HOGGAN SCIENTIFIC, LLC.

microFET 2™

USER GUIDE

Congratulations on becoming the proud owner of the new microFET2™ with wireless technology, Hoggan Scientific, LLC highly renowned handheld digital muscle tester. The microFET2™ is the cornerstone of Hoggan's highly functional and innovative medical products group, and is the most widely recognized muscle tester on the market today. The new microFET2™ wireless allows muscle testing to be done FREE of cords in conjunction with microFET clinical patient software. This provides freedom and ease of use performing muscle tests.

Hoggan has been creating innovative solutions for accurate, objective measurement since 1984, with the introduction of the original FET muscle tester. Over the past 20 + years, our product line has expanded to include inclinometers, grip and pinch gauges, and innovative ergonomic measurement instruments.

During that time, Hoggan's products have developed reputation for innovation, excellent quality, ease of use, and long lasting accuracy and reliability. Our highly satisfied customers include hospitals, universities, clinics and research institutions worldwide. The microFET products have been used by organizations as diverse as NASA, the Shands Institute, the US Olympics and professional sports teams.

At Hoggan, we are constantly improving our products to better meet your needs. Besides the addition of the new wireless technology incorporated into the microFET line of products, we've added some important new features to the microFET2™. You can now measure forces up to 300 lbs and select the unit of measure to read out in lbs, Newtons, or kgf.

We understand the value of customer feedback. Our customers provide us with many of our best product improvement ideas, as well as interesting new measurement applications. As you have comments and suggestions, we'd love to hear from you. Please e-mail us at contact@hogganhealth.net.

In the meantime, we hope you enjoy using your microFET2™ with new wireless technology immediately, and for many years to come. For more information on all of our innovative medical, ergonomic and fitness products, please visit us at www.hogganhealth.net.

microFET2™ Wireless Overview

The microFET2™ is an accurate, portable Force Evaluation and Testing (FET) dynamometer, designed specifically for taking objective, reliable, and quantifiable muscle testing measurements. The microFET2™ can be used as a stand alone device, or used with available software. The updated microFET2™ Wireless with radio frequency technology provides convenience for both you and your patients. The wireless microFET2™, when used with Hoggan Scientific microFET clinical software, alleviates the inconvenience of being wired to the computer and provides easier interaction with patients. A wireless instrument allows greater freedom in the exam room or testing area, and eliminates dictating the location of the computer and length of instrument cable so you can move freely during testing.

This unique, handheld device is battery operated, weighs less than 1 pound, and is ergonomically designed to fit comfortably in the palm of your hand. microFET2™ sophisticated digital technology was designed to achieve its high degree of accuracy and reliability.

Information from the gauge is displayed in two LCD windows, Peak Force, and Duration/Sec. During the test, the Peak Force LCD shows the force being applied against the transducer pad, and at the conclusion of the test, the LCD displays the maximum force reached. Duration/Secs shows the elapsed time of the test from the time the testing threshold was crossed until the test was concluded.

The microFET2™ was designed to be a standalone gauge for capturing individual force measurements for any muscle test. However, the gauge can also be attached to Hoggan Scientifics optional muscle testing software to increase your evaluation and documentation capability.

We hope you enjoy your microFET2™ experience.

Hoggan Scientific, LLC

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HOGGAN SCIENTIFIC, LLC.

microFET2™ System

CAUTION: Federal (USA) law restricts the sale of this device by or on the order of a physician.

USER QUALIFICATION
The microFET2™ must be used by a physician or by medical personnel under the supervision of a physician. The user must have received sufficient training in clinical procedures.

DESCRIPTION
The microFET2™ is a wireless-capable dynamometer that measures the peak force applied to the transducer pad and its duration during any muscle test.

INDICATIONS
microFET2™ is a dynamometer device for performing muscle tests to quantitatively measure muscle weakness caused by injury, as well as measure general muscle strength. The device is used to record and convey an individual's ability to resist force for a specific muscle or muscle group being tested.

