TEMPEST INC.

112 Elden Street Herndon, Virginia 20170
(703) "TEMPEST" (836-7378) FAX:(703) 709-9565
info-2007@tempest-inc.com http://www.tempest-inc.com

**** Our 22nd Year in Business: 1985 - 2007 ****

Results of Electromagnetic Compatibility Testing Performed in Accordance with Title 47, Part 15 of the United States Code of Federal Regulations on the Model ESRX Receiver of the eStrap™ System, a Strap-Controlled Guitar Expression System made by Atlantic Quality Design, Inc. 562 Oak Hill Road, Fincastle Virginia 24090

Prepared by:

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Louis T. Gnecco, M.S.E.E., President
Certified Electromagnetic Compatibility Engineer: Cert.# EMC-000544-NE

August 6, 2007

Abstract

As requested by purchase order # 10140 issued by Atlantic Quality Design, Inc., during the period of August 1 - 6, 2007 TEMPEST INC. performed the Electromagnetic Compatibility Tests required for Class B digital devices by Title 47, Part 15 of the United States Code Of Federal Regulations on the Model ESRX receiver, FCC ID# VHO-ESRX, of the eStrap™ system, a strap-controlled guitar expression system made by Atlantic Quality Design, Inc.

The eStrap™ system is called the "Strap-Controlled Expression System with Classic Wah." It consists of a transmitter and a receiver.

The transmitter is a battery-powered device that mounts on the shoulder strap of an electric guitar. Inside the transmitter is a strain gauge. It measures the varying amount of tension that the musician puts on the shoulder strap as he plays. The transmitter converts the strain gauge reading to a digital signal, operating in bursts at approximately 60 times per second. The digital signal is then used to modulate the frequency of a 916 MHz carrier. This FM signal is radiated by a short flexible wire that forms a 1/4 wave rod antenna.

Normally placed approximately ten feet from the transmitter, the receiver is powered by an a.c. adapter. The receiver detects the digital FM signal produced by the transmitter and uses it digitally to create special effects on the guitar's music, all under the control of the musician

This report only presents the results of testing performed on the Model ESRX receiver.

Transmitter testing is described in a separate report.

The receiver's radiated and power line conducted emissions were measured, as required for class B digital devices by Title 47 of the United States Code of Federal Regulations, Part 2, section 2.906, and Part 15, sections 15.33(b)(3), 15.101, 15.107 (b) and 15.109(a).

The testing was performed in accordance with ANSI C63.4-2003.

The eStrap™ Receiver that was tested complies with the requirements of Title 47, Part 15 of the United States Code Of Federal Regulations for Class B digital devices.

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List of Illustrations

The following illustrations are also submitted electronically as .jpg files:

List of Tables

Reference Documents:

(a) United States Code Of Federal Regulations, Title 47, Part 15

(b) ANSI C63.4-2003: "American National Standard for Methods of Measurement of Radio-Noise Emissions of Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"

(c) "Results of Electromagnetic Compatibility Testing Performed in Accordance with Title 47, Part 15 of the United States Code of Federal Regulations on the Model ESTX Transmitter of the eStrap™ System,
a Strap-Controlled Guitar Expression System made by
Atlantic Quality Design, Inc. 562 Oak Hill Road, Fincastle Virginia 24090"
TEMPEST INC.: August 6, 2007

1.0 Introduction.

As requested by purchase order #10140 issued by Atlantic Quality Design, Inc., during the period of August 1 - 6, 2007 TEMPEST INC. performed Electromagnetic Compatibility tests in accordance with References (a) and (b) on the Receiver of the eStrap™ system made by Atlantic Quality Design, Inc. of Fincastle, Virginia

1.1 Purpose.

The purpose of this test was to determine if the eStrap™ Receiver complies with the requirements of Reference (a.)

1.2 Test Location.

Testing was performed in the Electromagnetic Compatibility Laboratory and the FCC-listed Open Area Test Site of TEMPEST INC.

