Aidoc Medical, Ltd.
% John J. Smith, M.D., J.D.
Partner
Hogan Lovells U.S. LLP
555 Thirteenth Street NW
WASHINGTON DC 20004

December 5, 2022

Re: K222692
Trade/Device Name: BriefCase
Regulation Number: 21 CFR 892.2080
Regulation Name: Radiological computer aided triage and notification software
Regulatory Class: Class II
Product Code: QFM
Dated: November 10, 2022
Received: November 10, 2022

Dear John Smith:

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,

Jessica Lamb, PhD
Assistant Director
Imaging Software Team
DHT8B: Division of Radiological Imaging Devices and Electronic Products
OHT8: Office of 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)*

K222692

Device Name

BriefCase

Indications for Use *(Describe)*

BriefCase is a radiological computer aided triage and notification software indicated for use in the analysis of chest and abdominal CT images. The device is intended to assist hospital networks and appropriately trained medical specialists within the standard-of-care bone health setting in workflow triage by flagging and communication of suspected positive cases of Vertebral Compression Fractures (VCFx) findings.

BriefCase uses an artificial intelligence algorithm to analyze images and highlight cases with detected findings on a standalone application in parallel to the ongoing standard of care image interpretation. The device does not alter the original medical image and is not intended to be used as a diagnosis device.

The results of BriefCase are intended to be used in conjunction with other patient information and based on their professional judgment, to assist with triage/prioritization of medical images. Notified clinicians are responsible for viewing full images per the standard of care.

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.

K222692

510(k) Summary
Aidoc Medical, Ltd.'s BriefCase

Submitter:

Aidoc Medical, Ltd.
3 Aminadav St.
Tel-Aviv, Israel
Phone: +972-73-7946870

Contact Person: Amalia Schreier, LL.M.

Date Prepared: September 6, 2022

Name of Device: BriefCase

Classification Name: Radiological computer-assisted triage and notification software device

Regulatory Class: Class II

Product Code: QFM (21 C.F.R. 892.2080)

Primary Predicate Device: HealthVCF (K192901)

Device Description

BriefCase is a radiological computer-assisted triage and notification software device. The software system is based on an algorithm programmed component and consists of a standard off-the-shelf operating system, the Microsoft Windows server 2012 64bit, and additional applications, which include PostgreSQL, DICOM module and the BriefCase Image Processing Application. The device consists of the following three modules: (1) Aidoc Hospital Server (AHS/Orchestrator) for image acquisition; (2) Aidoc Cloud Server (ACS) for image processing; and (3) Aidoc Desktop Application for workflow integration.

DICOM images are received, saved, filtered and de-identified before processing. Filtration matches metadata fields with keywords. Series are processed chronologically by running the algorithms on each series to detect suspected cases.

The desktop application feed displays all incoming suspect cases, each notified case in a line. Hovering over a line in the feed pops up a compressed, low-quality, grayscale, unannotated image that is captioned "not for diagnostic use", "for prioritization only" and is displayed as a preview function. This compressed preview is meant for informational purposes only, does not contain any marking of the findings, and is not intended for primary diagnosis beyond notification.

Presenting the users with worklist prioritization facilitates earlier triage by prompting the user to assess the relevant original images in the PACS. Thus, the suspect case receives attention earlier than would have been the case in the standard of care practice alone.

Intended Use / Indications for Use

BriefCase is a radiological computer aided triage and notification software indicated for use in the analysis of chest and abdominal CT images. The device is intended to assist hospital networks and appropriately trained medical specialists within the standard-of-care bone health setting in workflow triage by flagging and communication of suspected positive cases of Vertebral Compression Fractures (VCFx) findings.

BriefCase uses an artificial intelligence algorithm to analyze images and highlight cases with detected findings on a standalone application in parallel to the ongoing standard of care image interpretation. The device does not alter the original medical image and is not intended to be used as a diagnosis device.

The results of BriefCase are intended to be used in conjunction with other patient information and based on their professional judgment, to assist with triage/prioritization of medical images. Notified clinicians are responsible for viewing full images per the standard of care.

Comparison of Technological Characteristics

The subject BriefCase for Vertebral Compression Fractures (VCFx) triage and primary predicate HealthVCF triage (K192901) are very similar, as explained below.

