RF Emissions Test Report
To Determine Compliance With:
FCC, Part 15
Rules and Regulations

Model number: Crick USB Switch Box
November 12, 2001

Applicant: Crick Software Inc.
50-11 6th Ave. S.E.
Suite 211
Bellevue, WA 98004

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Section 1

General Information

Applicant:	Crick Software Inc. 50-11 6th Ave. S.E. Suite 211 Bellevue, WA 98004
Applicant representative:	Mrs. Valerie Laird
Manufacturer:	Crick Software Ltd. 35 Charter Gate, Quarry Park Close Mountain Park Northampton NN3 6QB United Kingdom
Manufacturer representative:	**Mr. John Crick**
Equipment covered by this report:	Model no. Crick USB Switch Box
Options covered by this report:	None
Equipment serial no.	Prototype
Test specifications:	To determine compliance with: FCC, Part 15, Subpart B Rules and Regulations, Class B

Section 1 continued…

Test report number:	01-227A
Test commenced:	November 11, 2001
Test completed:	November 11, 2001
Test engineer:	**Kent Stewart**

Test Facility: The test facility used to perform these tests is on file with the FCC under file 31040/SIT, 1300F2 and located at:

EMC Testing Laboratories, Inc.
2420 Oak Street West
Cumming, GA. 30041-6456

Section 2

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Summary:

Tests	Results
FCC, Part 15, Class B, Radiated emissions:	**Pass**
FCC, Part 15, Class B, Conducted emissions:	**Pass**

1- The product(s) covered by this report was found to comply with the Class B limits of the FCC, Part 15, Subpart B Rules and Regulations.

2- The minimum margin of compliance was **–1.2** dBμv/m at 266.6 Mhz followed by **–5.5** dBμv/m at 333.2 Mhz.

3- The test results apply only to the products identified on the test report.

Product description:
The product(s) covered by this report consisted of a model Crick USB Switch Box, which is intended for use as a simple on/off device for use with disabled persons.

The enclosure is constructed of plastic with overall dimensions measuring 6.5cm wide by 6.5cm deep by 2.8cm high and house's the following components:

1. A printed wiring board, manufactured by Crick Software, part no. USB SWITCH © 2001 Iss. A STD+SIMTEC.

Test configuration:
The equipment under test was set-up and configured as specified by the manufacturer as follows:

1- The EUT was connected to the following support peripherals.

A) A laptop computer, manufactured by IBM, model no. 2611-410, serial no. AA-D2PFF 98/12, FCC marked.

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B) Two button switches, manufactured by Tash, series 5700.

C) A mouse manufactured by Logitech, model no. M-S34-6MD, serial number LZA60347350, FCC ID: DZL210472.

D) A printer, manufactured by Hewlett Packard, model 660C, serial number SG5BE1C151, FCC ID: B94C2164X.

E) A power controller, manufactured by CPS, model IPC, serial number 031561.

2- The EUT utilized the following cables and were connected as indicated below:

A) Two unshielded cables (integral to the button switches) were connected to the EUT's 1 and 2 Switch ports.

B) A shielded USB cable was connected from the EUT's USB port to the computer's USB port.

C) A shielded cable, (integral to the mouse) was connected to the computer's mouse port.

D) A shielded printer cable was connected from the computer's parallel printer port to the printer.

E) A shielded serial cable was connected from the computers serial port to the power controller's serial port.

Test operation:
For all measurements, the equipment under test was caused to function in a continuous mode of operation for maximum electrical activity as specified by the manufacturer. Specifically, the laptop computer was programmed with drivers to recognize the EUT as a human interface device (joystick controller) and the EUT was connected to the laptop's USB port. Additionally, the laptop was programmed with software to continuously scroll the "H" character across the monitor.