1.3 Cognizant Personnel.

The following personnel conducted, witnessed, or are cognizant of these tests:

Louis T. Gnecco, President
Paula Levin Gnecco Vice President
TEMPEST INC. 112 Elden Street, Herndon, Virginia 20170
(703) 836-7378 e-mail: info-2007@tempest-inc.com

Mr. Hank Wallace, President
Atlantic Quality Designs, Inc.
562 Oak Hill Road, Fincastle, VA 24090
540-966-4356 (v) 540-966-4358 (f)
hwallace@aqdi.com

2.0 Description of the eStrap™ Receiver.

The eStrap™ Model ESRX Receiver, FCC ID# VHOESRX, is part of the "Strap-Controlled Expression System with Classic Wah." a strap-controlled guitar expression system made by Atlantic Quality Design, Inc.

The system consists of a transmitter and a receiver.

The transmitter is a battery-powered device that mounts on the shoulder strap of an electric guitar. Inside the transmitter is a strain gauge. It measures the varying amount of tension that the musician puts on the shoulder strap as he plays. The transmitter converts the strain gauge reading to a digital signal, operating in bursts at approximately 60 times per second. The digital signal is then used to modulate the frequency of a 916 MHz carrier. This FM signal is radiated by a short flexible wire that forms a 1/4 wave rod antenna.

Normally placed approximately ten feet from the transmitter, the model ESRX receiver draws 9 Volts of d.c. power at 200 milliamperes, supplied by a 110 Volt a.c. outlet adapter. The receiver detects the FM signal produced by the transmitter and uses it to digitally create special effects on the guitar's music, all under the control of the musician.

The receiver uses the following local oscillators:
916MHz +/-10.7 MHz or 916 MHz +/-21.4 MHz (937.4 MHz maximum)

The receiver that was tested came with no serial number, so it was marked "RX-1" with an indelible marker.

3.0 Test Procedures.

As described below, testing was performed in accordance with references (a) and (b.) Radiated and power line conducted emissions were measured.

3.1 Instruments.

Table 1 is a list of the instruments used. No ancillary equipment was needed to make the eStrap™ Receiver operate normally.

A log periodic antenna, a biconical antenna, and a Hewlett-Packard spectrum analyzer were used in a 3 meter Open Area Test Site to detect radiated emissions.

A Solar Electronics Line Impedance stabilization network was used to detect power line conducted emissions in a 10 ft. x 12 ft. x 8 ft. 100 dB shielded room having filtered a.c. power and lined with microwave absorbing material.

3.2 Calibration Check.

Using its internal calibration source, the calibration of the spectrum analyzer was verified both immediately before and immediately after the test.

3.3 Dynamic Range and Detection System Sensitivity Tests.

Before testing, the dynamic range of the instrumentation was determined to be 80 dB, and the detection system sensitivity was -95 dBm.

3.4 Local Interference Test.

With the eStrap™ Receiver turned off, the ambient signals in the Open Area Test Site were measured and recorded, to verify that any signals being measured were coming from the eStrap™ Receiver, and not from other local sources, such as cellular telephones. Preliminary measurements were made in the laboratory to identify the frequencies emitted by the eStrap Receiver.

3.5 Measurements.

All measurements were performed in accordance with reference (b.)

3.5.1 Radiated Measurements.

The eStrap™ Receiver was placed normally, with its stub antennas facing upward, on a nonconductive turntable 3 meters from the antenna hoist. It was then rotated about 360 degrees in 16 equal increments of 22.5 degrees each, as recommended by reference (b.) The receiving antenna was raised from 1 to 4 meters above the ground plane while the emissions were measured. The peak values of the signals detected from the eStrap™ Receiver were recorded in dBm. These were converted to µV/m using the following formulas:

Field strength (dBµV/m) = measured level (dBm) +107 dB + antenna factor (dB) + cable loss (dB)

Field Strength in dBµV/m = 20 Log $_{10}$ (Field Strength in µV/m)

Field Strength (µV/m) = Anti Log $_{10}$ [(Field Strength in dBµV/m) / 20]

3.5.2 Power Line Conducted Measurements.

As shown in Figure 3, the eStrap™ Receiver was placed on a nonconductive table in a shielded room, as required by Reference (b). The eStrap™ receiver was connected to filtered 110V a.c. power through a Line Impedance Stabilization Network. (LISN.) Conducted emissions were measured over the 9 kHz to 30 MHz frequency range.

