



Atlas Compliance & Engineering, Inc.

FCC Test Report

FCC CFR 47 Part 15.207(d) and 15.249 COMPLIANCE

• • • • • • • • • •

MADCATZ
7480 Mission Valley Rd. Suite 101
San Diego, CA 92108 USA

Product:
PlayStation 2 RF Controller
Model:
8246

Test Report Number: 0230MDC8246c_subc
Date of Report: July 23, 2002

This report contains 22 pages and may be reproduced in full only.
Partial reproduction may only be done with the written consent of
Atlas Compliance & Engineering, Inc.



Table of Contents

Table of Contents	2
General Information	3
Test Equipment	4
Test Configuration.....	5
EUT Description / Note:.....	5
EUT Support Program.....	5
EUT Modifications for Compliance	5
EUT Support Devices	6
I/O Ports and Cables	6
Equipment Under Test.....	7
Equipment Block Diagram	15
Test Setup (Radiated Emissions)	16
Test Methods for Emissions	18
Conducted Emission Testing	18
Temperature and Humidity	19
Sample Calculations	19
FCC Part 15 Subpart C 15.207 and 15.249 Limits	20
Report of Measurements Radiated Data	21
COMPLIANCE VERIFICATION REPORT	22
Table 1 - Support Equipment Used For Test	6
Table 2 - EUT Port Termination's	6
Table 3 - Host Port Termination's	6
Table 4 - Radiated Emission Limits, Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHz, and 24.0 – 24.25 GHz.	20
Table 5 - Conducted Limits	20
Table 6 - Radiated Emission Level.....	21
Figure 1 - Test Setup Diagram.....	15



General Information

Test Report Number: 0230MDC8246c_subc

Date Product Tested: June 18, 2002

Date of Report: July 23, 2002

Applicant: MADCATZ
7480 Mission Valley Rd. Suite 101
San Diego, CA 92108 USA

Contact Person: Dave Preller

Equipment Tested: PlayStation 2 RF Controller

Trade Name: 8246 Controller

Model: 8246

Purpose Of Test: To demonstrate the compliance of the PlayStation 2 RF Controller, 8246, with the requirements of FCC CFR 47 Part 15 Rules and Regulations to the limits of Subpart C 15.207(d) and 15.249 using the procedure stated in ANSI C63.4-1992.

Frequency Range Investigated: 30 MHz to 10,000 MHz

Test Site Locations: Field Strength Measurement Facility:
Atlas Compliance & Engineering, Inc.
726 Hidden Valley Road
Royal Oaks, California 95076
Conducted Interference and Immunity
Measurement Facility:
Atlas Compliance & Engineering, Inc.
675 Sycamore Drive
Milpitas, California 95035

Test Personnel: Bruce Smith
EMC Engineer



Test Equipment

The following list contains the test equipment that was utilized in making the measurements in this report.

Description _ Model	Serial	Manufacturer	Calibrated	Calibration Due
BiLog Antenna _ CBL6112B	2783	Schaffner	8/8/01	8/8/02
Horn Antenna _ 3115	9003-3340	EMCO	1/23/02	1/23/03
Pre amp 9 kHz – 2 GHz _ CPA9231A	3323	Schaffner	5/24/02	5/24/03
Pre amp 1 – 26.5 GHz _ 8449B	3008A00910	HP	5/31/02	5/31/03
EMI Test Receiver 9 kHz - 2500 MHz _ ESPC	DE15934	Rohde & Schwarz	6/11/02	6/11/03
EMI Receiver 100 Hz – 22 GHz _ 8566B	2542A13058 (IF) 2637A03426 (RF)	HP	5/28/02	5/28/03



Test Configuration

Customer: MADCATZ
Test Date: June 18, 2002
Specification: FCC CRF 47 Part 15.249 Limits,
ANSI C63.4-1992 Methods

EUT Description / Note:

The EUT, 8246, a PlayStation 2 RF Controller, was powered up and in a continuous transmitting mode. The EUT is battery powered therefore no conducted emissions testing was performed.

EUT Support Program

The EUT was constantly at 924.8 MHz. The other frequencies between 924.8 MHz and 927.5 MHz were tested to find maximum emissions, 924.8 MHz was where the maximum emission level was observed. Bandedge measurement was taken with the EUT operating at 927.5 MHz and FSK modulation.

