Subtle Medical, Inc.
% Jared Seehafer
Regulatory Consultant
Enzyme Corporation
611 Gateway Blvd #120
SOUTH SAN FRANCISCO CA 94080

September 28, 2021

Re: K211964
Trade/Device Name: SubtlePET
Regulation Number: 21 CFR 892.1200
Regulation Name: Emission computed tomography system
Regulatory Class: Class II
Product Code: KPS, LLZ
Dated: August 31, 2021
Received: September 2, 2021

Dear Jared Seehafer:

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 (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 located 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.

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 803) for

devices or postmarketing safety reporting (21 CFR 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 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 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,

For

Thalia T. Mills, Ph.D.
Director
Division of Radiological Health
OHT7: Office of In Vitro Diagnostics
and Radiological Health
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: 06/30/2023
See PRA Statement below.

510(k) Number *(if known)*
K211964

Device Name
SubtlePET

Indications for Use *(Describe)*
SubtlePET is an image processing software intended for use by radiologists and nuclear medicine physicians for transfer, storage, and noise reduction of fluorodeoxyglucose (FDG), amyloid, 18F-DOPA, 18F-DCFPyL, Ga-68 Dotatate, and Ga-68 PSMA radiotracer PET images.

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.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

DO NOT SEND YOUR COMPLETED FORM TO THE PRA STAFF EMAIL ADDRESS BELOW.

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"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

510(k) Summary

K211964

Table 1. Subject Device Overview.

Submitter's Name:	Subtle Medical, Inc.
Address:	883 Santa Cruz Ave, Suite 205 Menlo Park, CA 94025
Contact Person:	Jared Seehafer
Title:	Regulatory Consultant
Telephone Number:	415-857-9554
Fax Number:	415-367-1279
Email:	jared@enzyme.com
Date Summary Prepared:	23-SEPT-2021
Device Proprietary Name:	SubtlePET
Model Number:	V 2.0.0
Common Name:	SubtlePET
Regulation Number:	21 CFR 892.1200
Regulation Name:	Emission computed tomography system
Product Codes:	KPS, LLZ
Device Class:	Class II
Predicate Device	Trade name: SubtlePET Manufacturer: Subtle Medical, Inc. Regulation Number: 21 CFR 892.1200 Regulation Name: Emission computed tomography system Device Class: Class II Product Codes: KPS, LLZ 510(k) Number: K182336 510(k) Clearance Date: November 30, 2018

1. Device Description

The SubtlePET image processing software reduces noise to increase image quality using a deep neural network-based algorithm.

The software employs a convolutional neural network-based method in a pixel's neighborhood to generate the value for each pixel. Using a residual learning approach, the software predicts the noise components and structural components. The software separates these components, which enhances the structure while simultaneously reducing the noise.

The workflow of the product can be easily adapted to existing radiology departmental workflow. The product acts as a DICOM node that receives DICOM 3.0 digital medical image data from the modality or another DICOM source, processes the data and then forwards the enhanced study to the selected destination. This destination can be any DICOM node, typically either the PACS system or a specific workstation.

2. Indications for Use

SubtlePET is an image processing software intended for use by radiologists and nuclear medicine physicians for transfer, storage, and noise reduction of fluorodeoxyglucose (FDG), amyloid, 18F-DOPA, 18F-DCFPyL, Ga-68 Dotatate, and Ga-68 PSMA radiotracer PET images.

Table 2 compares the indications for use of the predicate and subject device.

Table 2. Indications of Use Comparison.

Predicate Device	Subject Device	Differences
SubtlePET is an image processing software intended for use by radiologists and nuclear medicine physicians for transfer, storage, and noise reduction of fluorodeoxyglucose (FDG) and amyloid PET images (including PET/CT and PET/MRI)."	SubtlePET is an image processing software intended for use by radiologists and nuclear medicine physicians for transfer, storage, and noise reduction of fluorodeoxyglucose (FDG), amyloid, 18F-DOPA, 18F-DCFPyL, Ga-68 Dotatate, and Ga-68 PSMA radiotracer PET images.	Substantially similar. The subject device IFU removes reference to PET/CT and PET/MRI images as the specific models for those images have been removed, while listing additional tracers to reflect the update of the main machine learning model for PET images to accommodate those tracers.

3. Technological Characteristics

Table 3 compares the technological characteristics of the predicate and subject device.

Table 3. Summary of Technological Characteristics Comparison.

Topic	Predicate Device	Subject Device
Physical Characteristics	Software package that operates on off-the-shelf hardware	Same
Computer	Linux Compatible	Same
DICOM Standard Compliance	The software processes DICOM compliant image data	Same
Operating System	Linux	Same
Modalities	PET	Same
User Interface	None	Same
Image Enhancement Algorithm Description	The software employs a convolutional neural network-based method in a pixel's neighborhood to generate the value for each pixel. Using a residual learning approach, the software predicts the noise components and structural components. The software separates these components, which enhances the structure while simultaneously reducing the noise.	Same
Radiotracers supported	fluorodeoxyglucose (FDG), amyloid	fluorodeoxyglucose (FDG), amyloid, 18F-DOPA, 18F-DCFPyL, Ga-68 Dotatate, Ga-68 PSMA
Deep learning model(s)	PET, PET/CT, PET/MRI	PET

4. Performance Data

Subtle Medical conducted the following performance testing:

- Software verification and validation testing
- Noise reduction bench test utilizing representative cases of human data already gathered under the auspices of IRB-approved clinical protocols. The study showed a significant average increase in quantitative metrics for all cases demonstrating that the software reduced noise in PET scans.

Based upon the results of this testing, the SubtlePET performance was determined to be substantially equivalent to the predicate device.

5. Substantial Equivalence Conclusion

This 510(k) is being filed as a device modification to a currently legally marketed device, SubtlePET. The intended use remains identical, the indications for use are substantially similar, reflecting an update to the SubtlePET device to remove machine learning models for PET/CT and PET/MRI images, while updating the main machine learning model for PET images to accommodate additional tracers. This modification to SubtlePET is as safe and effective as the predicate, and does not raise different questions of safety and effectiveness.