The peak values of the signals detected from the eStrap™ Receiver were again recorded in dBm. These were converted to microvolts (µV) using the following formula:

Power Line conducted voltage (dBµV) = measured level (dBm) +107 dB + LISN correction factor (dB) + cable loss (dB)

4.0 Results.

As shown in Table 2, The eStrap™ Receiver passed all tests.
Power line conducted emissions were found from 30 to 61 MHz. These signals are more than 30 dB below the Class B limit. They were not detected during the radiated tests.

5.0 Conclusions.

The eStrap™ Receiver that was tested complies with the requirements of Reference (a) for Class B digital devices.

Illustrations.

Figure 1: eStrap™ Receiver

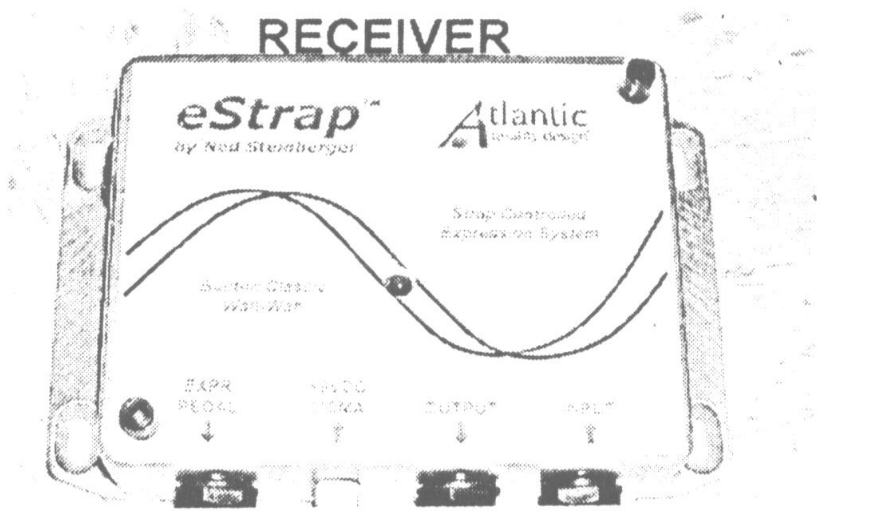
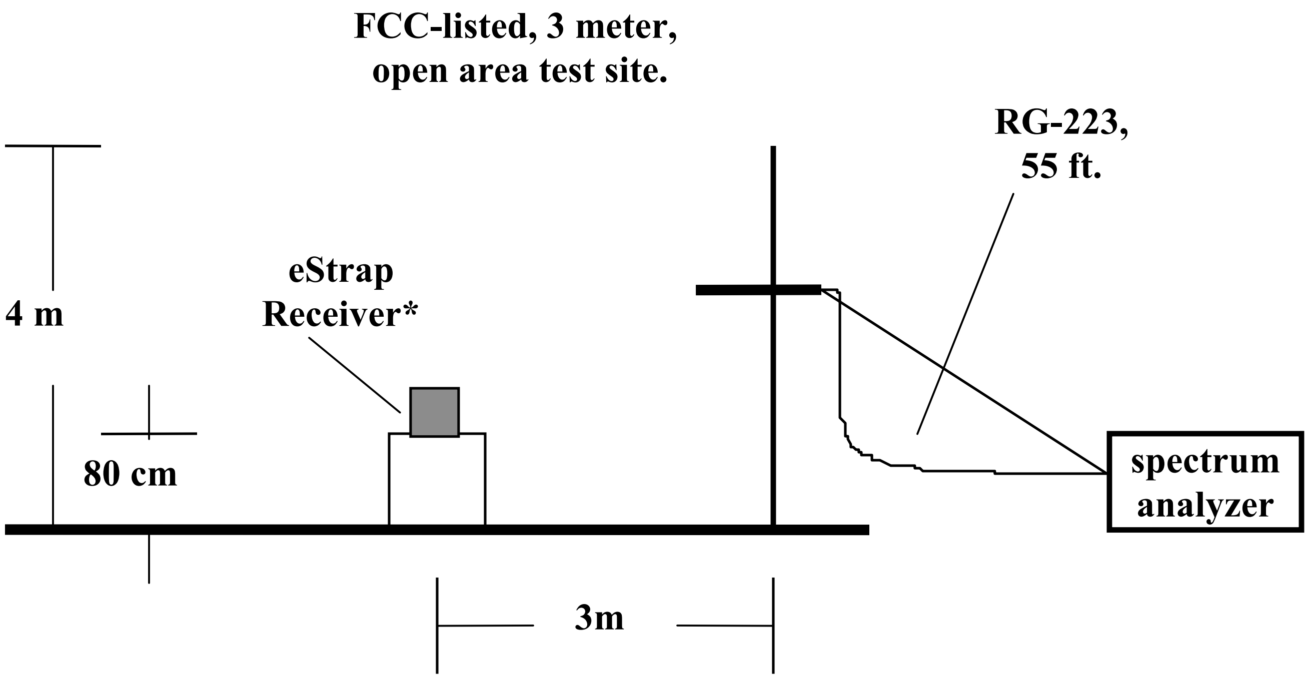
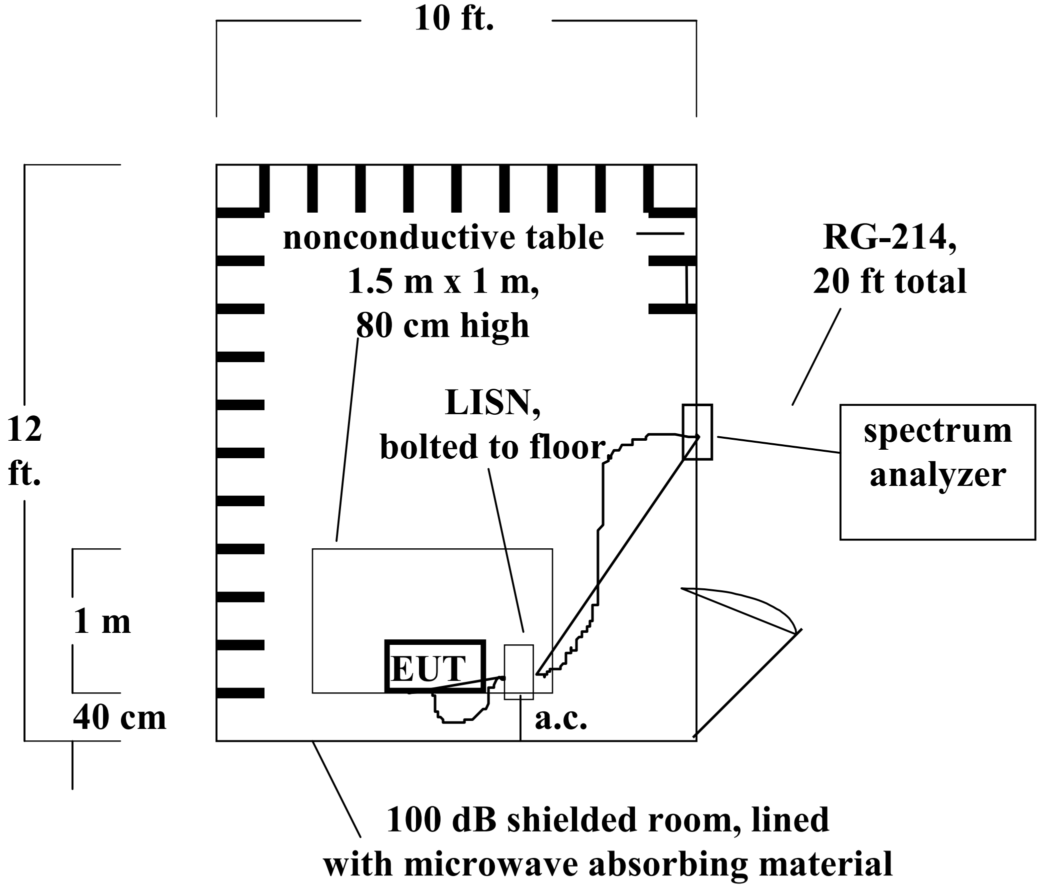


