Nemko Test Report:	1L0548RUS1
Applicant:	Advanced Neuromodulation Systems, Inc, 6501 Windcrest Drive, Suite 100 Plano, Texas 75024
Equipment Under Test: **(E.U.T.)**	Genesis System
In Accordance With:	**FCC Part 15, Subpart C, Paragraph 15.209** General Limits For Low Power Transmitters
Tested By:	Nemko Dallas Inc. 802 North Kealy Dallas, TX 75057
Authorized By:	 Tom Tidwell, Wireless Group Manager
Date:	01/04/2002
Total Number of Pages:	15

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Section 1. Summary Of Test Results

Manufacturer: Advanced Neuromodulation Systems, Inc,

Model No.: Genesis System

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart C for low power devices. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated Emissions were made on an open area test site.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP LAB CODE: 100496-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207	N/A
Radiated Emissions	15.209	Complies

Footnotes For N/A's:

The device is battery powered. (Qty 3, AAA)

Section 2. General Equipment Specification

Frequency Range:	87.5 kHz +/- 2.5 kHz
Operating Frequency(ies) of Sample:	87.3 kHz
Crystal Frequencies:	3.6 MHz

	Yes	**No**
Integral Antenna	☒	☐

Note: *If antenna is not integral to transmitter explain method of attachment and type of unique connector:*

Description of Modification for Class II Permissive Change

Not Applicable

Modifications Made During Testing

Not Applicable

Theory of Operation

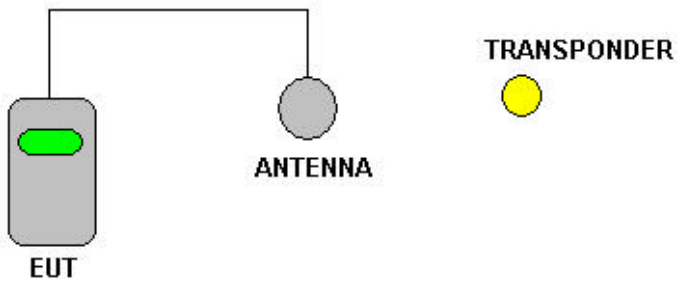
The Genesis™ System is a multi-programmable implantable neurostimulation system designed to deliver low-intensity, electrical impulses to nerve structures. The system consists of a hand-held battery powered patient programmer which communicates to a self-powered implantable pulse generator (IPG). The IPG delivers electrical impulses through an implanted lead(s) to the selected nerve fibers in order to provide therapeutic stimulation. The patient programmer enables the patient to adjust current stimulation parameters and select new programs for customized therapy.

The Genesis Programmer and IPG communicate by modulating a 87.5 kHz +/-2.5 kHz signal for data sent to the IPG and modulating a 40Khz signal for data sent back to the patient programmer. The data is modulated using a standard 2400 Baud RS232 protocol. All of the RF circuitry for the patient programmer is included in the paddle-like device which attaches to the patient programmer called the 'wand'. The wand must be placed within several inches of the implanted IPG to communicate with it.

For the transmitter section of the wand circuitry, timer circuitry generates a signal which is approximately 87.5 kHz that drives the carrier signal through an airwound inducter that acts as an antenna. The carrier is switched on and off by a signal from the patient programmer such that it meets the RS232 2400 baud timing requirements.

For the receiver section of the wand circuitry, when the wand is in receive mode, the airwound inductor becomes part of a 40Khz LC resonant tank circuit and the received carrier is sent through a two stage 40Khz bandpass circuit where it is then lowpass filtered to recover a 2400 baud logic level signal.

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY:	DATE:

Minimum Standard:

Frequency (MHz)	Maximum Permitted Conducted RF Voltage (dBmV)
.5 - 30	48

Not Applicable

Test Results: Complies / Does not comply. See attached graph(s).

Measurement Data: See attached graph(s).

Method of Measurement: **(Procedure ANSI C63.4-1992)**

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak Detector.

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.209
TESTED BY: David Light	DATE: 01/04/2002

Minimum Standard: The field strength of emissions from the device shall not exceed the following limits.

