

## FCC CLASS B COMPLIANCE REPORT

for

Electromagnetic Emissions

of

### THE VIRTUALLY INDESTRUCTIBLE KEYBOARD

**ID Number** : RPZAIR10903108  
**Trade Name** : GRANDTEC  
**Model Number** : FLX-2000  
**Serial Number** : N/A  
**Report Number** : SZ0310026  
**Date** : December 15, 2003

Prepared for :

**DOBBS-STANFORD CORPORATION**  
**2715 ELECTRONIC LANE DALLAS TEXAS 75220 USA**

Prepared by :  
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## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** THE VIRTUALLY INDESTRUCTIBLE KEYBOARD

**Trade Name:** GRANDTEC

**Model Number:** FLX-2000

**Serial Number:** N/A

**Applicant:** DOBBS-STANFORD CORPORATION  
2715 ELECTRONIC LANE DALLAS TEXAS 75220 USA

**Manufacturer:** SHENZHEN JINGHONG CONDUCTIVE RUBBER FACTORY  
287 GUSHU ONE ROAD, GUSHU, XIXIANG, BAOAN,  
SHENZHEN, P.R.C.

**Type of Test:** FCC Class B (Certification)

**Measurement Procedure:** ANSI C63.4: 1992

**File Number:** SZ0310026

**Date of test:** October 24~November 05, 2003

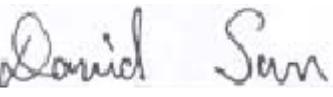
**Deviation:** None

**Condition of Test Sample:** Normal

The above equipment was tested by Compliance Certification Services (Shenzhen) Inc. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedure according to ANSI C63.4. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Approved by Authorized Signatory:

  
\_\_\_\_\_  
**David Sun / Q.A. Manager**

## SYSTEM DESCRIPTION

### **EUT Test Program:**

1. Notepad was loaded and executed in Windows 2000 mode.
2. EUT key "H" continuously to PC, and monitor is full of "H" patterns on the screen.
3. Test program sequentially exercised printer and modem, then sent "H" patterns to them individually.
4. Keep test program running throughout the test.

## PRODUCT INFORMATION

**Housing Type:** Plastic  
**EUT Power Rating:** DC 5V  
**Power During Test:** AC 120V/60Hz changed into DC 5V by PC  
**PS/2:** Shielded, 1.70m  
**USB Cable:** Shielded, 1.65m  
**OSC/Clock Frequencies:** 6MHz

### I/O Port of EUT:

I/O Port Type	Q'TY	Tested with
PS/2	1	1
USB	1	1

### 1) Difference between model numbers as below:

	Model Number	Trade Name
1	N/A	N/A

## SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	Trade Name	Data Cable	Power Cord	FCC ID
1.	PC	PC5	N/A	C&C	N/A	Unshielded 1.8m	DoC
2.	MODEM	SUPERFAX6.0	9013593	ACCEX	Shielded 1.8m	Unshielded 1.8m	IFAXDM1414
3.	MONITOR	CPD-G220	2404330	SONY	Shielded 1.5 m	Unshielded 1.8m	DoC
4.	PRINTER	P310B	C41344000NK02520275	EPSON	Shielded 1.5m	Unshielded 1.8m	DoC
5.	MOUSE	MUS9JN	298792-001	COMPAQ	Shielded 1.5m	N/A	DoC

**\*\*Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

**Grounding:** Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

## **SECTION 1 FCC (LINE CONDUCTED & RADIATED EMISSION)**

### **MEASUREMENT PROCEDURE**

#### **(PRELIMINARY LINE CONDUCTED EMISSION TEST)**

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC power from PC, and PC received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5) All support equipments received AC power from a second LISN supplying power, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

<b>Preliminary Conducted Emission Test</b>			
Frequency Range Investigated		150KHz TO 30 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
USB mode	11/04/2003	FLX-2000_0(L,N)	<input type="checkbox"/>
PS/2 mode	11/04/2003	FLX-2000_1(L,N)	<input checked="" type="checkbox"/>

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

## MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 9 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using an Average detector.
- 3) Instrument settings is: RBW: 9KHz, VBW:30KHz.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. MHz	Peak Raw dBuV	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.XXX	43.90	---	---	56.00	46.00	---	-2.10	L 1

Freq. = Emission frequency in MHz  
Raw dBuV = Uncorrected Analyzer/Receiver reading  
Limit dBuV = Limit stated in standard  
Margin dB = Reading in reference to limit  
Note = Current carrying line of reading  
“---“ = The emission level complied with the Average limits, with at least 2 dB margin, so no further recheck.

## LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
150kHz-500kHz	66-56dBuV	56-46dBuV
500kHz-5MHz	56dBuV	46dBuV
5MHz-30MHz	60dBuV	50dBuV

**\*\*Note:** The lower limit shall apply at the transition frequency.

## **MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)**

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC power from PC, and PC received AC power through the outlet socket under the turntable. All support equipment received AC power from socket under the turntable, if any.
- 5) The antenna was placed at 3 meter away from the EUT as stated in FCC Rules and Regulations Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode(s) were scanned during the preliminary test:

<b>Preliminary Radiated Emission Test</b>			
Frequency Range Investigated		30 MHz TO 1000 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
USB mode	11/05/2003	FLX-2000_0(L,N)	<input type="checkbox"/>
PS/2 mode	11/05/2003	FLX-2000_1(L,N)	<input checked="" type="checkbox"/>

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for final testing.

## MEASUREMENT PROCEDURE (FINAL RADIATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 7 of the preliminary test.
- 2) The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P/Peak. reading is presented.
- 4) Instrument settings is: RBW:100KHz,VBW:300KHz.
- 5) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

Freq. (MHz)	Raw Data (dBuV/m)	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits ( dBuV/m )	Margin (dB)	Reading Type P/Q
xxx.xxx	14.02	12.25	26.27	30.00	-3.73	P

Freq.	= Emission frequency in MHz
Raw Data (dBuV/m)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB)	= Correction factors of antenna factor and cable loss
Emiss. Level	= Raw reading converted to dBuV/m and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit
P	=Peak Reading
Q	=Quasi-peak

## RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30-88	3	40
88-216	3	43.5
216-960	3	46
960-1000	3	54

**\*\*Note:** The lower limit shall apply at the transition frequency.

## SUMMARY DATA (LINE CONDUCTED TEST)

**Model Number:** FLX-2000

**Location:** G-site

**Tested by:** Paul

**Test Mode:** PS/2 mode

**Test Results:** Passed

**Temperature:** 25°C

**Humidity:** 55%RH

(The chart below shows the highest readings taken from the final data)

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.159	52.85	---	---	65.74	55.74	---	-2.89	L1
0.238	46.19	---	---	63.46	53.46	---	-7.27	L1
0.397	40.31	---	---	58.92	48.92	---	-8.61	L1
0.427	39.71	---	---	58.07	48.07	---	-8.36	L1
0.514	37.03	---	---	56.00	46.00	---	-8.97	L1
15.607	46.38	---	---	60.00	50.00	---	-3.62	L1
0.157	53.41	---	---	65.79	55.79	---	-2.38	L2
0.236	47.07	---	---	63.52	53.52	---	-6.45	L2
0.392	40.88	---	---	59.08	49.08	---	-8.20	L2
0.553	38.03	---	---	56.00	46.00	---	-7.97	L2
15.607	46.25	---	---	60.00	50.00	---	-3.75	L2
17.999	41.01	---	---	60.00	50.00	---	-8.99	L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

\*\*NOTE: “---” denotes the emission level was or more than 2dB below the Average limit,  
so no re-check anymore.

