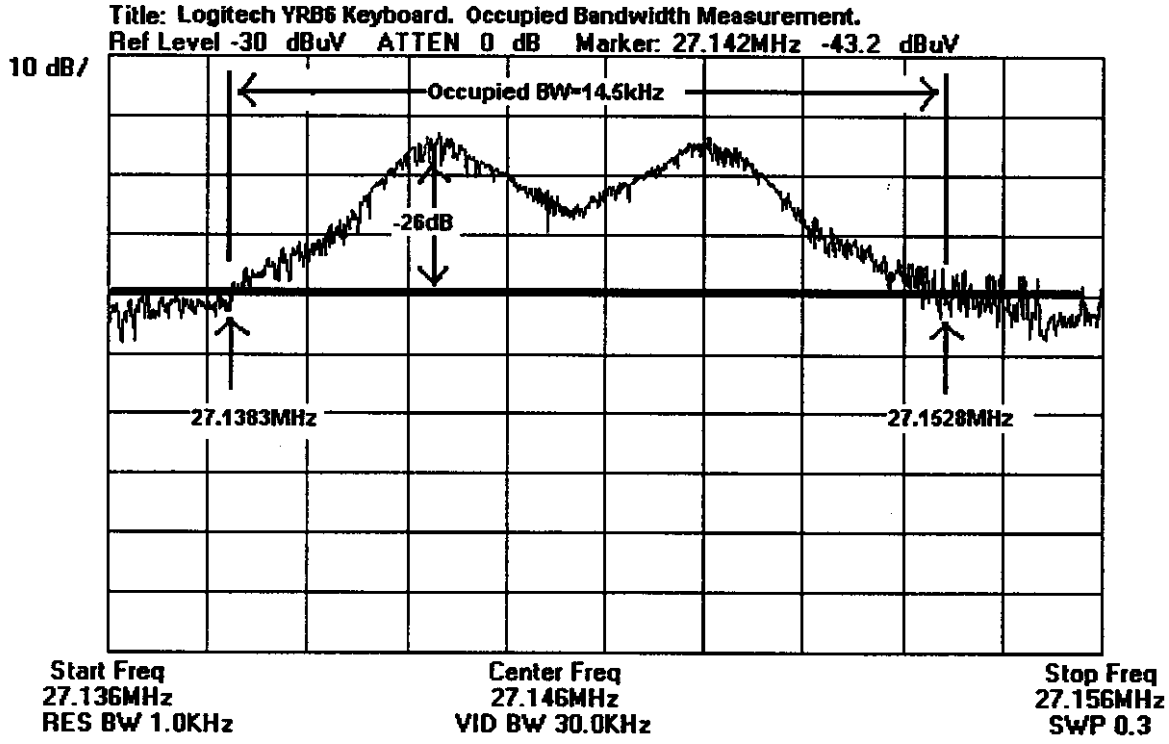
Occupied Bandwidth Plot



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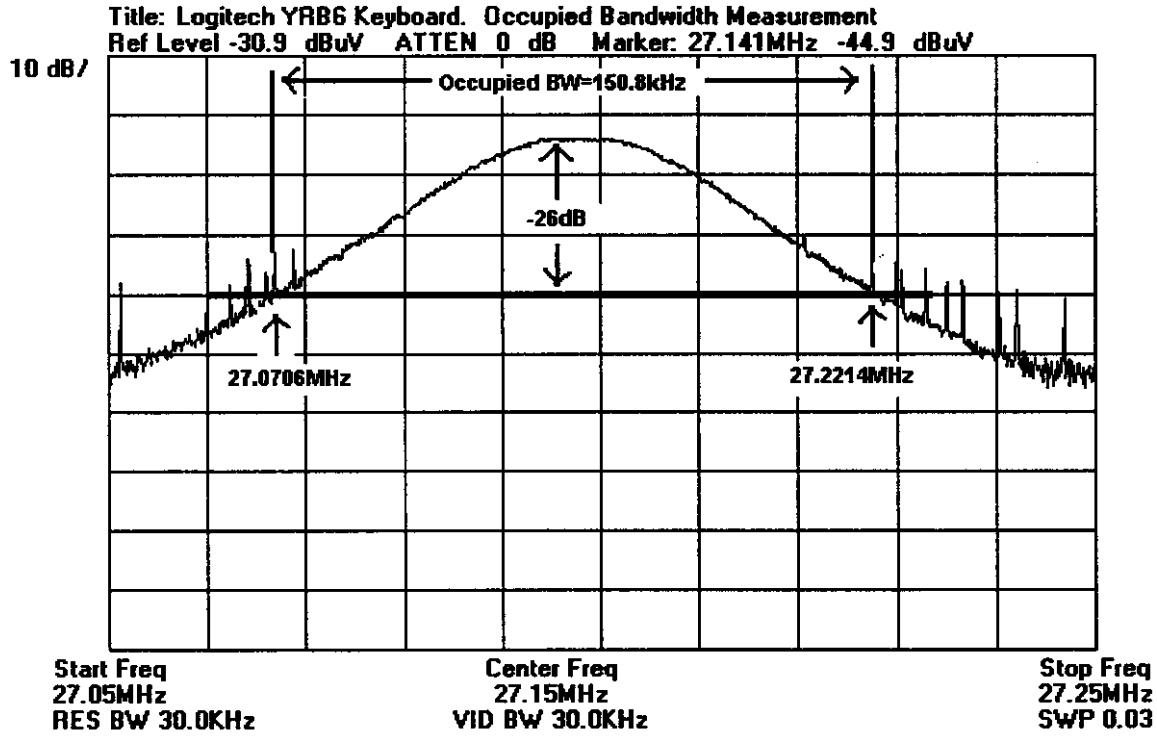
Occupied Bandwidth Plot