Test report summary sheet 3 of 3

Test notes:
During radiated and conducted testing all cables were manipulated to find the a worst case emissions configuration. During the investigation of the worst case configuration, it was determined that only two switch buttons were required to simulate worst case emissions since, the adding of additional cables did not increase the measured emissions.

Modifications:
The following modifications were required to comply with the indicated limits:

1- None

Engineering Statement:
All measurement data, of this test report, was taken in accordance with the FCC, Part 15, Subpart B Rules and Regulations and ANSI C63.4-1992 by EMC Testing Laboratories, Inc., located in Cumming, Georgia. Although this data is taken under stringent laboratory conditions and to the best of our knowledge, represents accurate data, it must be recognized that emissions from or immunity to this type equipment may be greatly affected by the final installation of the equipment. Therefore, EMC Testing Laboratories, Inc., while supporting the accuracy of the data in this report, takes no responsibility for use of equipment based on these tests. The manufacturer of this equipment must take full responsibility for any field problems which may arise, and agrees that EMC Testing Laboratories, Inc., in performing its functions in accordance with its objectives and purposes, does not assume or undertake to discharge any responsibility of the manufacturer to any other party or parties.

Conclusion:
With the above indicated modifications, the product(s) covered by this report has been tested and found to comply with the limits for a Class B device in accordance with the FCC, Part 15, Subpart B Rules and Regulations.

Tested by:

Kent Stewart
Laboratory Manager

Reviewed by:

Gene J. Bailey
Engineering Manager
EMC Testing Laboratories, Inc.
November 12, 2001

Section 2 cont…

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Section 3

STANDARD REFERENCE

The following primary standards were used for this test:

1) **ANSI C63.4-1992:** Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 Khz to 40 Ghz.

2) **US Code of Federal Regulations (CFR) (1998):** Title 47, Part 15, Radio Frequency Devices, Subpart B, Unintentional Radiators.

Section 4

TEST METHOD

INTRODUCTION:

The product(s) covered by this report were subjected to electromagnetic interference emissions measurements to determine compliance with the FCC, Part 15 requirements.

Radiated and conducted emissions were measured in accordance with Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz, ANSI C63.4.

MEASUREMENT CALCULATIONS:

Radiated Emissions:

For radiated emissions measurements, the signal attenuation due to impedance losses in the antenna and signal cable was significant and was added to the spectrum analyzer reading to give corrected signal strength reading. If a preamplifier was used, the signal gain was subtracted from the signal strength reading. Radiated emissions data was specified as decibels above 1 microvolt per meter (dBμV/m) of radiated field strength.

Radiated emissions (dBμV) = Analyzer reading (dBμV) plus
antenna factor (dB) plus cable factor (dB) minus Amplifier gain (dB)

Conducted Emissions:

For conducted emissions, the signal attenuation due to impedance losses in the LISN and signal cables were negligible and assumed to be 0dB. The conducted emissions were directly equal to the spectrum analyzer reading. Conducted emissions data was specified as decibels above 1 microvolt (dBμV) of conducted line voltage.

Conducted emissions (dBμV) = Analyzer reading (dBμV)

RADIATED EMISSIONS MEASUREMENT:

Radiated emissions measurements were performed at an open field test site. The receiving antenna was positioned 3 or 10 meters from the equipment under test as indicated below, along the center axis of the test site. Measurements were made with broadband antennas and if necessary, detected emissions were verified with dipole antennas. The dipole antenna was manually tuned to the signal frequency by adjusting the length of the antenna elements. The radiated emissions were measured for both the horizontal and vertical signal planes by rotating the antennas. Additionally, the EUT was rotated by the turntable and the antenna height was raised and lowered 1 to 4 meters to locate the maximum emission strength at each frequency.

Emission measurements made from 30 Mhz to 1000 Mhz were made at an antenna to EUT distance of 10 meters.

Emission measurements made from 1000 Mhz to 10 Ghz were made at an antenna to EUT distance of 3 meters.

The following antennas were used to measure the radiated emissions within the specified frequency spans.