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** FLX-2000

**Location:** G-site

**Tested by:** Paul

**Polar:** Vertical--3m

**Test Mode:** PS/2 mode

**Test Results:** Passed

**Detector Function:** Peak/QP

**Temperature:** 25°C

**Humidity:** 55%RH

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data ( dBuV/m )	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits	Margin (dB)	Reading Type (P/Q)
30.000	9.80	22.63	32.43	40.00	-7.57	P
45.590	15.90	12.84	28.74	40.00	-11.26	P
57.000	25.60	9.25	34.85	40.00	-5.15	P
98.800	20.10	12.17	32.27	43.50	-11.23	P
138.510	25.89	9.46	35.35	43.50	-8.15	P
186.025	20.32	12.61	32.93	43.50	-10.57	P

## SUMMARY DATA (RADIATED EMISSION TEST)

**Model Number:** FLX-2000

**Location:** G-Site

**Tested by:** Paul

**Polar:** Horizontal--3m

**Test Mode:** PS/2 mode

**Test Results:** Passed

**Detector Function:** Peak/QP

**Temperature:** 25°C

**Humidity:** 55%RH

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data ( dBuV/m )	Corr. Factor (dB)	Emiss. Level ( dBuV/m )	Limits ( dBuV/m )	Margin (dB)	Reading Type (P/Q)
132.450	25.32	9.65	34.97	43.50	-8.53	P
189.350	18.90	12.61	31.51	43.50	-11.99	P
219.038	23.50	13.60	37.10	46.00	-8.90	P
231.500	28.90	14.24	43.14	46.00	-2.86	P
279.500	21.60	16.17	37.77	46.00	-8.23	P
662.890	10.80	25.37	36.17	46.00	-9.83	P

## TEST FACILITY

**Location:** No. 6, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China

**Description:** There is one 3/10m open area test sites and one line conducted labs for final test.

The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

**Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

**Site Accreditation:** Accredited by NVLAP(Lab code:200577-0) for EMC.

**Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.

**Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

## TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at Compliance Certification Services (Shenzhen) Inc. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 1.0GHz or above.

**Equipment used during the tests:**

**Open Area Test Site:** G

Open Area Test Site G					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	HP	8546A	3448A00232	05/31/2003	05/30/2004
AMPLIFIER	HP	8447D	2944A07999	05/31/2003	05/30/2004
ANTENNA	EMCO	3142	9910-1436	05/31/2003	05/30/2004
CABLE	TIME MICROWAVE	LMR-400	N-TYPE04	05/31/2003	05/30/2004

**Conducted Emission Test Site:** G

Conducted Emission Test Site G					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTENT	R3132	N/A	05/31/2003	05/30/2004
EMI TEST RECEIVER	HP	8546A	3448A00232	05/31/2003	05/30/2004
LISN(EUT)	EMCO	3825/2	1371	05/31/2003	05/30/2004
LISN	EMCO	3825/2	8901-1459	05/31/2003	05/30/2004