HOW SUPPLIED
The microFET2™ is a reusable and provided non-sterile to the end-user. The device is packaged in a carrying case (See figure 1) to protect the device during transport. The microFET2™ is supplied with:

- microFET2™ wireless digital dynamometer (5021)
- Flat/Round Transducer pad (0001)
- Curved Transducer pad (00035)
- Digit Transducer pad (00003)
- Muscle Testing Positions wall chart
- Upper Body test recording tablet
- Lower Body test recording tablet
- User Guide
- Product/Warranty card
- Calibration certificate
- Carrying Case
- Rechargeable LI-ion Battery
- Wall Pack Power Supply Charger
- *Optional – Bluetooth / FET Stick (Included with software when software ordered)*

CONTRAINDICATIONS
The microFET2™ is contraindicated under the following:

- On or near open wounds
- Patients having severe osteoporosis
- On or near burned tissue
- On or near the eye
- On or near fractures
- Not to be used for any purpose other than indicated

Figure 1: The microFET2™ device in supplied carrying case

WARNINGS AND PRECAUTIONS:

- **The microFET2™ device should only be used by trained professionals.**
- **The microFET2™ device and accessories are provided non-sterile and are not compatible with autoclave or other sterilization techniques. Do not autoclave.**
- **Use only a factory supplied wall pack power supply, charger. Use of another charger may result in electrical shock or equipment damage.**
- **microFET2™ devices are not intended for use while attached to wall pack power supply, charger. Never attempt to operate the instrument while it is connected to the charger as electrical shock or damage to the instrument may occur.**
- **The microFET2™ device is not protected against ingress of liquids. Keep device dry. Do not immerse the microFET2™ device or accessories in water.**
- **When in use device should be used on top of clothing.**
- **Discontinue use of any product if skin irritation develops.**
- **The microFET2™ is a precision medical device. Device should be treated with care. Do not drop, bang or hit or cause other impact to the device.**
- **Not recommended for use in extreme temperatures.**
- **Applied part is microFET2™ device with a transducer pad attached.**
- **Do not dispose of microFET2™ device in fire. microFET2™ device contains lithium ion battery.**

- **Device is not known to contain any hazardous materials. For proper disposal instructions, consult your local waste management facility. Recycling should be used where available.**
- **Hoggan Scientific microFET2™ and USB dongle should not be used while stacked on, or adjacent to, other electrical or medical electrical equipment. If microFET2™ is stacked or adjacent to other electrical or medical electrical equipment, all electrical equipment should be checked to confirm normal operation.**
- **Rechargeable lithium ion battery is only serviceable part.**
- **Do not service the battery while in use with patient.**
- **Making any modifications or using any accessories not specifically approved by Hoggan Scientific, LLC may void the warranty as well as reduce immunity to electromagnetic interference, or increase electromagnetic emissions, and result in improper operation.**
- **The use of portable and mobile Bluetooth (RF) equipment:**
  - **A. Can possibly affect medical electrical equipment normal operation.**
  - **B. The RESPONSIBLE ORGANIZATION (Hospital, clinic, healthcare professional) should identify, analyze, evaluate and control related risks.**
  - **C. RESPONSIBLE ORGANIZATION - Changes to IT-Network (Updates or upgrades to the microFET2 device, changes to the IT Network Configuration, connections or disconnections of items to the IT Network) could introduce new risks that require additional analysis.**
- **Medical Electrical Equipment needs special precautions regarding EMC. microFET2™ needs to be installed and put into service according to the information provided in this manual.**

DIRECTIONS FOR USE

OPERATING FEATURES

- On/Off Switch – turns device on or off.
- Sleep Mode – The device enters a low power mode after being left on for three minutes. The device can be awoken by turning off the power for at least five minutes or pressing the reset button.
- Reset Button – (see Figure 2) The reset button activates the microFET2™ and reinitializes the unit for testing. It is not necessary to reset after each test, but may be necessary to clear false readings caused by static discharge.

Figure 2. Device Buttons

- Threshold Button – (See Figure 2) Controls the amount of force required before the microFET2™ begins recording test data.
- LCD Windows – Display Test Results and Option Settings.
  - Peak Force – Displays peak force of muscle test
  - Duration – Displays the duration of the muscle test

GENERAL USE

- Read all instructions before use.
- Select the appropriate transducer pad for the test being performed: Flat Pad for flat surfaces, curved pad for rounded surfaces, and digit pad for fingers and toes.
- Attach appropriate transducer test pad to muscle tester by screwing the transducer test pad onto the threaded stud on the muscle tester. Tighten to snug fit but do not over tighten.
- Switch the power button to the "On" position.
- To perform a muscle test, place examiner's hand through the elastic strap of the microFET2™.
- The device is placed between the examiner's hand and the patient's limb to be tested, with the transducer pad contacting the patient.
- The examiner applies a force against the limb, while the patient provides a counter or resistive force.
- After the test, the device displays the peak force measured along with the duration of the applied force for review and recording of test results (see Figure 5).
- To begin another test, perform muscle test. The device will automatically clear previous test results and begin recording data for new test. Pressing the Reset button will also clear previous test results and will display zeroes in both LCD display windows for start of new test.
- Up to 30 previous stored test results can be accessed. See Data Retrieval Mode Instructions below.