Antenna	**Frequency Span**
Biconical	20 - 200 Mhz
Log Periodic	200 - 1000 Mhz
Dipoles	20 - 1000 Mhz
Horn	1-18 Ghz

CONDUCTED EMISSIONS MEASUREMENT:

Conducted emissions measurements were performed on a ground plane that was electrically bonded to earth ground. The equipment under test was positioned 0.8 meter above the ground plane and 0.8 meter minimum from the LISN that was positioned on the ground plane. The LISN housings were electrically bonded to the ground plane. The conducted emissions for both the ungrounded supply conductor (L1) and the grounded conductor (L2) of the power supply cord were measured. The conducted emissions were measured over the frequency span of 0.45 to 30 Mhz. The measurements were conducted in the quasi-peak and average detector modes.

INSTRUMENTATION:

Radiated and conducted signal strength measurements were taken with a spectrum analyzer. Radiated emissions were measured with broadband and tuned dipole antennas. Conducted emissions were measured with a 50 UH line impedance stabilization network (LISN). The test equipment consists of the following:

Test Equipment	Model No.	Serial No.	Cal. Due
Spectrum Analyzer	HP 8591A	2919A00171	06-19-02
Spectrum Analyzer	8592L	3649A00744	02-12-02
LISN	94641-1	0145/0146	06-01-02
Biconical Antenna	3110B	1708	09-14-02
Biconical Antenna	BIA-25	2451	09-14-02
Log Periodic	LPA25	1112	09-14-02
Dipole Antenna	DM-105A-T1	31402-110	06-01-02
Dipole Antenna	DM-105A-T2	31402-105	06-01-02
Dipole Antenna	DM-105A-T3	31402-109	06-01-02
Horn Antenna	3115	9405-4264	09-14-02
R.F. Amplifier	QB-820	11602	09-14-02
Preamplifier	8449B	3008A00914	09-14-02

DETECTOR FUNCTION:

All measurements were taken using a peak hold signal detector function. In this mode, the spectrum analyzer makes continuous scans across the frequency band and stores the highest emission value detected at each frequency for all scans. The peak hold integration will detect transient or low duty cycle emissions peak which might be missed on single scan measurement. The emission value at each frequency was a true value.

SPECTRUM ANALYZER SETTING:

For all measurements, the spectrum analyzer was set for a 10 dB input attenuation. 10 dB/Division vertical scale and 90 or 100 dBμV reference level. The resolution bandwidth was set at 9 Khz for the 0.45 - 30 Mhz span, 120 Khz for 30 - 1000 Mhz span and 1 Mhz for measurement above 1000 Mhz. The video bandwidth and sweep rate were automatically coupled by the analyzer.

Section 5

RADIATED EMISSIONS MEASUREMENTS

RADIATED EMISSIONS MEASUREMENTS

Model number: Crick USB Switch Box **Test date:** November 11, 2001

Frequency Mhz	Measurement Reading dBμV/m	Corrected Reading dBμV/m	FCC Limit dBμV/m	Minimum Margin dBμV/m
Vertical				
114.9	31.0	21.8	33.0	-11.2
168.4	30.3	23.5	33.0	-9.5
232.5	33.3	25.1	35.5	-10.4
233.2	33.5	25.3	35.5	-10.2
266.6	35.1	28.4	35.5	-7.1
333.2	30.6	25.7	35.5	-9.8
Horizontal				
168.4	30.0	23.0	33.0	-10.0
232.5	30.8	22.2	35.5	-13.3
233.3	32.2	23.6	35.5	-11.9
*266.6	41.2	34.3	35.5	**-1.2**
333.2	35.2	30.0	35.5	**-5.5**
1333.0	45.9	36.2	54.0	-17.8

* - Indicates Quasi-Peak Measurement.