Both devices are radiological computer-aided triage and notification software programs. Both devices are artificial intelligence, deep-learning algorithms incorporating software packages for use with PACS and radiology workstations. The predicate HealthVCF evaluates images from CT scanners as does the proposed Briefcase for Vertebral Compression Fractures (VCFx). The predicate and subject devices run on chest and abdomen CTs. The predicate and subject devices both present non-diagnostic slices preview images.

The proposed device for Vertebral Compression Fractures has similar technology and design as the predicate device, and similar indications for use, i.e., both devices are intended to aid in prioritization and triage of time-critical radiological images. The subject and predicate HealthVCF devices raise the same types of safety and effectiveness questions, namely, accurate detection of findings within the processed study. It is important to note that, like the predicate, the subject device neither removes cases from the standard of care reading queue nor deprioritizes cases. Both devices operate in parallel with the standard of care, which remains the default option for all cases. A table comparing the key features of the subject and the predicate devices is provided below.

Table 1. Key Feature Comparison

	Predicate Device HealthVCF (K192901)	**Subject Device Aidoc Briefcase for Vertebral Compression Fractures (VCFx) Triage**
Intended Use / Indications for Use	HealthVCF is a passive notification for prioritization-only, parallel-workflow software tool used by clinicians to prioritize specific patients within the standard-of-care bone health setting for suspected vertebral compression fractures. HealthVCF uses an artificial intelligence algorithm to analyze chest and abdominal CT scans and flags those that are suggestive of the presence of at least one vertebral compression at the exam level. These flags are viewed by the clinician in Bone Health and Fracture Liaison Service programs in the medical setting via a worklist application on their Picture Archiving and Communication System (PACS). HealthVCF does not send a proactive alert directly to the user. HealthVCF does not provide diagnostic information beyond triage and prioritization, it does not remove cases from the radiology worklist, and should not be used in place of full patient evaluation, or relied upon to make or confirm diagnosis.	BriefCase is a radiological computer aided triage and notification software indicated for use in the analysis of chest and abdominal CT images. The device is intended to assist hospital networks and appropriately trained medical specialists within the standard-of-care bone health setting in workflow triage by flagging and communication of suspected positive cases of Vertebral Compression Fractures (VCFx) findings. BriefCase uses an artificial intelligence algorithm to analyze images and highlight cases with detected findings on a standalone application in parallel to the ongoing standard of care image interpretation. The device does not alter the original medical image and is not intended to be used as a diagnosis device. The results of BriefCase are intended to be used in conjunction with other patient information and based on their professional judgment, to assist with triage/prioritization of medical images. Notified clinicians are responsible for viewing full images per the standard of care.

	Predicate Device HealthVCF (K192901)	Subject Device Aidoc Briefcase for Vertebral Compression Fractures (VCFx) Triage
User population	Bone Health Clinicians	Hospital networks and appropriately trained medical specialists within the standard-of-care bone health setting.
Anatomical region of interest	Chest and abdomen	Chest and abdomen
Data acquisition protocol	Chest and abdominal CT scans	Chest and abdominal CT scans
Notification-only, parallel workflow tool	Yes	Yes
Interference with standard workflow	No	No
Algorithm	Artificial intelligence algorithm	Artificial intelligence algorithm
Structure	- Data input and validation (to ensure compatibility for processing by the algorithm) - HealthVCF algorithm. - Zebra Worklist.	- AHS module (orchestrator, image acquisition); - ACS module (image processing)); - Aidoc Desktop application for workflow integration (feed and non-diagnostic Image Viewer).

Performance Data

Pivotal Study Summary

Aidoc conducted a retrospective, blinded, multicenter, study with the BriefCase software to evaluate the software's performance in identifying Vertebral Compression Fractures in chest and abdominal CT images in 318 cases from 5 US-based clinical sites, compared to the ground truth as determined by three senior board-certified radiologists. The cases collected for the pivotal dataset were all distinct in time or center from the cases used to train the algorithm.

Primary endpoints were pre-specified standalone performance goal (PG) of area under the curve (AUC) > 0.95 for the study level receiver operating characteristic (ROC) curve. Secondary endpoints were BriefCase time-to-notification compared to the predicate device. Positive Predictive Value (PPV), Negative Predictive Value (NPV), Positive Likelihood Ratio (PLR), and Negative Likelihood Ratio (NLR) will also be assessed.

