Test Report

Product Name ： Cordless Keyboard
Model No. ： Y-RCP140
FCC ID. ： JNZYRCP140

Applicant ： Logitech Far East Ltd.
Address ： #2 Creation Rd., 4, Science-Based Ind. Park, Hsinchu, Taiwan, R.O.C.

Date of Receipt ： 2007/03/14
Issued Date ： 2007/03/21
Report No. ： 073H044-RFUSP03V01

Test Report Certification

Issued Date : 2007/03/21
Report No. : 073H044-RFUSP03V01

QuieTek

Product Name	:	Cordless Keyboard
Applicant	:	Logitech Far East Ltd.
Address	:	#2 Creation Rd., 4, Science-Based Ind. Park, Hsinchu, Taiwan, R.O.C.
Manufacturer	:	Logitech Far East Ltd.
Model No.	:	Y-RCP140
FCC ID.	:	JNZYRCP140
Rated Voltage	:	DC 3V (Power by Battery)
EUT Voltage	:	DC 3V (Power by Battery)
Trade Name	:	Logitech
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.227: 2005
Test Result	:	Complied

The test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

Documented By : Carol Tsai
(Carol Tsai)

Tested By : Eric Lee
(Eric Lee)

Approved By : Roy Wang
(Roy Wang)

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product Name	Cordless Keyboard
Trade Name	Logitech
Model No.	Y-RCP140
Frequency Range	27.095MHz~27.145MHz
Channel Number	2
Type of Modulation	FSK
Antenna Type	Loop Antenna

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
001	27.095MHz	002	27.145MHz

Note:

1. This device is a Cordless Keyboard.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.227 for spread spectrum devices.
3. Regards to the frequency band operation; the highest rate that was included the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.

1.3. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
EMI	Mode 1: Transmitter
Final Test Mode	
TX	Mode 1: Transmitter

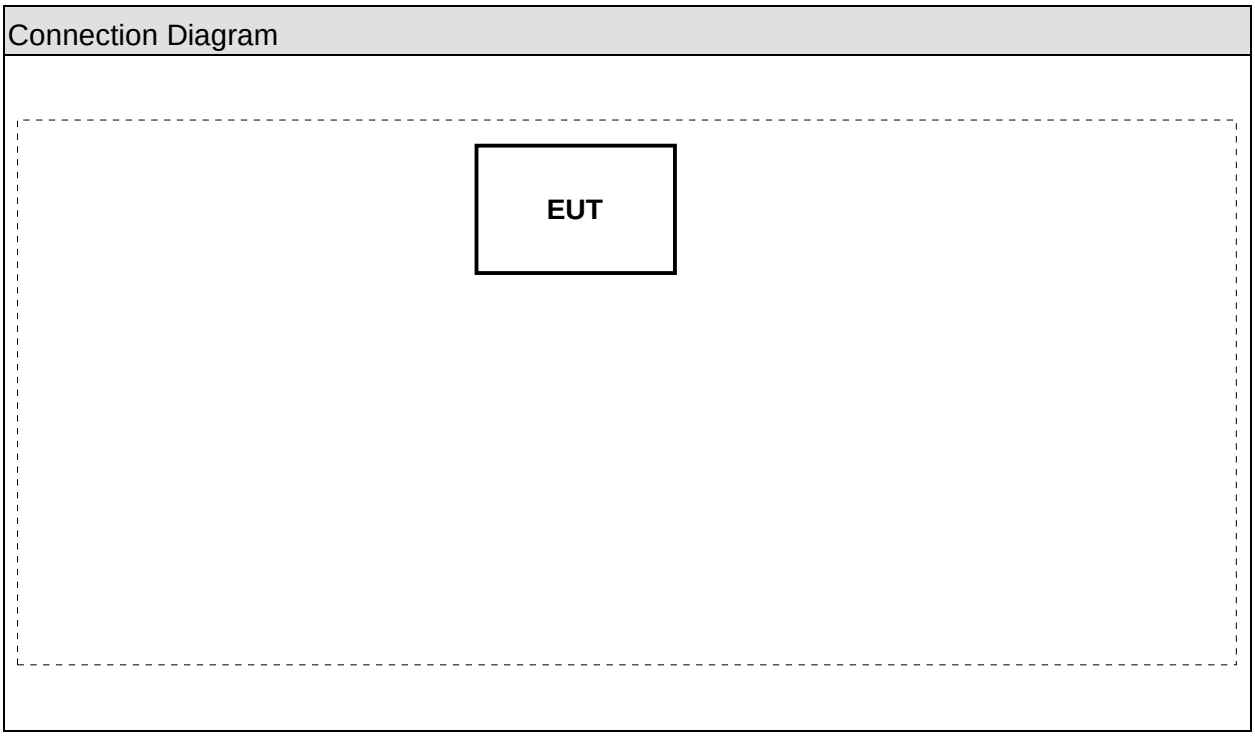
1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