EUT Modifications for Compliance

There were no modifications performed on the EUT. The test results state the emission levels of the EUT in the condition as it was received on June 14, 2002.



EUT Support Devices

Table 1 - Support Equipment Used For Test

Model:	Description:	S/N	FCC ID#
SCPH-30001	Sony PlayStation 2 Console	U0356599	DoC
14AF-41	Toshiba Color TV	15611401 A	DoC

I/O Ports and Cables

Table 2 - EUT Port Termination's

I/O Port	Cable Type	Length	Connector	Termination
none				

Table 3 - Host Port Termination's

I/O Port	Cable Type	Length	Connector	Termination
AV	Triple Coax, Ferrite Bead	8 FT	RCA (3x)	Monitor
Power	Non-Shielded	7 FT	IEC	Power Mains



Equipment Under Test

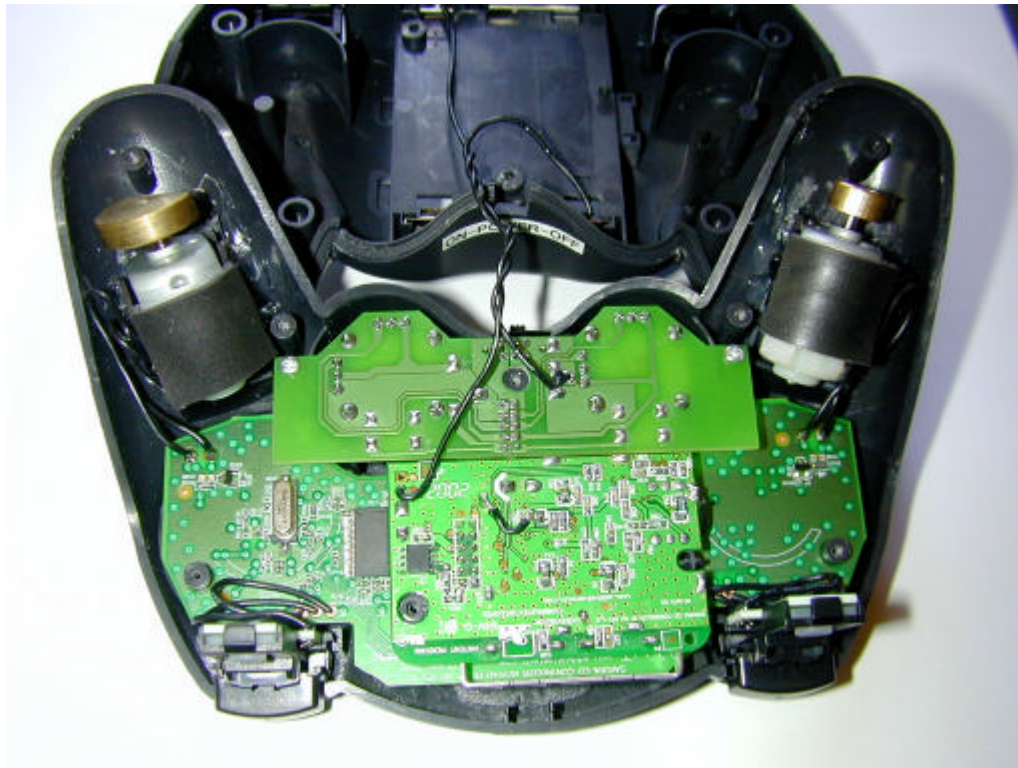
The photographs below show the condition of the EUT for test.



