DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

February 20, 2014

Given Imaging Limited
c/o Mr. Tim Thomas
Vice President, Regulatory and Quality
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Re: K123666
PillCam® COLON 2 Capsule Endoscopy System
Evaluation of Automatic Class III Designation – *De Novo* Request
Regulation Number: 21 CFR 876.1330
Regulation Name: Colon Capsule Imaging System
Regulatory Classification: Class II
Product Code: PGD
Dated: November 21, 2012
Received: November 29, 2012

Dear Mr. Thomas:

This letter corrects our classification letter of January 29, 2014.

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your *de novo* request for classification of the PillCam® COLON 2 Capsule, a prescription device under 21 CFR Part 801.109 that is intended to provide visualization of the colon. It is intended to be used for detection of colon polyps in patients after an incomplete optical colonoscopy with adequate preparation, and a complete evaluation of the colon was not technically possible. FDA concludes that this device should be classified into class II. This order, therefore, classifies the PillCam® COLON 2 Capsule Endoscopy System into class II under the generic name, colon capsule imaging system.

FDA identifies this generic type of device as:

> **Colon Capsule Imaging System**: A prescription, single-use ingestible capsule designed to acquire video images during natural propulsion through the digestive system. It is specifically designed to visualize the colon for the detection of polyps. It is intended for use only in patients who had an incomplete optical colonoscopy with adequate preparation, and a complete evaluation of the colon was not technically possible.

Section 513(f)(2) of the FD&C Act was amended by section 607 of the Food and Drug Administration Safety and Innovation Act (FDASIA) on July 9, 2012. This new law provides two options for *de novo* classification. First, any person who receives a "not substantially equivalent" (NSE) determination in response to a 510(k) for a device that has not been previously classified

under the Act may, within 30 days of receiving notice of the NSE determination, request FDA to make a risk-based classification of the device under section 513(a)(1) of the Act. Alternatively, any person who determines that there is no legally marketed device upon which to base a determination of substantial equivalence may request FDA to make a risk-based classification of the device under section 513(a)(1) of the Act without first submitting a 510(k). FDA shall, within 120 days of receiving such a request, classify the device. This classification shall be the initial classification of the device. Within 30 days after the issuance of an order classifying the device, FDA must publish a notice in the **Federal Register** classifying the device type.

On November 29, 2012 FDA received your *de novo* requesting classification of the PillCam® COLON 2 Capsule Endoscopy System into class II. The request was submitted under section 513(f)(2) of the FD&C Act. In order to classify the PillCam® COLON 2 Capsule Endoscopy System into class I or II, it is necessary that the proposed class have sufficient regulatory controls to provide reasonable assurance of the safety and effectiveness of the device for its intended use.

After review of the information submitted in the *de novo* request, FDA has determined that the PillCam® COLON 2 Capsule Endoscopy System indicated for visualization of the colon and the detection of colon polyps in patients after an incomplete optical colonoscopy with adequate preparation, and a complete evaluation of the colon was not technically possible can be classified in class II with the establishment of special controls for class II. FDA believes that class II (special) controls provide reasonable assurance of the safety and effectiveness of the device type. The identified risks and mitigation measures associated with the device type are summarized in Table 1.

Table 1- Identified Risks to Health and Mitigation Measures

Identified Risk	**Mitigation Measure**
Adverse Tissue Reaction	Biocompatibility
Equipment, malfunction leading to injury	Electrical safety, thermal and mechanical safety Software validation, verification and hazard analysis Non-clinical testing Labeling
Interference with other devices and with this device (e.g., interference with image acquisition, patient information compromised);	Electromagnetic compatibility testing Software validation, verification and hazard analysis Non-clinical testing
Poor image acquisitions	Optical imaging performance testing Non-clinical testing Labeling

Failure to excrete	Labeling
Misinterpretation of the captured images	Clinical performance data Non-clinical testing Labeling
Possibility of missing a polyp, or falsely identifying a polyp	Clinical performance data Software validation, verification and hazard analysis Labeling
Abdominal pain, nausea , vomiting, choking	Clinical performance data Labeling

In combination with the general controls of the FD&C Act, the Colon Capsule Imaging System is subject to the following special controls:

1. The capsule must be demonstrated to be biocompatible.

2. Non-clinical testing data must demonstrate the mechanical and functional integrity of the device under physically stressed conditions. The following performance characteristics must be tested and detailed protocols must be provided for each test:
    - Bite test to ensure that the capsule can withstand extreme cases of biting.
    - pH Resistance test to evaluate integrity of capsule when exposed to a range of pH values.
    - Battery life test to demonstrate that the capsule's operating time is not constrained by the battery capacity.
    - Shelf-life testing to demonstrate that the device performs as intended at the proposed shelf-life date.
    - Optical testing to evaluate fundamental image quality characteristics such as resolution, field of view, depth of field, distortion, signal to noise ratio, uniformity, and image artifacts. A test must be performed to evaluate the potential of scratches, caused by travelling through the gastrointestinal tract, on the transparent window of the capsule and their impact on the optical and color performance.
    - An optical safety analysis must be performed based on maximum (worst-case) light exposure to internal gastrointestinal mucosa, and covering ultraviolet, visible and near-infrared ranges, as appropriate. A mitigation analysis must be provided.
    - A color performance test must be provided to compare the color differences between the input scene and output image.
    - The video viewer must clearly present the temporal or spatial relationship between any two frames as a real-time lapse or a travel distance. The video viewer must alert the user when the specific video interval is captured at a frame rate lower than the nominal one due to communication errors.
    - A performance test evaluating the latency caused by any adaptive algorithm such as adjustable frame rate must be provided.

- If the capsule includes a localization module, a localization performance test must be performed to verify the accuracy and precision of locating the capsule position within the colon.
- A data transmission test must be performed to verify the robustness of the data transmission between the capsule and the recorder. Controlled signal attenuation should be included for simulating a non-ideal environment.
- Software validation, verification and hazards analysis must be provided.
- Electrical equipment safety, including thermal and mechanical safety and electromagnetic compatibility (EMC) testing must be performed. If the environments of intended use include locations outside of hospitals and clinics, appropriate higher immunity test levels must be used. Labeling must include appropriate EMC information.
- Information demonstrating immunity from wireless hazards.

3. The clinical performance characteristics of the device for the detection of colon polyps must be established. Demonstration of the performance characteristics must include assessment of positive percent agreement and negative percent agreement compared to a clinically-acceptable alternative structural imaging method.

4. Clinician labeling must include:
    - Specific instructions and the clinical and technical expertise needed for the safe use of the device.
    - A detailed summary of the clinical testing pertinent to use of the device, including the percentage of patients in which a polyp was correctly identified by capsule endoscopy, but also the percent of patients in which the capsule either missed or falsely identified a polyp with respect to the clinically-acceptable alternative structural imaging method.
    - The colon cleansing procedure.
    - A detailed summary of the device technical parameters.
    - A detailed summary of the device- and procedure-related complications pertinent to use of the device.
    - An expiration date/shelf life.

5. Patient labeling must include:
    - An explanation of the device and the mechanism of operation.
    - Patient preparation procedure.
    - A brief summary of the clinical study. The summary should not only include the percentage of patients in which a polyp was correctly identified by capsule endoscopy, but also the percent of patients in which the capsule either missed or falsely identified a polyp with respect to the clinically-acceptable alternative structural imaging method.
    - A summary of the device- and procedure-related complications pertinent to use of the device.

In addition, this is a prescription device and must comply with 21 CFR 801.109. Section 510(m) of the FD&C Act provides that FDA may exempt a class II device from the premarket notification requirements under section 510(k) of the FD&C Act, if FDA determines that premarket notification is not necessary to provide reasonable assurance of the safety and effectiveness of the device type. FDA has determined premarket notification is necessary to provide reasonable assurance of the safety and effectiveness of the device type and, therefore, the device is not exempt from the premarket notification requirements of the FD&C Act. Thus, persons who intend to market this device type must submit a premarket notification containing information on the Colon Capsule Imaging System they intend to market prior to marketing the device and receive clearance to market from FDA.

A notice announcing this classification order will be published in the **Federal Register**. A copy of this order and supporting documentation are on file in the Dockets Management Branch (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Room 1061, Rockville, MD 20852 and are available for inspection between 9 a.m. and 4 p.m., Monday through Friday.

As a result of this order, you may immediately market your device as described in the *de novo* request, subject to the general control provisions of the FD&C Act and the special controls identified in this order.

If you have any questions concerning this classification order, please contact Irene Bacalocostantis, PhD at 301-796-6814.

Sincerely yours,

Jonette R. Foy -S

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