N/A

1.5. Configuration of tested System

Connection Diagram



1.6. EUT Exercise Software

1	Setup the EUT as shown on 1.4.
2	Enable RF signal and confirm EUT active.
3	Modulate output capacity of EUT up to specification.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC Part 15 Subpart C Paragraph 15.207 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC Part 15 Subpart C Paragraph 15.209 and 15.227 Radiated Emission (DSSS)	15 - 35	24
Humidity (%RH)		25 - 75	59
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC Part 15 Subpart C Paragraph 15.215 Occupied Bandwidth (DSSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

January 24, 2005 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520

Accredited by CNLA
Accreditation Number: 1313
Effective through: September 27, 2007

1313

ILAC MRA

Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2006

Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

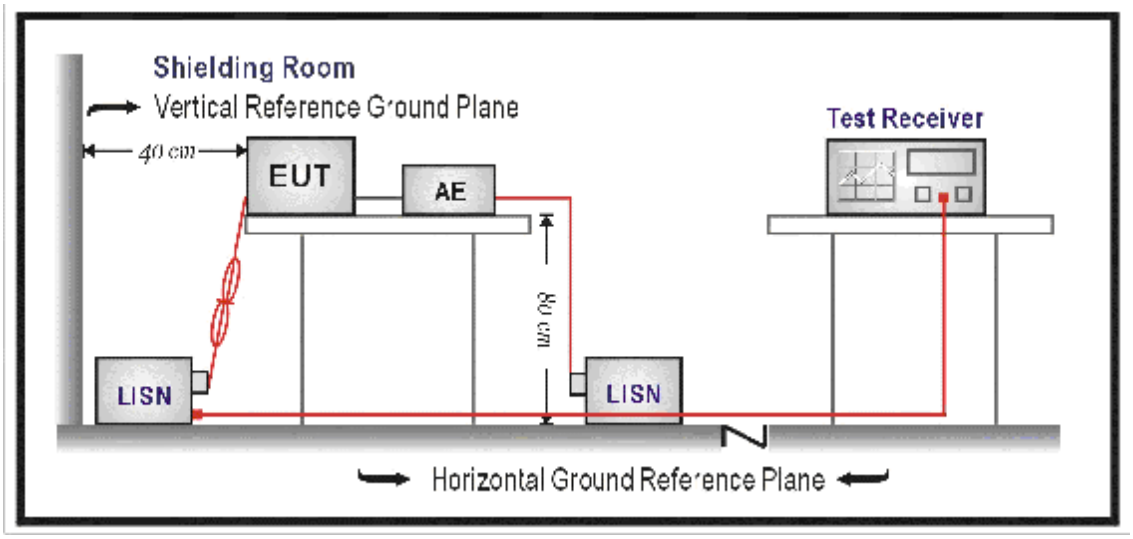
The following test equipment are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
4-Wire ISN	R & S	ENY 41	837032/001	2006/04/15
Artificial Mains Network	R & S	ENV4200	848411/010	2007/03/13
Double 2-Wire ISN	R & S	ENY 22	835354/008	2006/04/15
LISN	R & S	ESH3-Z5	825562/002	2006/03/31
Pulse Limiter	R & S	ZSH3Z2	357.8810.54	2006/07/19
Test Receiver	R & S	ESCS 30	100122	2007/02/21

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

Limits (dBuV)		
Frequency	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed on conducted measurement.
The bandwidth of the field strength meter is 9kHz.