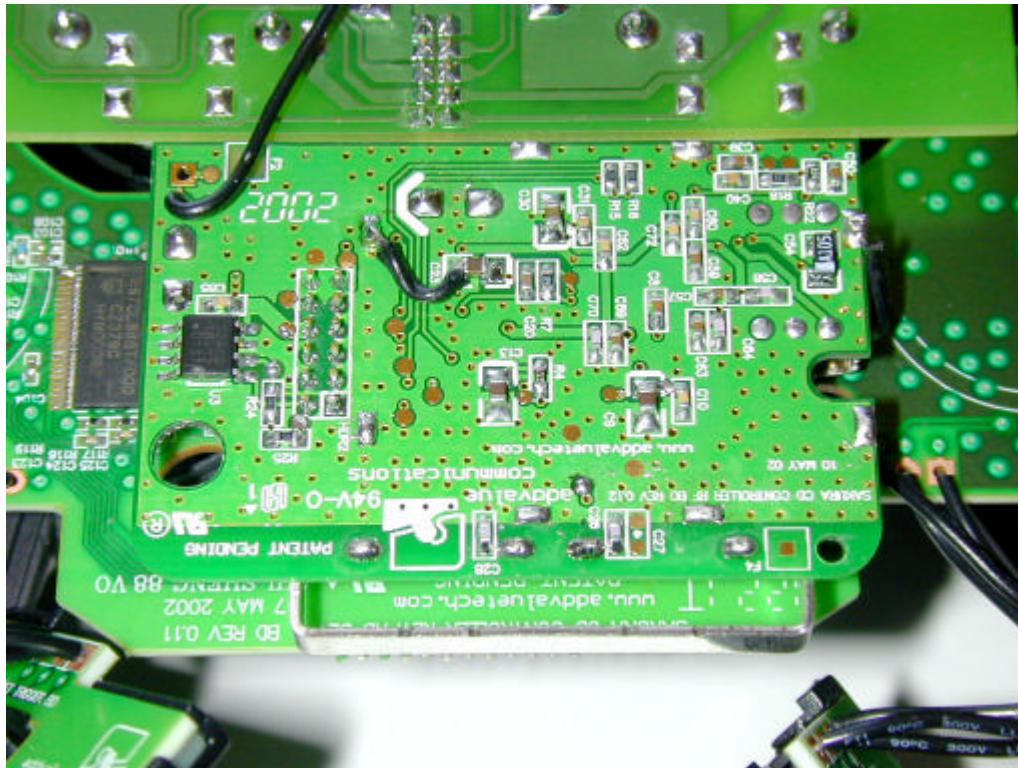


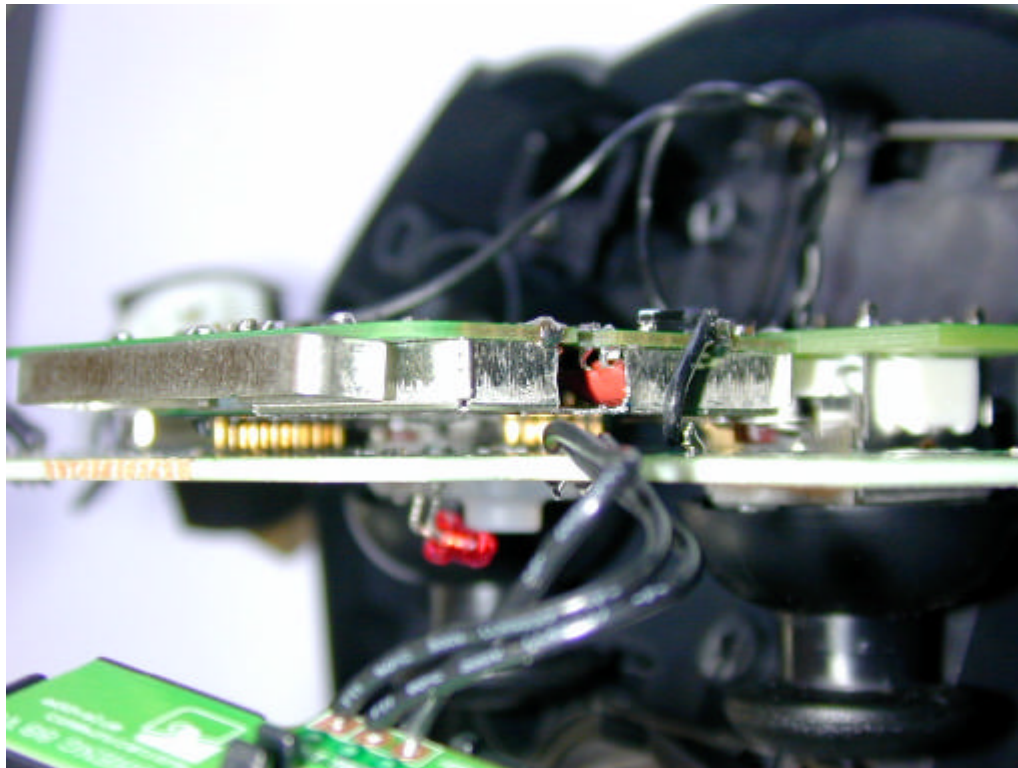










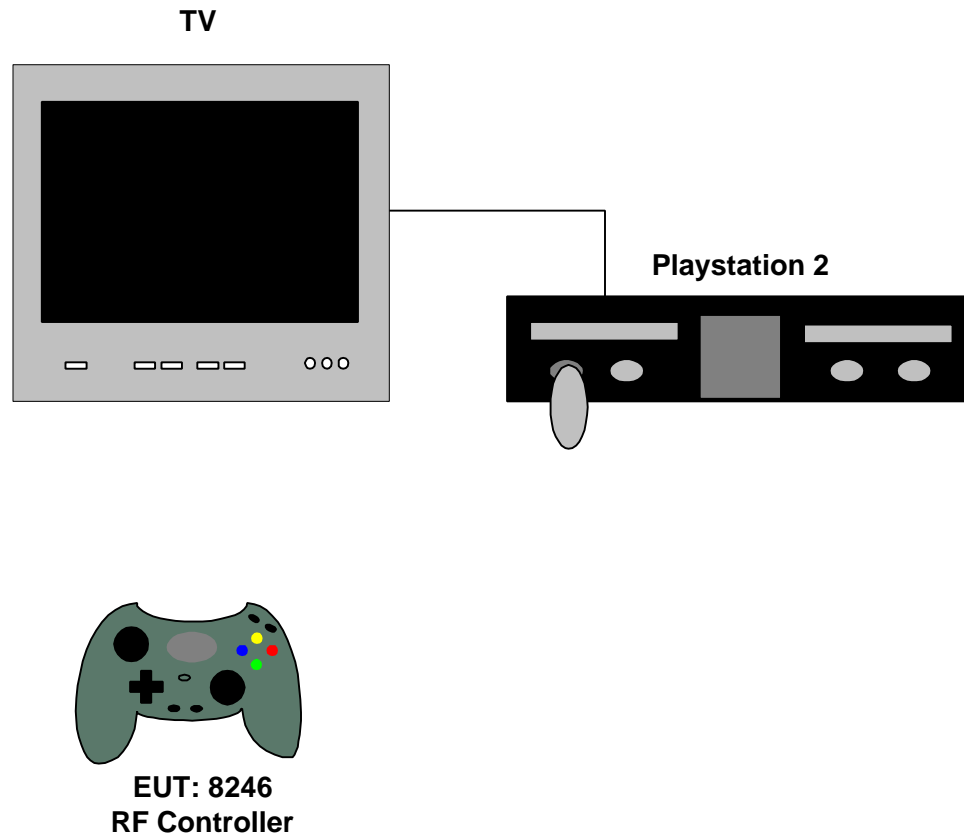




Equipment Block Diagram

Following is the block diagram of the test setup. Refer to TEST CONFIGURATION pages for port connections and information.