DATA RETRIEVAL MODE

- With the device in the test mode (displaying zeroes in both display windows), hold down the threshold button and click the reset button, this puts the device

in data retrieval mode.

- The device will display the peak force (in the peak force window), test number (in the left hand side of the duration window), and duration of the test (in the right hand side of the duration window) See Figure 3).

Figure 3. Data Retrieval Mode Test Result Display Example

- Press the threshold button to cycle through the stored test results (up to 30).
- For tests shorter than 10 seconds, a decimal point will appear for the duration.
- For tests longer than 10 seconds, no decimal point will appear for the duration.
- To delete saved tests, hold down threshold button and click reset button twice.
- Note: If wireless or RF mode is powered on (wireless mode turned on for use of device with software), device will not save and store tests.
-

microFET2™ WIRELESS OPERATION

The microFET2™ may wirelessly transfer data to accompanying software if desired by the examiner.

- To turn the wireless mode on, hold down the threshold button for ten (10) seconds.
- The device will enter force unit of measure setting mode after five (5) seconds, continue to hold down the threshold button until the peak force display shows "rF", this is the wireless power setting menu (see Figure 4).

Figure 4. Wireless Mode Setting

- The duration screen will display the current wireless power mode as "On" or "Off".
- Toggle the wireless power setting by pressing the threshold button.
- Return to test mode by pressing the reset button.

THRESHOLD SETTINGS

- The device threshold determines the minimum force required before the microFET2™ begins recording test data as shown in the table below.

Threshold Setting	High	Low
Force Required to Start Test	3 lbf 12.1 N	0.8 lbf 3.6 N
Measurement	Up to 300 lbf in 0.1 lbf increments (1320 N in 0.44 N increments)	
When to Use	Normal Use – Reduces False Starts	Weak Muscles, Finger and Toe Tests

- The current threshold setting is displayed as either an "L" or "H" on the left side of the duration window. Figure 5 shows the device in Low Threshold Setting.

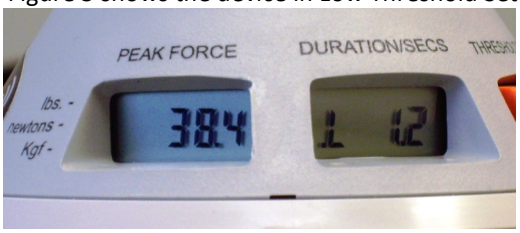

Figure 5. LCD Display Windows /Threshold Setting and Sample Test Results

- The threshold can be toggled between high and low by pressing the threshold button (see Figure 2) when the device is in test mode.

FORCE MEASUREMENT SETTINGS

- The force unit of measure may be changed between Pounds, Newtons, and Kilogram force.
- With the device in test mode, hold down the threshold button for five seconds, this puts the device in force unit of measure mode.
- The Peak Force display will then display a hash mark next to the current measurement unit in the peak force window (See Figure 6) .

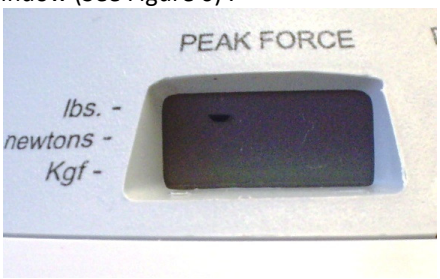

Figure 6. Force Measurement Mode

- Press the threshold button to toggle through the available units of measure.
- Once the desired unit is selected, press the reset button to return to test mode.

BATTERY CHECK

- With the device powered on in test mode, hold down the threshold button and click the reset button.
- Continue to hold the threshold button for five seconds. The device will display “P” in the peak force window and a number from 1 to 100 in the duration window. The number in the duration window indicates the battery charge in percentage (See Figure 7).