Figure 2: Block Diagram of Test Setup,
Radiated Emissions



* The eStrap Receiver was connected to 110 V a.c. power per fig. 11a, (pg.37) of Ref. (b.)

Figure 3: Block Diagram of Test Setup, Power Line Conducted Emissions.



Tables.

Table 1: Instruments

Mfg.	Model	Name	Serial No.	calibrated:	Due date:
Hewlett-Packard	141T	Spectrum Analyzer Display	TI-98	12/26/06	12/26/07
“	8555A	RF Section	TI-750	“	“
“	8552B	IF Section	TI-751	“	“
Tensor	4104	Biconical antenna	2154	12/27/06	12/27/07
TEMPEST INC.	NA 200/2G	Log Periodic Antenna	82	12/20/06	12/20/07
Solar Electronics	8012-50R -24BNC	Line Impedance Stabilization Network	970-901	12/3/06	12/3/07

Cable C1: 55 ft. of RG-223 with BNC male connectors: checked on 7/31/07
Cables A & B: 20 ft (total) of RG-214 with type “N” connectors, checked on 7/31/07.

Spectrum analyzer calibration was spot checked both before and after each test.

Table 2: Data

No radiated emissions were found. Per ref. (b,) six representative ambients are shown below: Vertical polarization, antenna height: 2 meters.

Frequency accuracy: 2% Amplitude accuracy: +/- 2 dB

Frequency MHz	Level dBm	level dBµV r.m.s.	Antenna Factor, dB	Cable loss,* dB	Level dBµV/m	Level µV/m	Class B Limit at 3 meters, µV/m
Biconical antenna							
20	-80	27	14	<1	46	200	n/a
58	-80	27	10	1	47	70	100
66	-40	67	10	1	78	8000	100
70	-82	25	7	1	33	30	100
Log Periodic Antenna							
418	-77	30	11	3	44	160	220
525	-46	61	14	4	79	8000	220
1000	-78	29	14	7	50	333	500

*55 feet of RG-223

Power Line Conducted Emissions: Phase Side.

Frequency accuracy: 2% Amplitude accuracy: +/- 2 dB

100 kHz Bandwidth, Detection system sensitivity: -90 dBm

Frequency MHz	signal ID	Level dBm	Level, dBµV r.m.s.	LISN factor dB	cabl e loss, dB	Level, dBµV rms	Class B Limit, dBµV
20	ambient noise	-86	21	1	<1	22	60
30	emission	-80	27	1	<1	28	60
38	"	-85	22	1	<1	23	n/a
52	"	-80	27	1	<1	28	n/a
53	"	-82	25	1	<1	26	n/a
54	"	-84	23	1	<1	24	n/a
61	"	-85	22	1	<1	23	n/a
.Power Line Conducted Emissions, Neutral Side							
20	ambient noise	-86	21	1	<1	22	60
30	emission	-82	25	1	<1	26	60
38	"	-86	21	1	<1	22	n/a
52	"	-80	27	1	<1	28	n/a
53	"	-80	27	1	<1	28	n/a
54	"	-84	23	1	<1	24	n/a
61	"	-86	21	1	<1	22	n/a

Appendix A: Cross-reference.

As a courtesy to the reviewer, the following is a cross reference to the documentation requirements of Ref. (b).

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