Fundamental (MHz)	Field Strength (mV/m)	Field Strength (dBmV)
0.009 - 0.490	2400/F(kHz) @ 300m	—
0.490 - 1.705	24000/F(kHz) @ 30m	—
1.705 - 30	30 @ 30m	—
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complies.

Measurement Data: **(Procedure ANSI C63.4-1992)**

Tested with fully charged batteries

Maximizing Emission Levels:
For hand held equipment or equipment that may be mounted in a variety of positions, the E.U.T. was tested on three orthogonal axis to determine orientation of worst-case emission levels. Below 30 MHz an active loop antenna is used at a fixed height of 1 meter. The loop is rotated about it's vertical axis to obtain worst-case results.

Spectrum Searched:
The spectrum was searched from the lowest frequency generated in the E.U.T. up to 1000 MHz, or the 10^{th} harmonic of the fundamental emission.

Near-Field Measurement:
Emissions below 30 MHz are measured in the near-field and an extrapolation factor of 40 dB per decade is used to determine the 10m limit.

Example: Measurement Distance = 10m
Specification Distance = 300m

10m Limit: Specified limit (at 300m) - (40 Log $\frac{10}{300}$)

Thus for measurement at 10m the specified limit is increased by 59 dB.

Test Data - Radiated Emissions

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

~~Data Plot~~ **~~Occupied Bandwidth~~**

Page ~~1~~ of ~~1~~ Complete X

Job No.: 1L0548R Date: 1/4/2002 Preliminary: _____

Specification: PART 15.209 Temperature(°C): 20

Tested By: David Light Relative Humidity(%) 45

E.U.T.: GENESIS SYSTEM