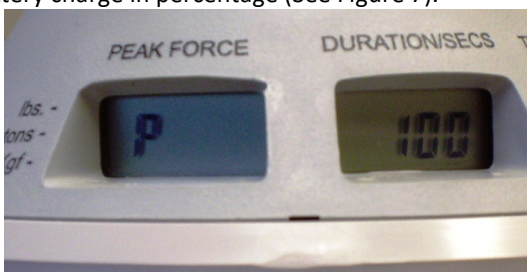

Figure 7. Power Check Display

- The unit will return to data retrieval mode after five seconds. To regain access to battery check, hold the threshold button for five seconds.
- To return to test mode, press the reset button.

“MAKE” OR “BREAK” MUSCLE TESTING

The microFET2™ is designed to be used with either the "make" or the "break" form of manual muscle testing.

To perform “make” testing the clinician positions the patient to isolate and contract the muscle of interest with the device in the proper position (see Figure 8 for examples). The clinician gets into "power position", a stable position that will provide the clinician the maximum ability to resist the force applied by the patient. The clinician instructs the patient to apply force against the device, while the clinician resists. The object of the test is for the patient to exert or "make" the maximum force he is capable of, using only the muscle being tested. "Make" tests typically run for seconds (slow count of 4). Many people find it helpful to start the test by announcing "go" and end the test by stating "relax".

"Break" testing is also performed by carefully positioning the patient and the device. The clinician stabilizes the patient in the isolated position, with one hand, while placing the microFET2™ unit in position to exert force against the limb associated with the muscle. The test begins with the clinician gradually applying force and the patient trying to resist. The object of the test is for the clinician to overcome, or "break" the patient's resistance.

Multiple published studies have proven manual muscle testing to provide consistent, reliable results, both across multiple tests by single tester, and across multiple testers. The keys to achieving valid results are proper patient and device positioning, and consistency of the testing methodology used.

Figure 8. Examples of Muscle Tests

For information on positions and manual muscle testing for main muscle groups, refer to the Manual Muscle Testing Positions Wall Chart included with your microFET2™. For additional clarification or how to test for additional muscle test positions, refer to manuals such as Daniels and Worthingham.

LOW BATTERY INDICATOR

Blinking readouts in LCD displays or unlit segments of the LCD display are indications that the microFET2™ battery power may be low. If LCD displays still blink or unlit segments remain after pressing Reset, the battery should be charged.

To avoid testing interruptions due to low battery power, we recommend that you check remaining battery power regularly, and re-charge battery when reaches approximately 15% power level. To check battery power, follow the battery check instructions.

CHARGING THE BATTERY

- To charge the battery, unscrew the transducer test pad to remove from the main unit.
- Insert the barrel connector from the wall pack transformer into the power connector that is located under the attachment. (see power connector on microFET2™ , Figure 9).
- If the unit is turned on the right display will show the battery power while the battery is charging.
- When the battery power reaches 100% then the battery is fully charged.
- To check battery level charge, turn power button to On position.
- If device is stored longer than 30 days, check battery power level and recharge battery before using if necessary.

Caution: *Only use power supply provided by manufacturer: Phihong Model PSAC05R-050-L6.*

Caution: *The power supply is the disconnect device and shall remain readily accessible for easy disconnection.*

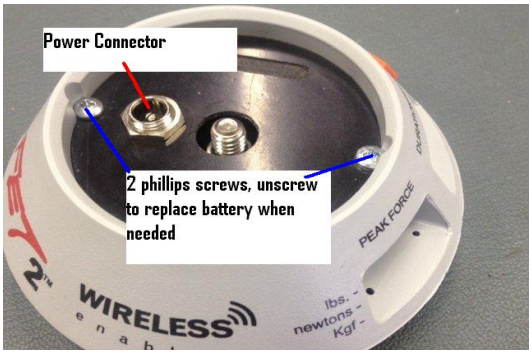

Figure 9. Device Charging and Battery Access

REPLACING THE BATTERY

When replacing rechargeable battery, use only rechargeable battery supplied by Hoggan Scientific: Model ICR14250 (1) 3.7V 1/2 AA LI-ion rechargeable battery, 280 mAH. Other batteries may cause damage to device and void warranty. These batteries can be purchased from Hoggan Scientific LLC. To change the battery:

- When replacing battery, do not touch the internal circuitry, battery, and patient simultaneously.
- Remove the attachment from the main unit. Carefully remove the 2 Philips head screws from the battery cover (see Figure 9).
- Pull the battery cover up and rotate to the side to allow access to the battery.
- When installing new battery, make sure the positive (+) post of battery aligns with the (+) mark on the microFET2™ pc board (see Figure 10).
- Check power level of rechargeable battery to see if needs charging before use.
- If after installing replacement battery, the segments do not light up in LCD displays, please contact Hoggan Scientific LLC Customer Service Department at ph: 800-678-7888 / 801-572-6500.