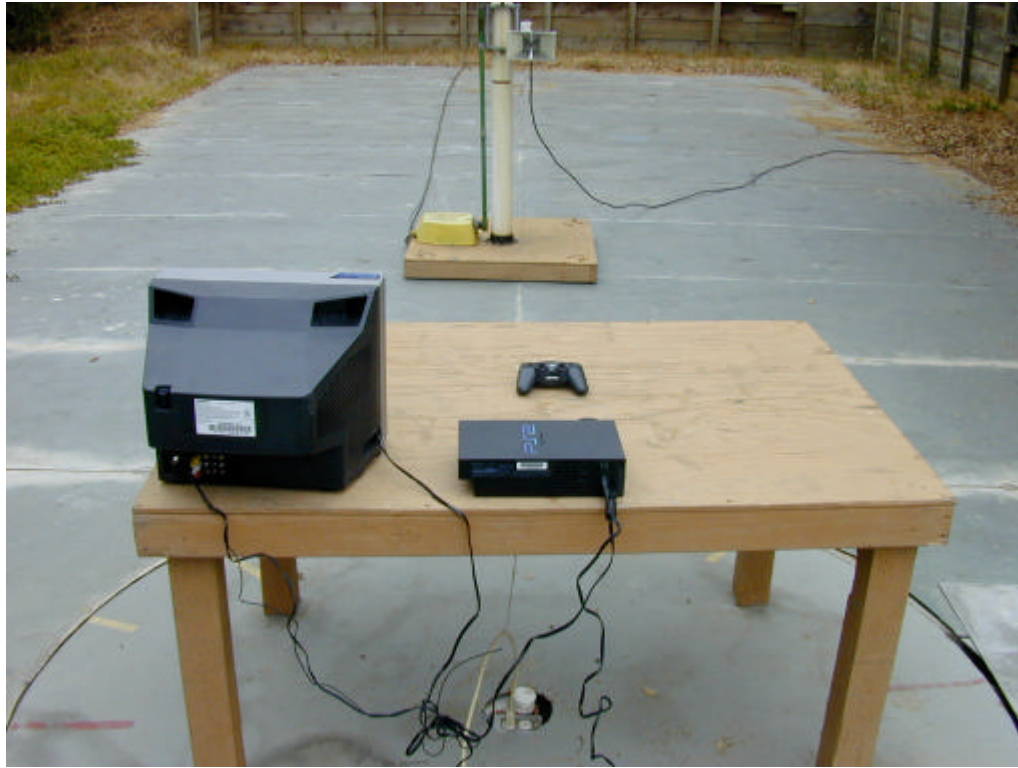
Figure 1 - Test Setup Diagram





Test Setup (Radiated Emissions)

The photographs below show worst case setup for radiated emission testing.







Test Methods for Emissions

The test procedure stated in ANSI C63.4-1992 was used to collect the test data. The radiated emission data of the EUT was taken with the Rohde & Schwarz EMI Test Receiver or HP 8566B. Incorporating the application of correction factors programmed into the Test Receiver and verified for distance, antenna, cable loss, and amplifier gain, the data was reduced as shown in the Sample Calculations. These correction factors are available upon request. The corrected data was then compared to the emission limits to determine compliance.

During radiated emission testing, the EUT was placed on a nonconductive rotating table 0.8 meter above the conductive grid. The nonconductive table dimensions were 1 meter deep by 1.5 meters wide at 0.8 meter high. The EUT is centered on the tabletop and the measurement antenna was placed 3 meters from the EUT as noted in the test data. The EUT, being a hand-held device, was tested in 3 orthogonal axes to determine which attitude produced the highest emission.

For radiated emissions testing, scans in the frequency range of 30 MHz to 10000 MHz were made. Each frequency between 9 kHz and 150 kHz was measured at a bandwidth of 200 Hz, between 150 kHz and 30 MHz was measured at a bandwidth of 10 kHz, between 30 MHz and 1000 MHz was measured at a bandwidth of 120 kHz and between 1000 MHz and above was measured at a bandwidth of 1 MHz. Measurements were made employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz, and above 1GHz which employed an average detector. All readings within 10 dB of the limits were recorded, and those emissions were then measured using the appropriate detector and bandwidth for a 2-second measurement time.

Measurements were made at a distance of 3 meters.

Conducted Emission Testing

The EUT is a battery powered device therefore no conducted emission testing was performed.



Temperature and Humidity

The ambient temperature of the actual EUT was within the range of 10° to 40° C (50° to 104° F) unless the particular equipment requirements specify testing over a different temperature range. The humidity levels were within the range of 10% to 90% relative humidity unless the EUT operating requirements call for a different level.

Sample Calculations

An example of how the EMI Test Receiver reading is converted using correction factors is given for the emissions recorded in Table 6. These correction factors are programmed into the EMI Test Receiver and verified. For radiated emissions in dBμV/m, the EMI Test Receiver reading in dBμV is corrected by using the following formula:

92.4	Meter Reading (dBμV/m)
29	- Pre amp Gain (dB)
1.9	+ Cable Loss (dB)
23.3	+ Antenna Factor (dB)
88.6	= Corrected Reading (dBμV/m)

This reading is then compared to the applicable specification limits and the difference will determine compliance. For conducted emissions, no correction factors are needed when a 50 μH LISN is used.