2.5. Test Specification

According to EMC Standard: FCC Part 15 Subpart C Paragraph 15.207

2.6. Uncertainty

The measurement uncertainty is evaluated as ± 2.26 dB.

2.7. Test Result

Product	Cordless Keyboard		
Test Item	Conducted Emission		
Test Mode	--		
Date of Test	--	Test Site	No.2 Shielded Room

Owing to the DC operation of EUT, this test item is not performed.

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the test:

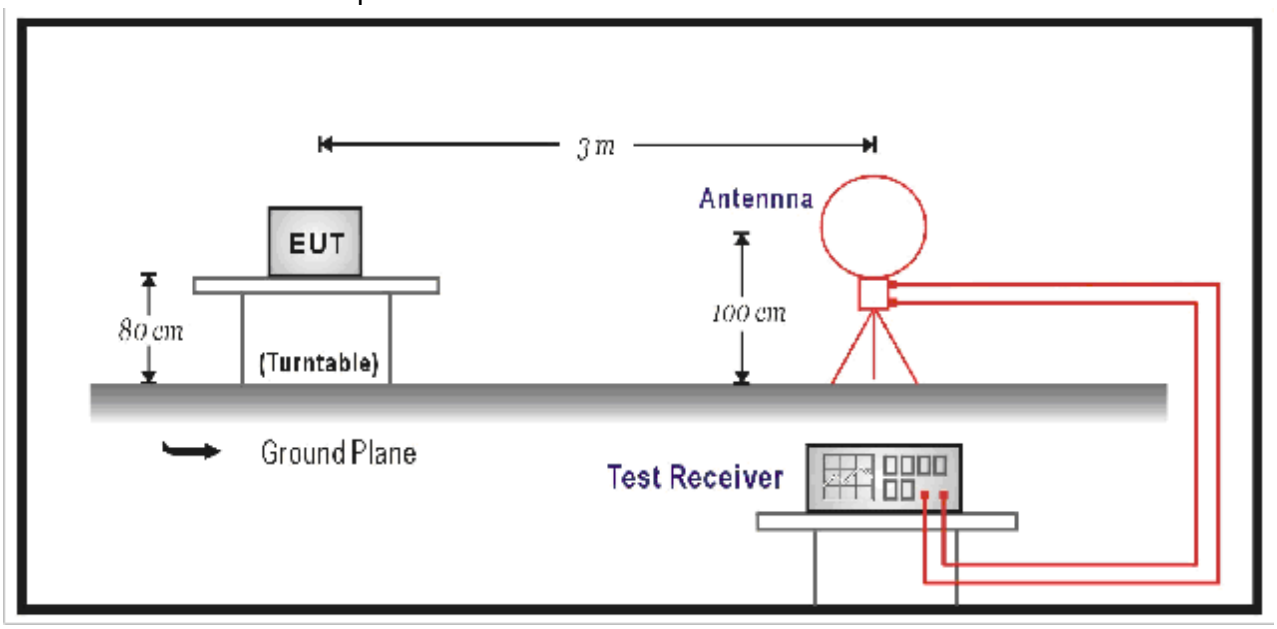
Radiated Emission / Site1

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2895	2006/09/03
Horn Antenna	Electro Metrics	EM-6961	103325	2007/03/15
Pre-Amplifier	HP	8449B	3008A01123	2006/11/15
Pre-Amplifier	Quietek	AP-025C	N/A	N/A
Spectrum Analyzer	R & S	FSP40	100005	2006/08/25
Spectrum Analyzer	Advantest	R3162	120300649	2006/11/24
Test Receiver	R & S	ESCS 30	825442/017	2007/02/13