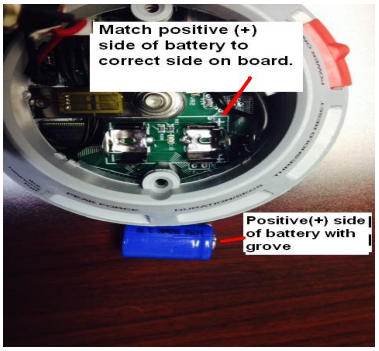

Figure 10. Battery Replacement

STORAGE AND TRANSPORTING

The microFET2™ is provided with a hard sided protective carrying case. It is recommended to keep the device in this case when in transportation or when not in use. Store the device in a cool dry location.

SERVICE, MAINTENANCE, AND CLEANING

Your microFET2™ is built to provide long lasting, reliable service. As with any precision instrument, it should be used with care. It should not be dropped, banged against hard surfaces, or used as scale.

The microFET2™ 's exterior surface can be cleaned with soft cloth dampened with clean water We recommend that you periodically inspect your unit for wear, and proper functioning.

Caution: Do not immerse microFET2™ or accessories in water or other fluids or liquids. Device is not protected against moisture, water or liquids.

DEVICE DISPOSAL:

Follow electronic device disposal guidelines when disposing of used device. There are no special risks related to the disposal of these devices.

USE LIFE:

The microFET2™ is designed to provide long lasting reliable service. The expected use life of the device 5-10 years. This is determined by the use frequency and proper maintenance and care by the user. Improper use, dropping, or mistreatment of the device will likely shorten its functioning Use Life.

CALIBRATION:

The microFET2™ comes with calibration certificate, ensuring that the unit was properly calibrated at the time of shipment. To ensure continued accuracy and reliability, your microFET2™ unit should be recalibrated annually, by properly authorized Hoggan Scientific, LLC service technicians.

If the microFET2™ device is to be used with the optional software, software setup and USB driver installation is required. Please refer to software and USB driver set up instructions that comes with the software.

WARRANTY

The microFET2™ is warranted for a period of one (1) year from the time of purchase. If the microFET2™ fails to operate because of defect in materials or workmanship at any time within one (1) year of the purchase date, it will be repaired free of charge by Hoggan Scientific LLC. (return shipping not included). Extended warranties are available at an additional nominal fee.

If you wish to purchase and extended warranty after the purchase of your microFET2™, there is a 30 day grace period to purchase an extended warranty package. Contact Hoggan Scientific, LLC for more information.

WARRANTY REGISTRATION

To ensure your warranty is in force, please complete and mail, or fax your warranty card to Hoggan Scientific LLC at 800-915-3439. Or visit www.hogganhealth.net to register your warranty information online. Please save proof of your original purchase date, such as your sales slip, invoice, credit card voucher, or cancelled check to establish the warranty period.

WARRANTY REPAIRS

Before deciding that your microFET2™ is inoperable or defective, please review and follow the information in this instruction booklet.

In the unlikely event your microFET2™ becomes inoperable, please contact Hoggan Scientific, LLC to arrange to have the equipment repaired. Hoggan reserves the right to repair or replace the unit with new or refurbished parts or equipment**.**

Hoggan's Customer Service Department can be contacted at 800-678-7888, or by email at contact@hogganhealth.net. When Hoggan Customer Service Representative authorizes return of the product, you will be given Return Merchandise Authorization (RMA) number. Please include the RMA number with your unit. For confirmed warranty repairs, the customer is responsible for the applicable shipping costs and shipping to Hoggan Scientific.

WARRANTY EXCLUSIONS AND LIMITATIONS

The microFET2™ warranty does not cover damage by negligence, misuse, or accident. Damage or unit failure caused by modifications or repairs other than those approved by Hoggan or its authorized repair agent, or damage to equipment resulting from improper installation or operation is not covered. Any warning or instructional labels or decals must remain on the unit for the warranty to be valid.

This warranty applies to the original purchaser. Some states do not allow the exclusion or limitation of incidental or consequential damages, in which case the exclusions and limitations may not apply. This warranty gives specific legal rights, and may also have other rights, which vary from state to state. To determine the legal rights in your state, consult your local or state consumer affairs office or State Attorney General.