FCC Part 15 Subpart C 15.207 and 15.249 Limits

*Table 4 - Radiated Emission Limits,
 Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz,
 5725 – 5875 MHz, and 24.0 – 24.25 GHz.*

Frequency MHz	Field Strength of fundamental millivolts/meter	Field Strength of harmonics microvolts/meter
902 – 928	50	500
2400 – 2483.5	50	500
5725 – 5875	50	500
24000 – 24250	250	2500

NOTE:

1. Field strength limits are specified at a distance of 3 meters..
2. Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.
3. As shown in 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Table 5 - Conducted Limits

Frequency MHz	Limit Quasi-Peak dBmV	Limit mV
0.45-30	48	250

NOTE:

1. The emission limits shown are based on measurements employing a CISPR quasi-peak detector.



Report of Measurements Radiated Data

The following table reports the results of the radiated measurements for the PlayStation 2 RF Controller, 8246.

Table 6 - Radiated Emission Level

15.249 Limit dB μ V/m	Fundamental Frequency MHz	Level dB μ V/m	Detector	Test Distance	Antenna	Polarity	Margin dB
94 @ 3 meters	924.8	83.1	PK	3	BiLog	H	10.9
		88.6	PK	3	BiLog	V	5.4

15.249 Limit dB μ V/m	Harmonic Frequency MHz	Level dB μ V	Detector	Test Distance	Antenna	Polarity	Margin dB
54 @ 3 meters	1849.6	49.09	PK	3	Horn	H	4.91
		51.49	PK	3	Horn	V	2.51
54 @ 3 meters	2774.4	30.26	PK	3	Horn	H	23.74
		41.16	PK	3	Horn	V	12.84
54 @ 3 meters	3699.2	13.17	PK	3	Horn	H	40.83
		16.47	PK	3	Horn	V	37.53
54 @ 3 meters	4624.0	13.74	PK	3	Horn	H	40.26
		13.74	PK	3	Horn	V	40.26
54 @ 3 meters	5548.8	16.15	PK	3	Horn	H	37.85
		16.15	PK	3	Horn	V	37.85
54 @ 3 meters	6473.6	16.49	PK	3	Horn	H	37.51
		16.49	PK	3	Horn	V	37.51
54 @ 3 meters	7398.4	18.29	PK	3	Horn	H	35.71
		18.29	PK	3	Horn	V	35.71
54 @ 3 meters	8323.2	19.05	PK	3	Horn	H	34.95
		19.05	PK	3	Horn	V	34.95
54 @ 3 meters	9248.0	20.50	PK	3	Horn	H	33.50
		20.50	PK	3	Horn	V	33.50

46 @ 3 meters	Bandedge 928	27.46	QP	3	BiLog	H	18.54
---------------	-----------------	-------	----	---	-------	---	-------

Test Method: ANSI C63.4-1992
 Spec Limit: FCC 15.249
 No other emissions were observed.

Note: PK = Peak
 H = Horizontal
 V = Vertical

COMMENTS: System continuously running. Ambient temperature 67°F and relative humidity of 56%. Test distance of 3 meters. Quasi-peak and average detectors were not used since the peak readings were under the limits. No emissions observed after the forth harmonic, measurements taken are baseline measurements after the forth harmonic. Bandedge measurement was taken with FSK modulation.



COMPLIANCE VERIFICATION REPORT

TEST CERTIFICATE

APPLICANT: MADCATZ
7480 Mission Valley Rd. Suite 101
San Diego, CA 92108 USA

Trade Name: PlayStation 2 RF Controller

Model: 8246


I HEREBY CERTIFY THAT:

The measurements shown in this report were made in accordance with the procedures indicated and that the energy emitted by this equipment, as received, was found to be within the FCC CFR 47 Part 15 Subpart C section 15.249 for Radiated emissions. Additionally, it should be noted that the results in this report apply only to the items tested, as identified herein.

I FURTHER CERTIFY THAT:

On the basis of the measurements taken at the test site, the equipment tested is capable of operation in compliance with the requirements set forth in FCC CFR 47 Part 15.207(d) and 15.249 Rules and Regulations.

On this Date: July 23, 2002



Bruce Smith
Atlas Compliance & Engineering, Inc.

Printed Name

Signature
MADCATZ Representative