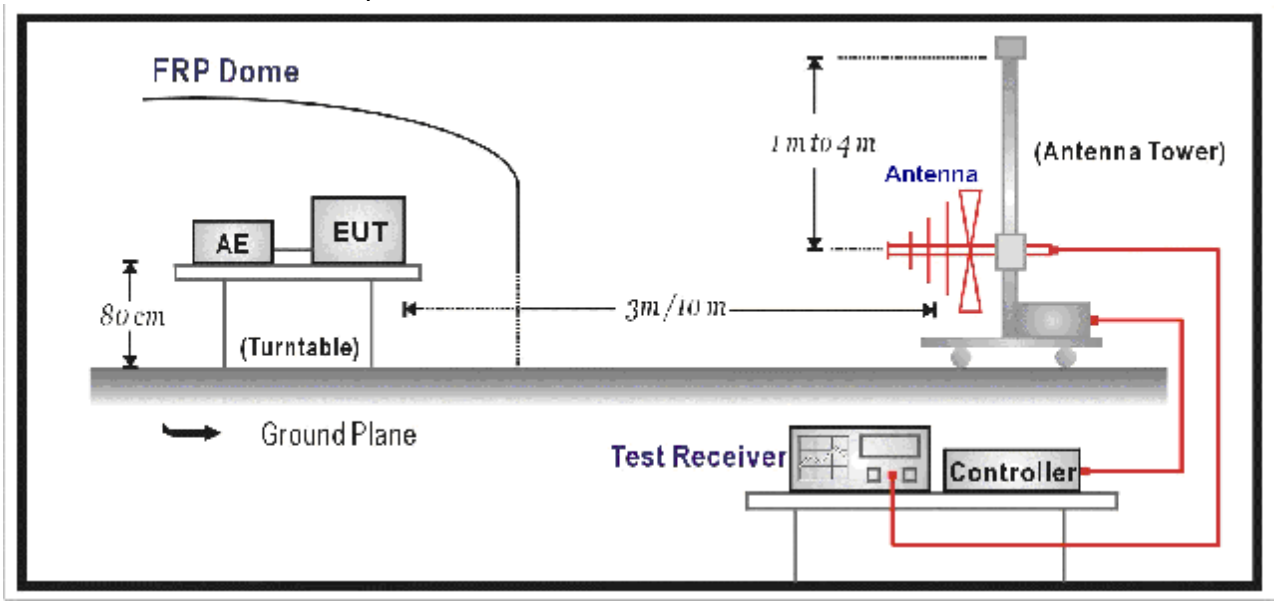
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. “N/A” Ca1.Date is used to Pre-test, not final test.

3.2. Test Setup

For 9kHz-30MHz Test Setup



For 30MHz-1GHz Test Setup



3.3. Limits

Ø FCC Part 15 Subpart C Paragraph 15.227 Limit

FCC Part 15 Subpart C Paragraph 15.227 Limits		
Fundamental Frequency MHz	Field strength of fundamental	
	uV/m	dBuV/m
26.96-27.28	10000	80.0

Remarks :

1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

Ø Frequencies in restricted band are complied to limits on Paragraph 15.209.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark[1]	300
0.490-1.705	24000/F(kHz)	See Remark[1]	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 on radiated measurement.
On the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing a average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.
On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function.

When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.5. Test Specification

According to EMC Standard: FCC Part 15 Subpart C Paragraph 15.209 and 15.227

3.6. Uncertainty

The measurement uncertainty is evaluated as ± 3.19 dB.

3.7. Test Result

Product	Cordless Keyboard		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmitter (27.095MHz)		
Date of Test	2007/03/17	Test Site	No.1 OATS

Direction	Frequency (MHz)	Correction Fact (dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)
X	27.095	9.65	40.40	39.20	50.05	48.85	100	80
Y	27.095	9.65	51.40	50.40	61.05	60.05	100	80
Z	27.095	9.65	47.00	45.90	56.65	55.55	100	80