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Test Location: CKC Laboratories, Inc. • 1653 Los Viboras Rd., Site A • Hollister, Ca 95023 • (831) 637-0485

Customer:	**Logitech, Inc.**	Date:	May-26-99
Specification:	**FCC 15.227 RADIATED**	Time:	16:35
Test Type:	**Maximized Emissions**	Sequence#:	5
Equipment:	**Keyboard, Wireless**		
Manufacturer:	Logitech, Inc.	Tested By:	Wes Norris
Model:	Y-RB6		
S/N:	SLA-3		

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

Function	Manufacturer	Model #	S/N
Keyboard, Wireless*	Logitech, Inc.	Y-RB6	SLA-3

Support Devices:

Function	Manufacturer	Model #	S/N
Cordless Desktop Transceiver	Logitech	C-RC3-KBD	DVT 103
PC	HP	8180	US73553464
Printer	HP	DeskJet 340	
AC Adaptor	HP	0950-2435	
Modem	Cardinal	020-0470	
AC Adaptor	AMIGO	AM-9300	
Monitor	HP	D5258A	DK73795774

Test Conditions / Notes:

This test is to FCC C, Paragraph 15.227, and 15.209, IAW ANSI C63.4. The EUT is a cordless Keyboard and communicates with the PC by means of a transmitted RF signal. The fundamental frequency of this signal is 27.145MHz. The PC is fitted with a Cordless Desktop Receiver to detect and decode the signal. The PC is running a special 'Test Software' which causes the EUT to transmit a continuous stream of the letter I, in lower-case. A monitor is connected to the PC and displays status information. A modem, printer, and mouse are connected to the PC, but are not operating in this 'Keyboard Test' Mode.

Measurement Data: Sorted by Margin Test Distance: 3 Meters

#	Freq MHz	Rdng DBµV	.Amp. dB	dB	cab3 dB	Maglp dB	Dist dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar
1	299.219	41.0	-26.0 +20.3		+2.5	+0.0	+0.0	37.8	46.0	-8.2	Horiz
2	54.353	47.3	-26.6 +9.5		+1.1	+0.0	+0.0	31.3	40.0	-8.7	Horiz
3	299.219	39.8	-26.0 +20.3		+2.5	+0.0	+0.0	36.6	46.0	-9.4	Vert
4	27.383	31.2	+0.0 +0.0		+0.0	+7.5	+0.0	38.7	50.0	-11.3	Vert
5	27.237	58.9	+0.0 +0.0		+0.0	+7.5	+0.0	66.4	80.0	-13.6	Vert

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6	27.177	58.6	+0.0 +0.0	+0.0	+7.5	+0.0	66.1	80.0	-13.9	Vert
7	27.227	58.2	+0.0 +0.0	+0.0	+7.5	+0.0	65.7	80.0	-14.3	Vert
8	27.625	27.8	+0.0 +0.0	+0.0	+7.4	+0.0	35.2	50.0	-14.8	Vert
9	81.504	42.4	-26.6 +6.7	+1.8	+0.0	+0.0	24.3	40.0	-15.7	Horiz
10	108.646	40.8	-26.6 +12.0	+1.5	+0.0	+0.0	27.7	43.5	-15.8	Horiz
11	271.954	34.0	-25.9 +19.4	+2.5	+0.0	+0.0	30.0	46.0	-16.0	Vert
12	29.186	26.5	+0.0 +0.0	+0.0	+7.1	+0.0	33.6	50.0	-16.4	Vert
13	29.812	25.7	+0.0 +0.0	+0.0	+7.0	+0.0	32.7	50.0	-17.3	Vert
14	81.519	40.2	-26.6 +6.7	+1.8	+0.0	+0.0	22.1	40.0	-17.9	Vert
15	135.781	35.7	-26.4 +14.5	+1.6	+0.0	+0.0	25.4	43.5	-18.1	Horiz
16	27.031	32.2	+0.0 +0.0	+0.0	+7.5	+0.0	39.7	80.0	-40.3	Vert
17	26.973	30.5	+0.0 +0.0	+0.0	+7.5	+0.0	38.0	80.0	-42.0	Vert

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