October 08, 2024

Theranica Bio-Electronics Ltd
% Janice Hogan
Partner
Hogan Lovells US LLP
1735 Market St. Floor 23
Philadelphia, Pennsylvania 19103

Re: K241756
Trade/Device Name: Nerivio; NerivioInfinity
Regulation Number: 21 CFR 882.5899
Regulation Name: Trunk And Limb Electrical Stimulator To Treat Headache
Regulatory Class: Class II
Product Code: QGT
Dated: June 18, 2024
Received: June 18, 2024

Dear Janice Hogan:

We have reviewed your section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (the Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database available at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Additional information about changes that may require a new premarket notification are provided in the FDA guidance documents entitled "Deciding When to Submit a 510(k) for a Change to an Existing Device" (https://www.fda.gov/media/99812/download) and "Deciding When to Submit a 510(k) for a Software Change to an Existing Device" (https://www.fda.gov/media/99785/download).

Your device is also subject to, among other requirements, the Quality System (QS) regulation (21 CFR Part 820), which includes, but is not limited to, 21 CFR 820.30, Design controls; 21 CFR 820.90, Nonconforming product; and 21 CFR 820.100, Corrective and preventive action. Please note that regardless of whether a change requires premarket review, the QS regulation requires device manufacturers to review and approve changes to device design and production (21 CFR 820.30 and 21 CFR 820.70) and document changes and approvals in the device master record (21 CFR 820.181).

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR Part 803) for devices or postmarketing safety reporting (21 CFR Part 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR Part 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR Parts 1000-1050.

All medical devices, including Class I and unclassified devices and combination product device constituent parts are required to be in compliance with the final Unique Device Identification System rule ("UDI Rule"). The UDI Rule requires, among other things, that a device bear a unique device identifier (UDI) on its label and package (21 CFR 801.20(a)) unless an exception or alternative applies (21 CFR 801.20(b)) and that the dates on the device label be formatted in accordance with 21 CFR 801.18. The UDI Rule (21 CFR 830.300(a) and 830.320(b)) also requires that certain information be submitted to the Global Unique Device Identification Database (GUDID) (21 CFR Part 830 Subpart E). For additional information on these requirements, please see the UDI System webpage at https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-system-udi-system.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Jitendra V. Virani -S

CDR Jitendra Virani
Assistant Director
DHT5B: Division of Neuromodulation and
Rehabilitation Devices
OHT5: Office of Neurological and
Physical Medicine Devices
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 07/31/2026
See PRA Statement below.

Submission Number *(if known)*

K241756

Device Name

Nerivio;
NerivioInfinity

Indications for Use *(Describe)*

The Nerivio is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.

The NerivioInfinity is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

510(k) SUMMARY

Theranica Bio-Electronics LTD.'s NerivioInfinity and Nerivio

Submitter
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Date Prepared: October 8, 2024

Name of Device: Nerivio (NerivioInfinity)

Common or Usual Name: Nerivio (NerivioInfinity)

Regulation Name: Trunk and limb electrical stimulator to treat headache

Regulatory Class: Class II

Regulation Number: 21 CFR 882.5899

Product Code: QGT

Predicate Devices

Primary predicate: NerivioInfinity, Theranica Bio-Electronics LTD. (K232152)

Secondary predicate: Nerivio, Theranica Bio-Electronics LTD. (K223169)

Device Description

The Nerivio and NerivioInfinity are wearable, battery-powered, Remote Electrical Neuromodulation (REN) devices that are controlled by a mobile application. The systems deliver low energy electrical pulses to the upper arm for 45 minutes per treatment, after which the device turns off automatically.

The devices are composed of:

- A pair of UltraStim® electrodes (K130987) covered with hydrogel and removable protective film. In NerivioInfinity, the electrodes are embedded in a disposable, replaceable pad. In Nerivio, the electrodes are not disposable or replaceable.
- An electronic circuitry that includes microcontroller with firmware, LED indicator, a power button for activating the device, and Bluetooth radio for wireless connection to Android and iOS mobile platforms. The circuitry also includes a battery, which is rechargeable in NerivioInfinity and not rechargeable in Nerivio.
- An armband that is wrapped over the device to secure the device position on the user's arm is also included.

The devices are operated and controlled via mobile application software that is installed and run on the user's personal mobile device, such as a mobile phone or tablet. The device's hardware communicates with the mobile application through Bluetooth protocol. This mobile application software allows the user to control the stimulation intensity from 0 to 100% (representing intensity levels of 0-40mA), to start, pause or stop the stimulation program, and to view device status such as the device's connection state, stimulation duration, battery level (when connected to NerivioInfinity), remaining number of treatments (when connected to Nerivio), and user notifications.

The user is instructed to adjust the intensity to the strongest stimulation level just below the perceived pain level. Treatments with Nerivio and NerivioInfinity are intended to be self-administered by the user immediately after the onset of migraine headache or aura or every other day for migraine prevention.

Intended Use / Indications for Use

NerivioInfinity is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.