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

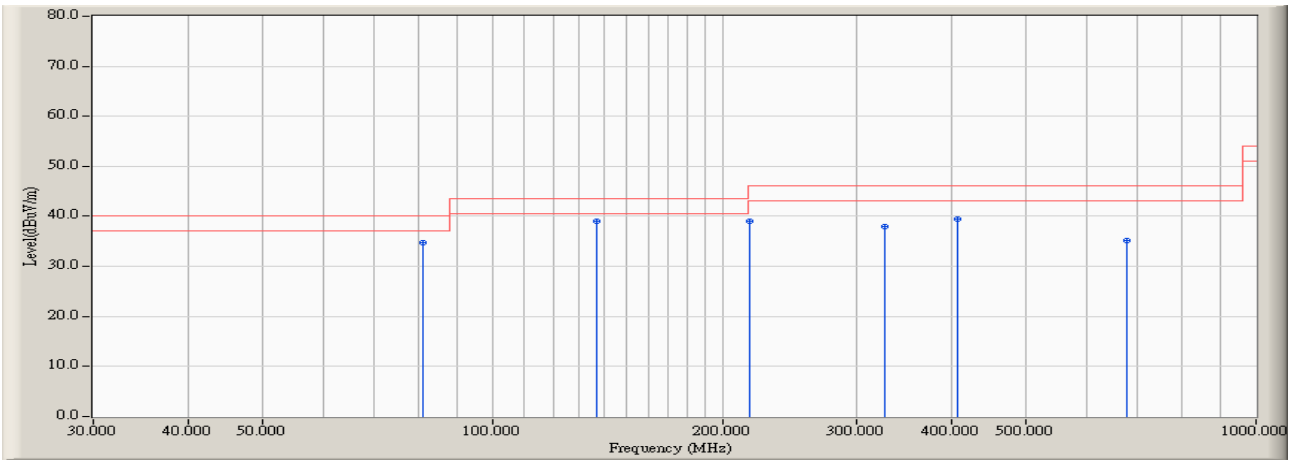
Product	Cordless Keyboard		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmitter (27.145MHz)		
Date of Test	2007/03/17	Test Site	No.1 OATS

Direction	Frequency (MHz)	Correction Fact (dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)
X	27.145	9.65	40.60	39.30	50.25	38.95	100	80
Y	27.145	9.65	49.40	48.30	59.05	57.95	100	80
Z	27.145	9.65	47.10	46.00	56.75	55.65	100	80

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : Site 1	**Time : 2007/03/17 - 10:26**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 3**
EUT : Cordless Keyboard	**Probe : CBL6112B_2932(30-2000MHz) - HORIZONTAL**
Power : DC 3V (Power by Battery)	**Note : Mode 1: Transmitter (27.095MHz)**