Configuration: TX TO TRANSPONDER IN TEST FIXTURE

Sample Number: 7

Location: Lab 1 RBW: Refer to plots

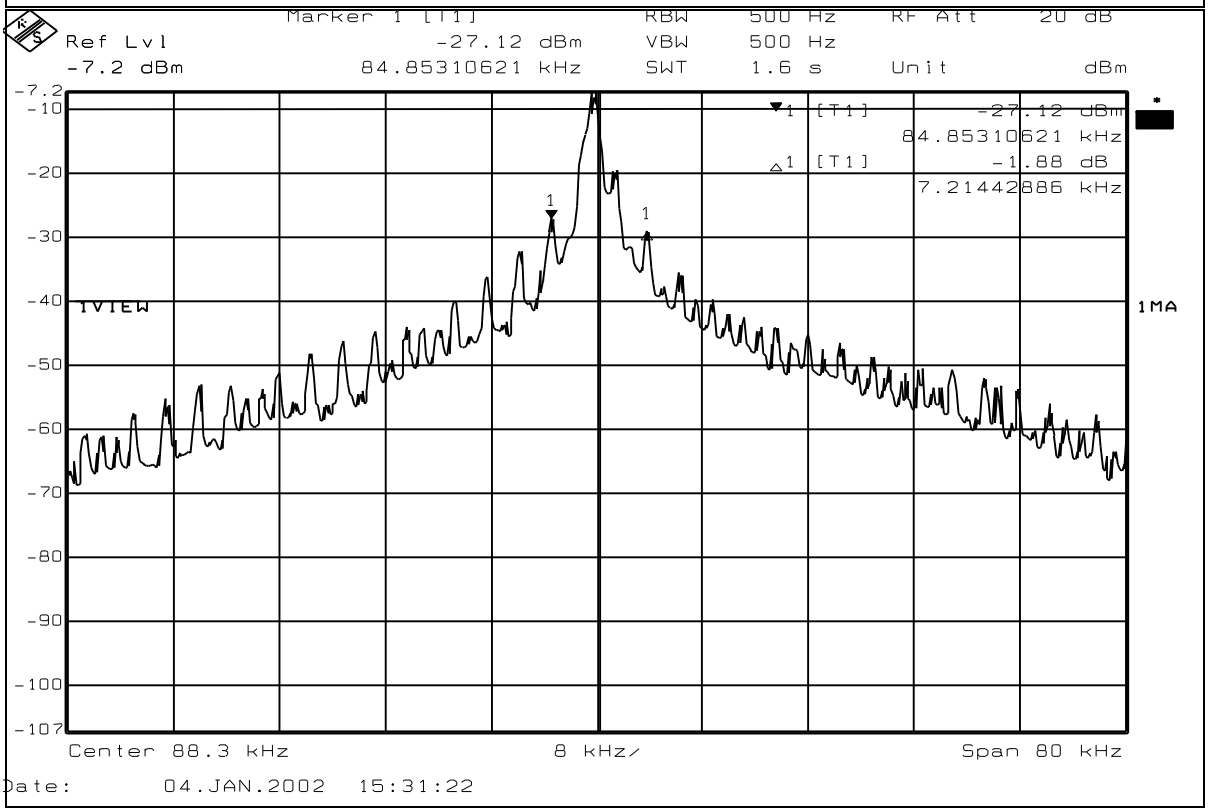
Detector Type: Peak VBW: Refer to plots

~~Test Equipment Used~~

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1082
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: _____

Measurement Uncertainty: +/-1.7 dB



Test Data – Radiated Emissions

Nemko Dallas, Inc.

802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Radiated Emissions

Radiated Emissions

H - Field

Complete X
Preliminary

Page 1 of 1

Client: ANS W.O.#: 1L0548R Date: 1/4/2001

EUT: GENESIS SYSTEM S/N: None

Tech: LIGHT Test #: 3 Lab: AOATS Photo ID: None

Equipment Used: 981-966 Antenna Distance: 3 Meters

Configuration: Transmitting to transponder in test fixture

IF Bandwidth: See below Video Bandwidth: N/A Detector: Peak X Quasi Peak

Ambient Temperature: 2 C EUT Power: 115 V.A.C. 60 Hz 1 Phase
Relative Humidity: 40 % 230 V.A.C. 50 Hz 3 Phase
X Other 4.5 Vdc (3 AAA Batteries)

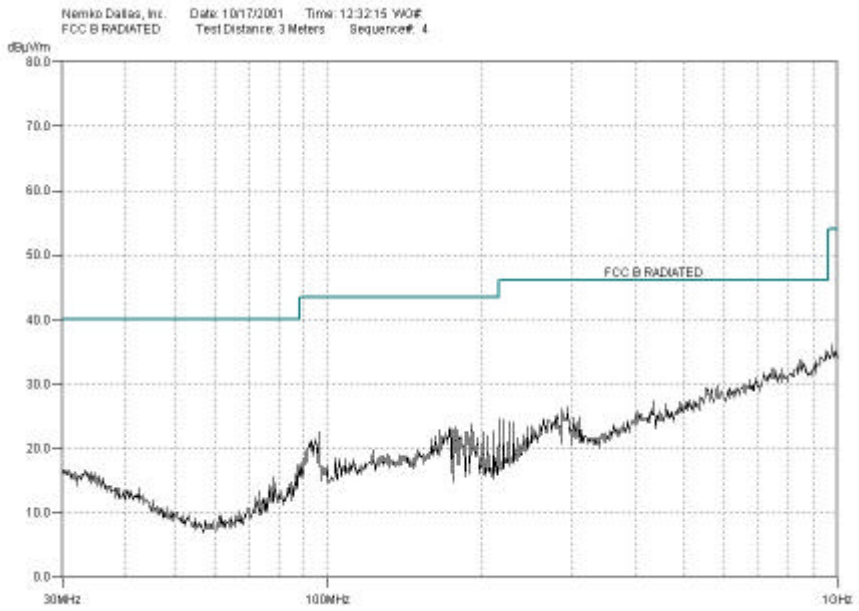
Freq. (MHz)	Meter Reading (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	RBW (Hz)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Delta (dB)	Comments:
88.3	43	0	0	200	43	108.7	-65.7	
176.6	38	0	0	200	38	102.7	-64.7	
264.9	40	0	0	9k	40	99.1	-59.1	
353.2	36	0	0	9k	36	96.6	-60.6	
441.5	29	0	0	9k	29	94.7	-65.7	
529.8	46	0	0	9k	46	73.1	-27.1	
618.1	29	0	0	9k	29	71.8	-42.8	Noise floor
706.4	34	0	0	9k	34	70.6	-36.6	Noise floor
794.7	41	0	0	9k	41	69.9	-28.9	Ambient
883.0	34	0	0	9k	34	68.7	-34.7	Noise floor