Primary Endpoint

AUC was 97.6% (95% CI: 96.1%, 99.1%), Sensitivity was 95.11% (95% CI: 90.92%, 97.74%) and Specificity was 93.28% (95% CI: 87.63%, 96.88%). As the AUC exceeded 0.95 and sensitivity and specificity both exceeded 80%, the study's primary endpoints were met.

Lower confidence limits for AUC, sensitivity and specificity were all above the pre-specified performance goals, demonstrating that the pre-specified performance goals were met.

Secondary Endpoint

In addition, the time-to-notification metric observed for the BriefCase software in the five medical centers was compared to the equivalent metric of the predicate devices.

- The BriefCase time-to-notification includes the time to get the DICOM exam, de-identify it, upload it to the cloud, analyze and send a notification on a positive suspect case back to the desktop application.

The BriefCase time-to-notification was measured for all True Positive cases (i.e., identified as positive both by the reviewers as well as the BriefCase device) and is given in **Table 2** below. The table also displays the same metric reported for the predicate HealthVCF.

The time-to-notification results obtained for the subject BriefCase device show comparability with the primary predicate with regard to time savings to the standard of care review. The BriefCase mean time-to-notification for Vertebral Compression Fractures was 117.2 seconds (95% CI: 98.64-135.85). The time-to-notification for the HealthVCF triage was 61.36 seconds.

Table 2. Time-to- Notification Comparison for BriefCase and Predicate Devices

Time -to-notification	N	Mean Estimate	95% Lower CL	95% Upper CL	Median	IQR
Predicate K192901 Processing Time	unknown	61.36	unknown	unknown	unknown	unknown
BriefCase Time-to-notification	184	117.2	98.64	135.85	71.5	99.5

NPV was 99.5% (95% CI: 99.1%- 99.8%) and PPV was 55.2% (95% CI: 39.6%- 69.8%).

PLR was 14.1606 (95% CI: 7.528-26.637) and NLR was 0.0524 (95% CI: 0.028- 0.099).

Thus, the reported similar time-to-notification data demonstrates that when using the subject BriefCase for Vertebral Compression Fractures triage the radiologists may have the same benefit in time saving as with the HealthVCF triage.

As can be seen in **Table 3** the mean age of patients whose scans were reviewed for VCFx was 65.7 years, with a standard deviation of 16.9 years. Gender distribution was 46.5% male, and 53.5% female (**Table 4**). Scanner distribution can also be found in **Table 5** below.

Table 3. Descriptive Statistics for Age

	Mean	Std	Min	Median	Max	N
Age (Years)	65.7	16.9	18	68	90	318

Table 4. Frequency Distribution of Gender

Ground Truth Results	Gender				All	
	Male		Female			
	N	%	N	%	N	%
Positive	92	28.9%	92	28.9%	184	57.9%
Negative	56	17.6%	78	24.5%	134	42.1%
All	148	46.5%	170	53.5%	318	100.0%

Table 5. Frequency Distribution of Manufacturer

Manufacturer	N	%
GE MEDICAL SYSTEMS	114	35.9%
SIEMENS	91	28.6%
TOSHIBA	57	17.9%
Philips	56	17.6%
Total	318	100%

Conclusions

The subject BriefCase for Vertebral Compression Fractures and the predicate HealthVCF triage are intended to aid in prioritization and triage of radiological images for the indications of vertebral compression fractures. Both devices are software packages with substantially equivalent technological characteristics and principles of operation, incorporating deep learning AI algorithms that process images, and software to send notifications and display unannotated compressed low-quality preview images. In both devices, the labeling clearly states that the devices are not for diagnostic use and for prioritization only and instructs the user to further evaluate and diagnose based only on the original images in the local PACS.

Both devices operate in parallel to the standard of care workflow in the sense that they do not change the original image, do not provide any marking on the output preview, do not remove images from the standard of care FIFO queue and do not de-prioritize cases, thus not disturbing standard interpretation of the images. Both devices notify the radiologist of time-sensitive critical cases within the range of several minutes, and thus contribute similarly to the standard of care workflow turnaround time reduction through preemptive triage.

The subject BriefCase device for Vertebral Compression Fractures triage is thus substantially equivalent to the primary predicate HealthVCF triage.