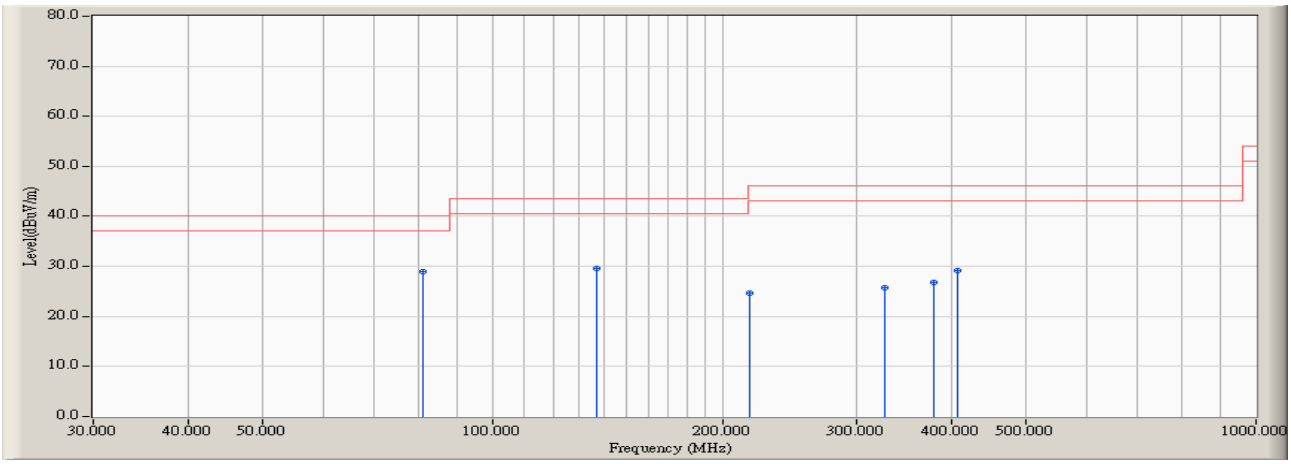


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		80.925	-14.049	48.850	34.801	-5.199	40.000	QUASIPEAK
2	*	136.700	-9.559	48.524	38.965	-4.555	43.520	QUASIPEAK
3		216.725	-11.964	50.903	38.939	-7.081	46.020	QUASIPEAK
4		325.850	-5.915	43.875	37.960	-8.060	46.020	QUASIPEAK
5		405.875	-3.161	42.599	39.438	-6.582	46.020	QUASIPEAK
6		677.475	0.463	34.779	35.242	-10.778	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 1	**Time : 2007/03/17 - 10:34**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 3**
EUT : Cordless Keyboard	**Probe : CBL6112B_2932(30-2000MHz) - VERTICAL**
Power : DC 3V (Power by Battery)	**Note : Mode 1: Transmitter (27.095MHz)**

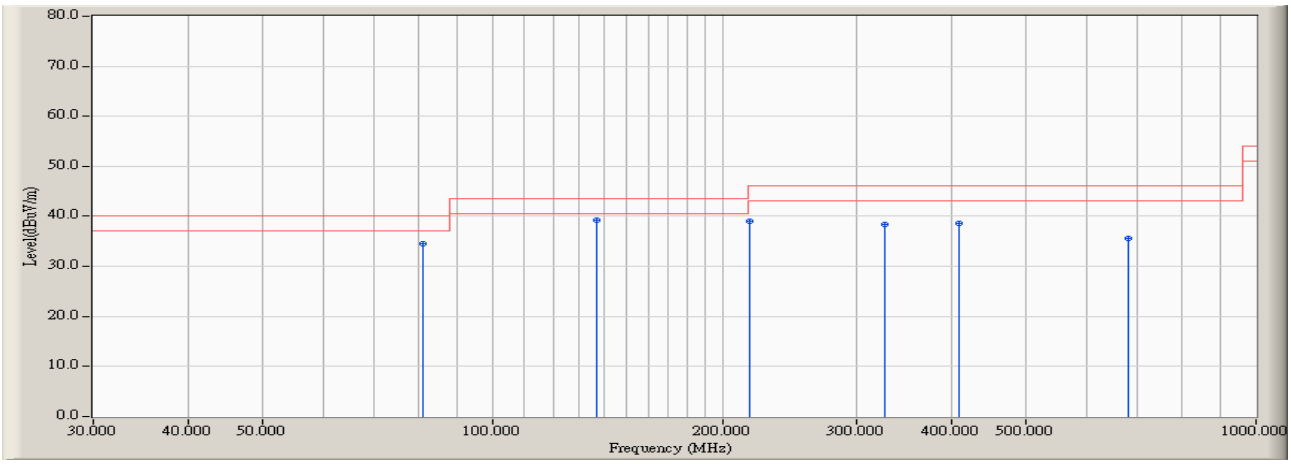


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.925	-14.049	43.050	29.001	-10.999	40.000	QUASIPEAK
2		136.700	-9.559	39.052	29.493	-14.027	43.520	QUASIPEAK
3		216.725	-11.964	36.637	24.673	-21.347	46.020	QUASIPEAK
4		325.850	-5.915	31.655	25.740	-20.280	46.020	QUASIPEAK
5		379.200	-4.357	31.154	26.797	-19.223	46.020	QUASIPEAK
6		405.875	-3.161	32.240	29.079	-16.941	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 1	**Time : 2007/03/17 - 10:43**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 3**
EUT : Cordless Keyboard	**Probe : CBL6112B_2932(30-2000MHz) - HORIZONTAL**
Power : DC 3V (Power by Battery)	**Note : Mode 1: Transmitter (27.145MHz)**