Nerivio is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.

The subject devices' indications for use are identical to the predicate devices except for the addition of children aged 8-11 to the indicated age range. This modification does not change the device's overall intended use of treating and preventing migraines through electrical stimulation of the trunk or limb.

Summary of Technological Characteristics

The technological characteristics of the subject NerivioInfinity and Nerivio are identical to those of the predicate NerivioInfinity (K232152) and Nerivio (K223169), respectively. Both the subject devices and the predicate devices function as remote electrical neuromodulation (REN) devices that utilize electro-stimulation that relieves migraine headache, and/or reduces the number of migraine days (depends on the treatment regime), using equivalent output parameters. The basic pulse structure is biphasic, with symmetrical interleaving phases and rectangular shape. The amplitude shift signal alternates between a nominal maximum and a nominal minimum of the amplitude signal. The maximal output current is 40mA. The assumed impedance is 1K ohm +/- 500 ohms.

The Nerivio app has been updated since the prior clearance (K223169) so that it integrates the functionality of the NerivioInfinity app as cleared under K232152. Both the Nerivio and NerivioInfinity are now operated by the same mobile app, with only minor differences compared to the predicates to address this integration which do not raise different questions of safety or effectiveness.

Table 1 provides a comparison between the key functional features of the subject devices and predicate devices.

Table 1. Comparison between Subject and Predicate Devices

Characteristic	NerivioInfinity		Nerivio		Comparison
	Subject Device	**Predicate Device (K232152)**	**Subject Device**	**Predicate Device (K223169)**	
Indications for Use	NerivioInfinity is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.	NerivioInfinity is indicated for acute and/or preventive treatment of migraine with or without aura in patients 12 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.	Nerivio is indicated for acute and/or preventive treatment of migraine with or without aura in patients 8 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.	Nerivio is indicated for acute and/or preventive treatment of migraine with or without aura in patients 12 years of age or older. It is a prescription use, self-administered device for use in the home environment at the onset of migraine headache or aura for acute treatment, or every other day for preventive treatment.	Modified – minimum age limit in subject devices is 8 years of age, versus 12 years of age in the predicate devices.
Prescription or OTC	Prescription	Prescription	Prescription	Prescription	Same
Number of channels	1	1	1	1	Same
Electrical waveform	Biphasic rectangular, modulated	Biphasic rectangular, modulated	Biphasic rectangular, modulated	Biphasic rectangular, modulated	Same
Max output voltage **500 Ω** **2 KΩ** **10 KΩ**	 20V (measured) 60V (measured) 60V (measured)	 20V (measured) 60V (measured) 60V (measured)	 20V (measured) 60V (measured) 60V (measured)	 20V (measured) 60V (measured) 60V (measured)	Same

Characteristic	NerivioInfinity		Nerivio		Comparison
	Subject Device	Predicate Device (K232152)	Subject Device	Predicate Device (K223169)	
Max output current **500 Ω** **2 KΩ** **10 KΩ**	 40 mA 30 mA 6 mA	 40 mA 30 mA 6 mA	 40 mA 30 mA 6 mA	 40 mA 30 mA 6 mA	Same
Maximum phase charge (500Ω)	8 µC	8 µC	8 µC	8 µC	Same
Maximum average current (500Ω)	1.76 mA	1.76 mA	1.76 mA	1.76 mA	Same
Maximum current density (peak) (500Ω)	1.6 mA/cm^2	1.6 mA/cm^2	1.6 mA/cm^2	1.6 mA/cm^2	Same
Maximum current density (r.m.s) (500Ω)	0.34 mA/cm	0.34 mA/cm	0.34 mA/cm	0.34 mA/cm	Same
Maximum average current density (abs value) (500Ω)	0.07 mA/cm^2	0.07 mA/cm^2	0.07 mA/cm^2	0.07 mA/cm^2	Same
Maximum average power density (500Ω)	1.41 mW/cm^2	1.41 mW/cm^2	1.41 mW/cm^2	1.41 mW/cm^2	Same
Frequency	Range: 100-120 Hz Average: 110 Hz (measured)	Range: 100-120 Hz Average: 110 Hz (measured)	Range: 100-120 Hz Average: 110 Hz (measured)	Range: 100-120 Hz Average: 110 Hz (measured)	Same
Primary phase duration	200 µSec	200 µSec	200 µSec	200 µSec	Same
Pulse duration	400 µSec	400 µSec	400 µSec	400 µSec	Same
Electrode area	25 cm^2	25 cm^2	25 cm^2	25 cm^2	Same
Treatment location	Upper arm	Upper arm	Upper arm	Upper arm	Same
Treatment duration	45 min.	45 min.	45 min.	45 min.	Same
Reusable	Yes	Yes	Yes	Yes	Same
# of treatments per one device	Up to 18 treatments for each disposable electrodes pad. No	Up to 18 treatments for each disposable electrodes pad. No	18 treatments per one entire device.	18 treatments per one entire device.	Same