Scanned 9 kHz to 30 MHz

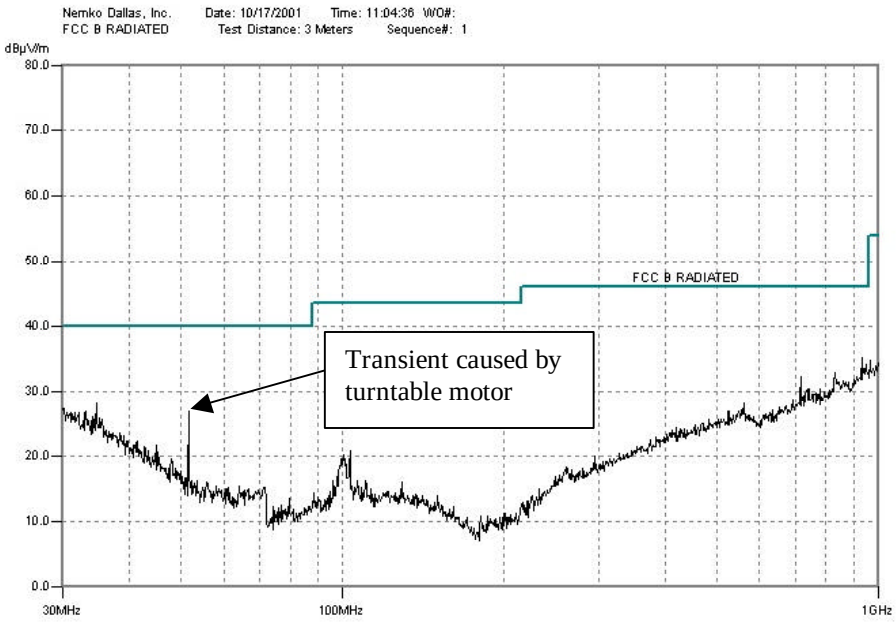
Test Data - Radiated Emissions

No emissions were detected above 30 MHz during prescan in an anechoic chamber.

Data plot horizontal



Data plot vertical



Radiated Photographs (Worst Case Configuration)

FRONT VIEW

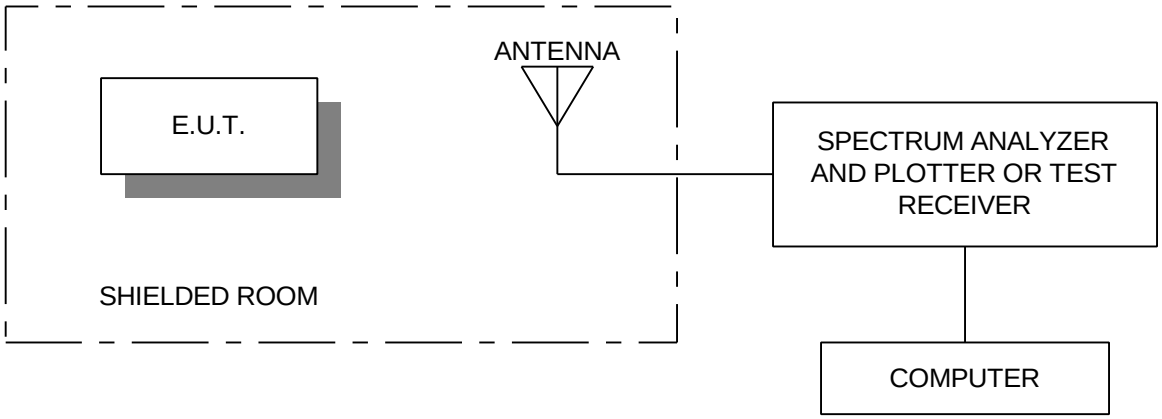
REAR VIEW

Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
981	ANTENNA,LOOP	ROHDE & SCHWARZ HFH2-Z2	871336/20	Cal Not Req
966	Receiver	Rohde & Schwartz ESH2	880370/029	06/05/01
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	06/01/01
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	06/01/01
791	PREAMP, 25dB	ICC LNA25	398	08/16/01
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	CalNotReq

ANNEX A - TEST DIAGRAMS

Radiated Prescan



Test Site For Radiated Emissions