Section 6

CONDUCTED EMISSIONS MEASUREMENTS

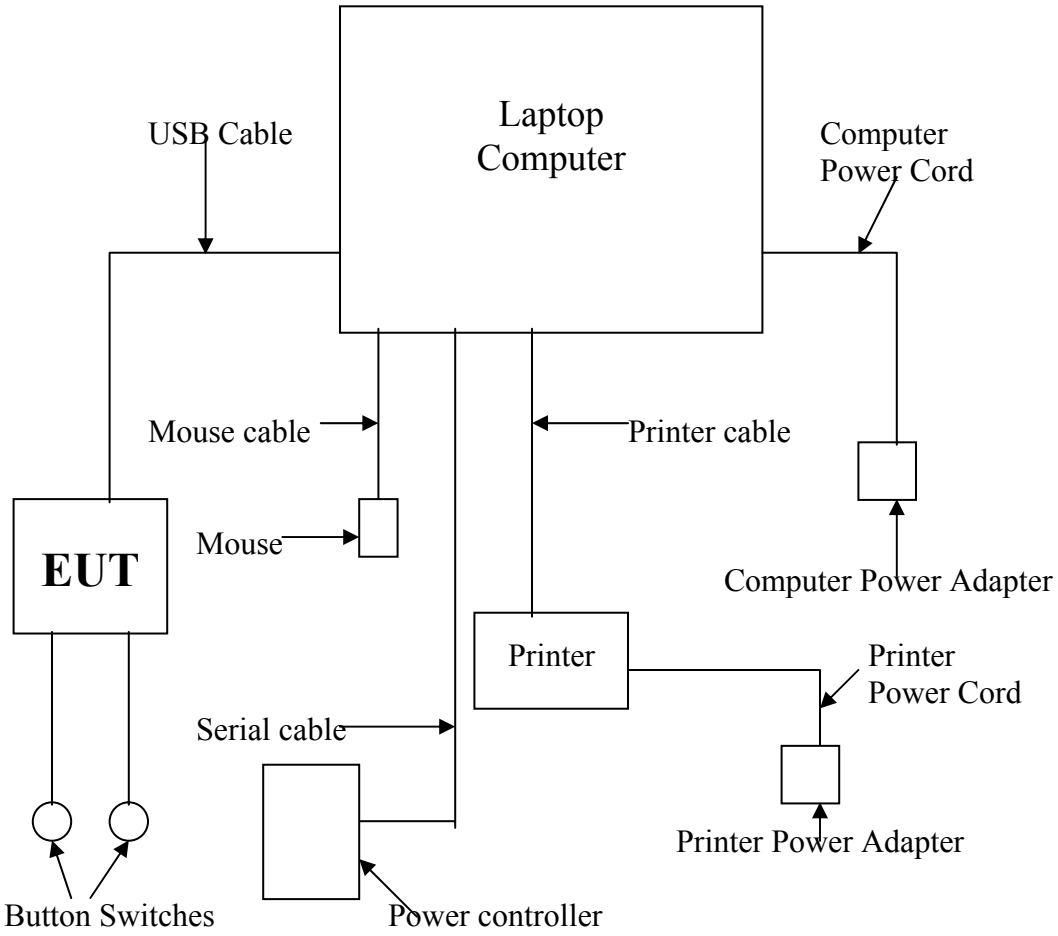
CONDUCTED EMISSIONS MEASUREMENTS

Model number: Crick USB Switch Box
Test voltage: 120V, 60Hz **Test date:** November 11, 2001

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBuV	Margin dBuV
0.45	35.1	0.45	35.8	48.0	-12.2
1.6	31.2	1.6	30.0	48.0	-16.8
8.2	26.4	8.5	25.8	48.0	-21.6
20.5	30.1	20.4	30.7	48.0	-17.3
21.8	31.5	21.6	32.7	48.0	-15.3
22.5	30.8	22.1	32.4	48.0	-15.6

Section 7

Test Configuration



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