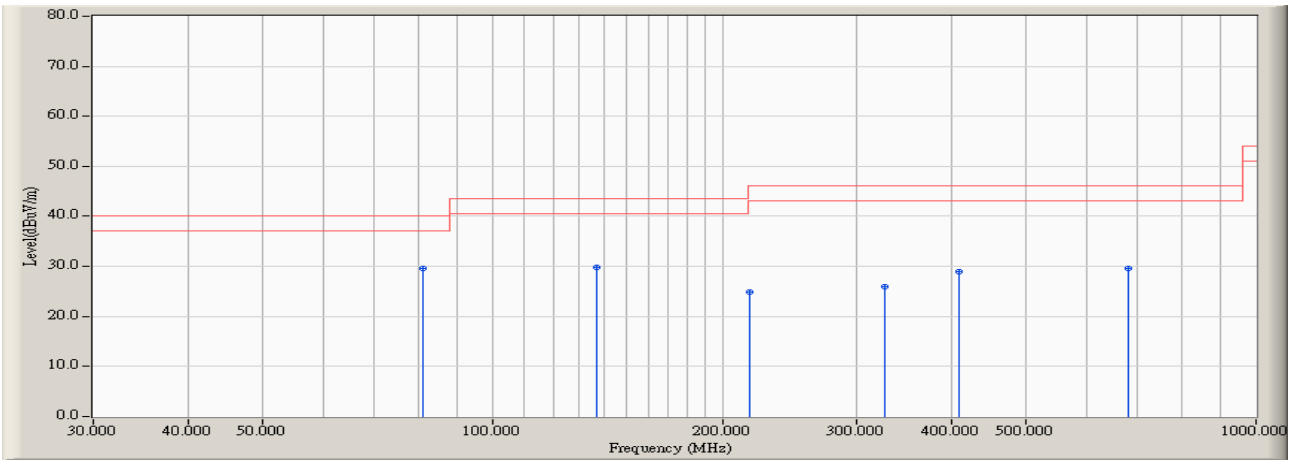


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		80.925	-14.049	48.634	34.585	-5.415	40.000	QUASIPEAK
2	*	136.700	-9.559	48.715	39.156	-4.364	43.520	QUASIPEAK
3		216.725	-11.964	50.928	38.964	-7.056	46.020	QUASIPEAK
4		325.850	-5.915	44.313	38.398	-7.622	46.020	QUASIPEAK
5		408.300	-3.048	41.688	38.640	-7.380	46.020	QUASIPEAK
6		679.900	0.519	35.155	35.674	-10.346	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 1	**Time : 2007/03/17 - 10:55**
Limit : FCC_SpartC_15.209_03M_QP	**Margin : 3**
EUT : Cordless Keyboard	**Probe : CBL6112B_2932(30-2000MHz) - VERTICAL**
Power : DC 3V (Power by Battery)	**Note : Mode 1: Transmitter (27.145MHz)**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.925	-14.049	43.540	29.491	-10.509	40.000	QUASIPEAK
2		136.700	-9.559	39.402	29.843	-13.677	43.520	QUASIPEAK
3		216.725	-11.964	36.788	24.824	-21.196	46.020	QUASIPEAK
4		325.850	-5.915	31.786	25.871	-20.149	46.020	QUASIPEAK
5		408.300	-3.048	32.083	29.035	-16.985	46.020	QUASIPEAK
6		679.900	0.519	29.141	29.660	-16.360	46.020	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