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

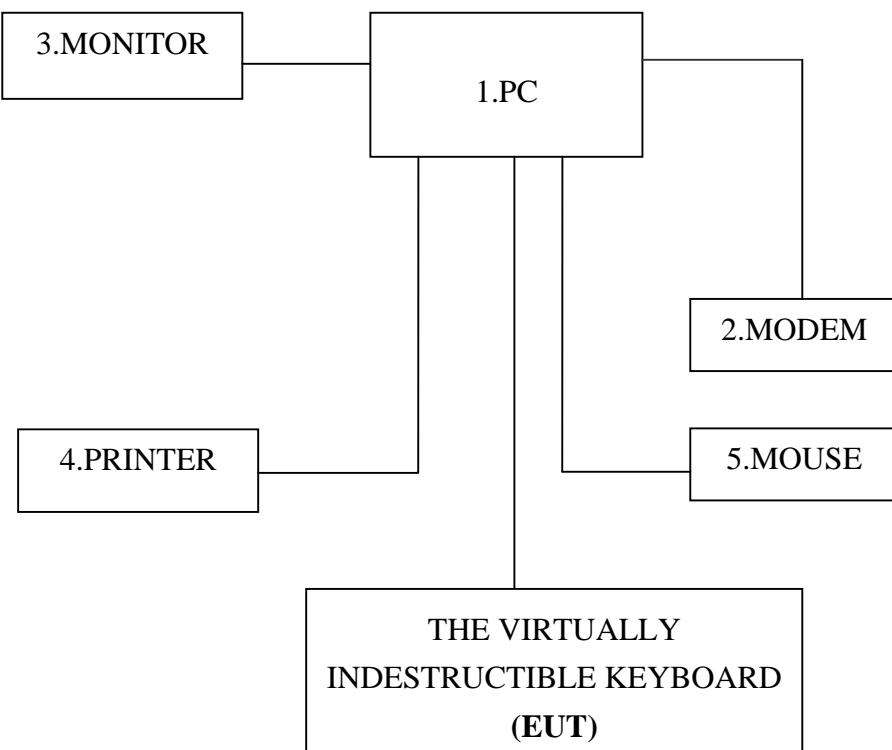
## BLOCK DIAGRAM OF TEST SETUP

### System Diagram of Connections between EUT and Simulators

**EUT: THE VIRTUALLY INDESTRUCTIBLE KEYBOARD**

**Trade Name: GRANDTEC**

**Model Number: FLX-2000**



## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

**(TEST SETUP OF LINE CONDUCTED EMISSION )**

## LINE CONDUCTED EMISSION TEST



## **APPENDIX 2**

### **PHOTOGRAPHS OF TEST SETUP (TEST SETUP OF RADIATED EMISSION )**

## RADIATED EMISSION TEST



## **APPENDIX 3**

### **PHOTOGRAPHS OF EUT**

**Top view of EUT**



**Bottom view of EUT**



## **APPENDIX 4**

### **SPECTRUM PLOT OF L1 AND L2**



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### **Site 6**

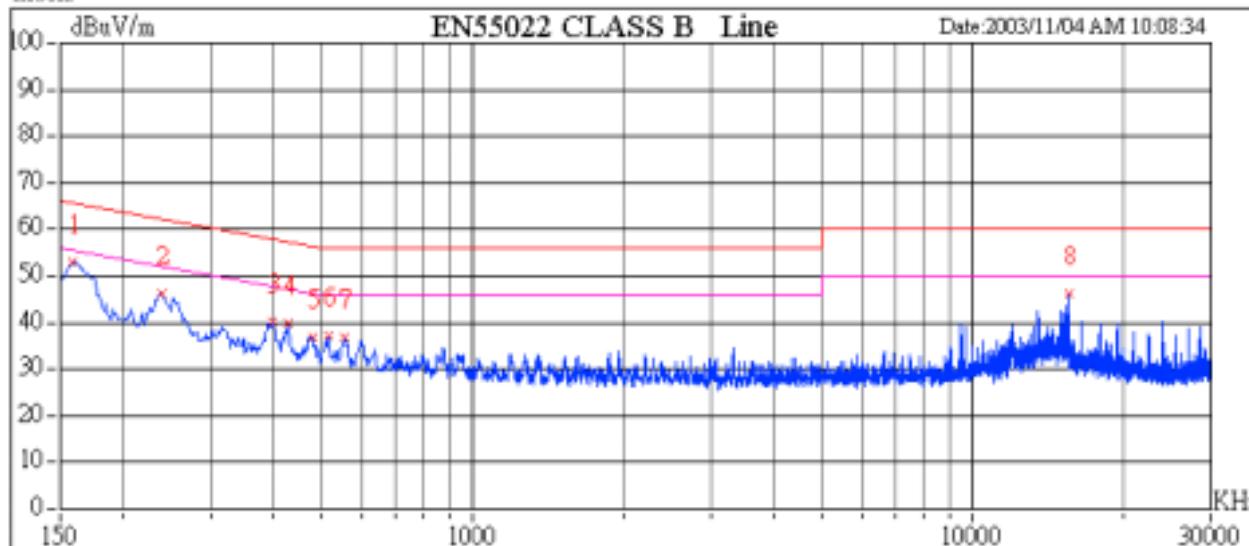
Custom Name: Dobbs-stanford corporation  
Model Name: FLX-2000  
Test Mode: PS/2

Project No.: SZ0310026  
Engineer Name: Paul

Custom Name: Dobbs-s  
Model Name: FLX-2000

Test Mode: PS/2

## Index:





Tel: 86-755-28055000  
Fax: 86-755-28055221

### **Site 6**

Custom Name: Dobbs-stanford corporation  
Model Name: FLX-2000  
Test Mode: PS/2

Project No.: SZ0310026  
Engineer Name: Paul

Custom Name: Dobbs-st:

Model Name: FLX-2

Test Mode: PS/2

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