CUSTOMER SERVICE REPAIRS

Customer satisfaction is important to Hoggan. We are happy to assist with questions, problems or service issues on any Hoggan products you may own. Our business has grown on the basis of excellent product quality and customer satisfaction. Our fulltime customer service representatives are available from 7:00 am to 4:30 pm MST at 800-678-7888 to meet your needs. You can also contact Hoggan Scientific online regarding your customer service issue or calibration needs by e-mailing us at contact@hogganhealth.net.

ORDERING REPLACEMENT PARTS

Hoggan Products are manufactured to exacting specifications. When replacing worn or damaged parts, use only original parts supplied by Hoggan Scientific. The use of substitute or unauthorized parts will void your warranty and may increase the possibility of injury to the user, or cause additional damage to the unit.

When ordering Replacement Parts, please take the unit out of service, and complete the following:

- Identify the brand, model, and serial number, and note the unit's function.
- Identify and document the problem and the worn or missing parts.
- Contact Hoggan Scientific LLC. Replacement parts (attachments) will be shipped directly from Hoggan.

All repair services will be performed at Hoggan Scientific LLC Manufacturing plant.

Except for replacing batteries, do not attempt to repair the unit on your own. This will void all warranties.

microFET2™ batteries, replacement parts and Preferred Service Contracts can be ordered either by calling Hoggan Scientific LLC or order online at www.hogganhealth.net.

microFET2™ SPECIFICATIONS

- Weight: 1 lb.
- Operation Use Time:
  - Non-wireless mode - 90 hours continuous
  - Wireless mode - 6 hours continuous
- Transportation, Storage, and Operating Conditions:
  - Temperature: 11 – 33 degrees Celsius (52 – 92 degrees Fahrenheit)
  - Humidity: 30 - 80% humidity non-condensing
  - Atmospheric Pressure: 800 hPA - 1060 hPA. (11.60 psi – 15.37 psi)
- Maximum Force Capacity: 300 lbs. (136 kgf / 1320 Newtons)
- Internal Power Source - Battery: Model ICR14250 user serviceable, 3.7 volt 1/2 AA lithium ion rechargeable battery 280 mAH.
- Input Power: 5V 1.0A
- Recharge Time: Three (3) continuous hours of charging
- Power Supply: Phihong Model PSAC05R-050-L6. Input - 100-240V. Output – 1A. 5 volt DC regulated
- No Protection Against Harmful Ingress of Water: IPX0 – ordinary equipment
- Test Range:
  - Low Threshold 0.8 lbs to 300 lbs in 0.1 lb increments Metric Newtons: 3.6N 1320N in 0.4N increments KGF (kilograms force):
  - 0.4kgf to 135kgf in .1kgf increments

- High Threshold 3.0 lbs to 300 lbs in 0.1 lb increments Metric Newtons: 12.1N to 1320N in 0.4N increments KGF: 0.4kgf to 135kgf in 0.1 increments
- Accuracy: Within 1%
- Data Storage Stores 30 most recent tests.
- Wireless Frequency Operating Distance: 25 feet, 7.6 meters from receiver, indoor environment
- Device is Class II ME equipment while charging, and internally powered when in use.
- FCC ID: T9J-RN42
- Radio Frequency: 2.4 GHz

DEVICE CLASSIFICATIONS
Classifications: Class II
Type B Applied Part
Mode of Operation: Continuous
IPX0 (Do Not Wet the Device)

Device complies with:
IEC 60601-1-2:2014 (EMC)
IEC 61000-4-2 (2008)
IEC 61000-4-3 (2006), A1:(2007), +A2:(2010)
IEC 61000-4-8 (2009)
CISPR 11 Emissions Class B (2009), +A1:2010
Radiated Emissions Conducted Emissions
FCC Part 15B

TECHNICAL ASSISTANCE:
For further assistance, contact Hoggan Scientific at:
www.hogganhealth.net
Phone: 800-678-7888 / 801-572-6500
Email: contact@hogganhealth.net

GRAPHIC SYMBOLS AND DEFINITIONS

						**Rx Only**
Device will not work when connected to AC outlet	Device is provided non-sterile	Attention, See Instructions for Use	Catalogue number	Serial Number	Keep Dry	For prescription use only
	IPX0					
Manufacturer	Do not wet the device	Class II Electrical Equipment	Type B applied part – External Body only contact	FCC Compliant Device	Radio Frequency	

microFET2™ is a registered trademark of ***Hoggan Scientific, LLC***.

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