4. Occupied Bandwidth

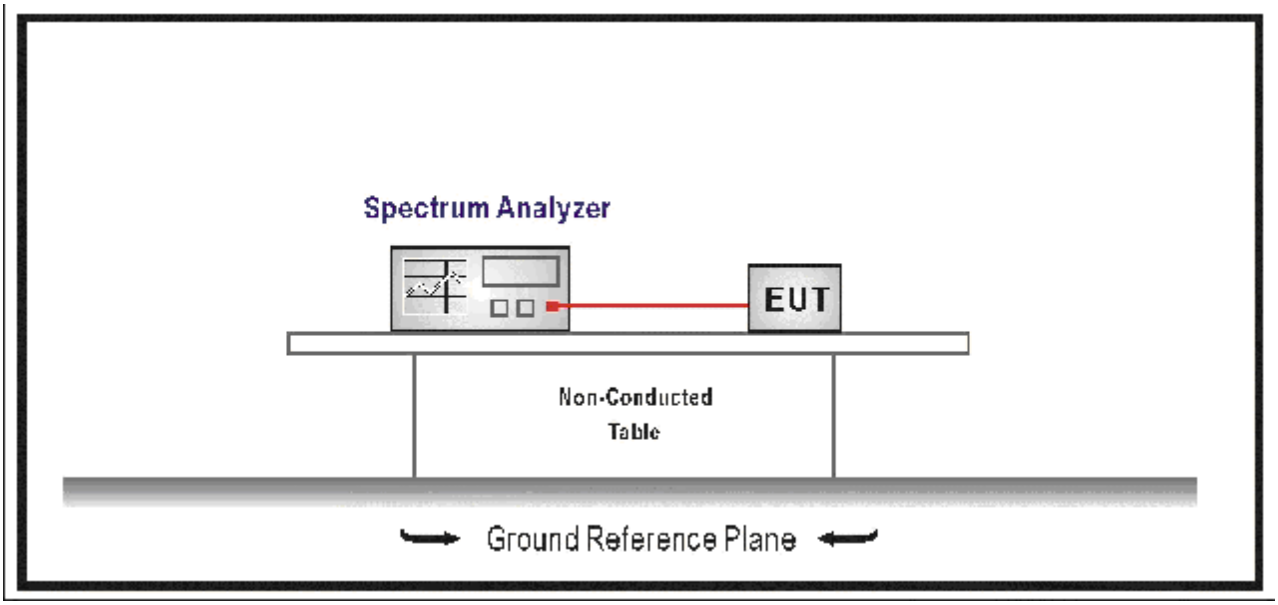
4.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2007
2	No.1 OATS			Sep., 2006

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. Limits

N/A

4.4. Test Specification

According to EMC Standard: FCC Part 15 Subpart C Paragraph 15.215

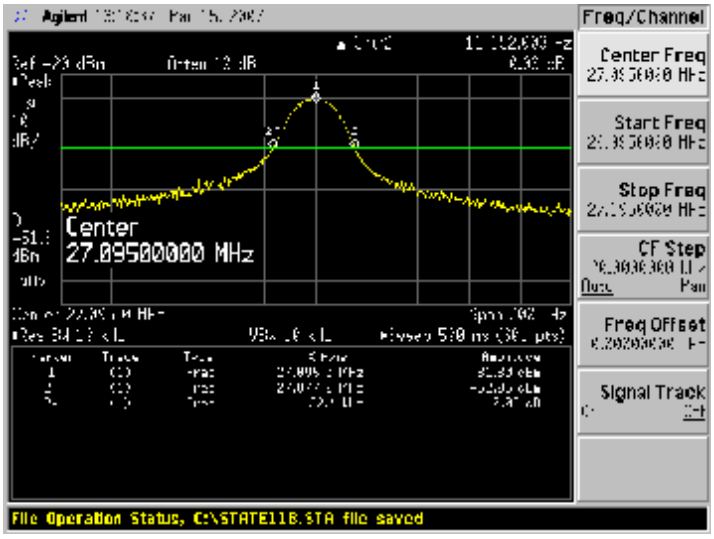
4.5. Uncertainty

The measurement uncertainty is defined as ±50kHz

4.6. Test Result

Product	Cordless Keyboard		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit (27.145MHz)		
Date of Test	2007/03/15	Test Site	No.1 OATS

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)
1	27.095	32.400	--



Product	Cordless Keyboard		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit (27.145MHz)		
Date of Test	2007/03/15	Test Site	No.1 OATS

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)
1	27.145	30.700	--