Characteristic	NerivioInfinity		Nerivio		Comparison
	Subject Device	Predicate Device (K232152)	Subject Device	Predicate Device (K223169)	
	limitation for device body unit	limitation for device body unit			
Power source	Li-Ion cell battery - rechargeable	Li-Ion cell battery - rechargeable	LiMnO2 cell battery – non-rechargeable	LiMnO2 cell battery – non-rechargeable	Same
On/off button	Power push-button	Power push-button	Power push-button	Power push-button	Same
Dimensions	Device – 7.9x3.5x1.7cm Electrodes pad – 13.7x7.6x5.3cm Armband – 48.0x10.0x0.3 cm	Device – 7.9x3.5x1.7cm Electrodes pad – 13.7x7.6x5.3cm Armband – 48.0x10.0x0.3 cm	Device (electrodes included) – 12.0x7.5x1.5 cm Armband – 48.0x10.0x0.3 cm	Device (electrodes included) – 12.0x7.5x1.5 cm Armband – 48.0x10.0x0.3 cm	Same
Weight	Device – 38 gr Electrodes pad – 15 gr Armband – 33 gr	Device – 38 gr Electrodes pad – 15 gr Armband – 33 gr	Device (including an embedded pair of electrodes) – 50 gr Armband – 33 gr	Device (including an embedded pair of electrodes) – 50 gr Armband – 33 gr	Same
Mobile application software	Yes	Yes	Yes	Yes	Same
Biocompatibility	Yes	Yes	Yes	Yes	Same
Sterile	No	No	No	No	Same
Processor control	Yes	Yes	Yes	Yes	Same
Wireless control	Yes	Yes	Yes	Yes	Same
Automatic overload trip	Yes	Yes	Yes	Yes	Same
Automatic no load trip	Yes	Yes	Yes	Yes	Same
Automatic shut off	Yes	Yes	Yes	Yes	Same
Mobile application treatment control	Yes	Yes	Yes	Yes	Same
Remote (over-the-air) FW update option	Yes	Yes	No	No	Same

Performance Data

Non-Clinical Tests:

Software testing was performed for the minor modifications made to the mobile application for the Nerivio device. The test results demonstrated that the device meets all design requirements and functions as intended.

Human factors testing was performed to evaluate use of the Nerivio and NerivioInfinity by representative patients aged 8-11, with and without assistance of a parent. For both devices, all critical tasks were successfully performed with no use errors or close calls by 100% of the child patients and their parents, and all knowledge tasks were successfully answered by 100% of participant parents. Therefore, the human factors testing successfully validated that the devices can be used as intended by the expanded patient population.

Clinical Investigation:

Theranica conducted a clinical study to evaluate Nerivio's safety and efficacy in the acute treatment of migraine in children in a real-world setting. The study consisted of a retrospective analysis of prospectively-collected real-world data for children in the United States who were prescribed Nerivio to treat migraine and used the device at least once between May 2020 to October 2023. The study population included n=293 patients, aged 6-11 at their first use of the Nerivio.

Safety data, collected primarily via customer service complaints and other reports of product issues, showed no adverse events. Effectiveness for acute treatment of migraine was evaluated in patients who completed the voluntary pre- and post-treatment surveys. Among these patients, rates of consistent relief or freedom from headache pain, functional disability, and specific migraine-associated symptoms were comparable to the results from prior clinical testing of the Nerivio in adolescent patients (aged 12 to 17) reported for the predicate device, K223169.

Consistent headache relief was reported by 72.2% of patients with available data (13/18), and consistent freedom from headache was reported by 36.0% (9/25). Consistent functional disability relief was reported by 83.3% (15/18) of patients with available data, and consistent functional disability freedom was reported by 38.9% (7/18). With respect to consistent disappearance of migraine associated symptoms, 70.0% (7/10) of patients achieved freedom from nausea/vomiting, 50.0% (4/8) were free from phonophobia, and 22.2% (2/9) were free from photophobia. Nerivio's effects on pain, disability and migraine symptoms in children aged 6-11 years old showed no significant differences from the results reported for adolescents in prior clinical testing, demonstrating statistically equivalent performance in both age groups.

Effectiveness for preventive treatment of migraine was evaluated in patients who used the device in a manner similar to that of the prevention treatment regime showing frequent use of the device in month one, suggestive of preventative treatments. In these patients, device use over time (change from Month 1 to Months 2 and 3) was similar to that of the previously reported adolescent cohort where device usage was more infrequent in subsequent months,

These data, in conjunction with prior studies of the Nerivio device, support the use of the device for the listed indications.

Conclusions

The Nerivio and NerivioInfinity have the same intended use and indications for use as the predicate devices, except for the addition of children aged 8-11 years old to the indicated patient population. The addition of these patients does not alter the intended therapeutic use of the device, nor does it raise different questions of safety or effectiveness. Software testing, usability validation, and real-world clinical data demonstrate that Nerivio and NerivioInfinity are as safe and effective as the predicate devices.