



June 20, 2025

Eko.ai Pte. Ltd. d/b/a Us2.ai
Hui Tay
RAQA Manager
2 College Road, 02-00
Singapore, 169850
Singapore

Re: K250151

Trade/Device Name: Us2.ca
Regulation Number: 21 CFR 870.2200
Regulation Name: Adjunctive Cardiovascular Status Indicator
Regulatory Class: Class II
Product Code: SDJ
Dated: May 21, 2025
Received: May 21, 2025

Dear Hui Tay:

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,

for **Robert T. Kazmierski -S**

LCDR Stephen Browning

Assistant Director

Division of Cardiac Electrophysiology,

Diagnostics, and Monitoring Devices

Office of Cardiovascular Devices

Office of Product Evaluation and Quality

Center for Devices and Radiological Health

Enclosure

Indications for Use

Please type in the marketing application/submission number, if it is known. This textbox will be left blank for original applications/submissions.

K250151

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Please provide the device trade name(s).

?

Us2.ca

Please provide your Indications for Use below.

?

Us2.ca processes acquired transthoracic cardiac ultrasound images to support qualified cardiologists, sonographers, or other licensed professional healthcare practitioners in their diagnosis of cardiac amyloidosis. Us2.ca is intended for use only in adult patients with increased left ventricular wall thickness, defined as an interventricular septal thickness (IVSd) or left ventricular posterior wall thickness (LVPWd) $\geq$ 12mm. Us2.ca is not intended to provide a diagnosis and does not replace current standards of care. The results from Us2.ca are not intended to exclude the need for further follow-up on cardiac amyloidosis.

Please select the types of uses (select one or both, as applicable).

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

?

510(k) Summary

Table 1. Subject Device Overview.

Submitter's Name:	Eko.ai Pte. Ltd. (d/b/a Us2.ai)
Address:	2 College Road, #02-00, Singapore 169850
Contact Person:	Hui Qun, Tay
Title:	Regulatory Affairs and Quality Assurance Manager
Telephone Number:	+65 62327857
Fax Number:	+65 62327857
Email:	huiqun@us2.ai
Date Summary Prepared:	Jan 17, 2025
Device Proprietary Name:	Us2.ca
Model Number:	Us2.ca
Common Name:	Us2.ca
Regulation Number:	21 CFR 870.2200
Regulation Name:	Adjunctive cardiovascular statue indicator
Product Code:	SDJ
Device Class:	Class II
Predicate Device	Trade name: EchoGo Cardiac Amyloidosis 1.0 Manufacturer: Ultromics Limited 4630 Kingsgate Cascade Way, Oxford Business Park South, Oxford Oxfordshire, United Kingdom, OX4 2SU Regulation Number: 21 CFR 870.2200 Regulation Name: Adjunctive Cardiovascular Statue Indicator Device Class: Class II Product Code: SDJ 510(k) Number: K240860 510(k) Clearance Date: Nov 15, 2024

Device Description

The Us2.ai platform is a clinical decision support tool that analyzes echocardiogram images in order to generate a series of AI-derived measurements. Fully automated, functional reporting with disease indications is also provided, in line with ASE & ESC guidelines.

Echo images are sent to the Us2.ai platform where they are processed, analyzed and measured. Results that meet the confidence threshold for both image quality and measurement accuracy are passed through to a report for review by the clinical users. Report text is also generated and presented with the measurements, providing functional reporting and disease indications. The ultimate clinical decision and interpretation reside solely with the clinician.

Us2.ca is an enhancement to Us2.ai existing Us2.v2 software, adding the capability to detect cardiac amyloidosis. It is an image post-processing analysis software device used for viewing and quantifying cardiovascular ultrasound images in DICOM format. The device is intended to aid diagnostic review and analysis of echocardiographic data, patient record management and reporting.

The primary intended function of Us2.ca is to automatically identify patients who require additional follow-up for cardiac amyloidosis. In doing so, the primary benefit is to improve clinical echocardiographic workflow, enabling clinicians to generate and edit reports faster, with precision and with full control. The final clinical decision of the results still remains with the clinicians.

Indications for Use

Us2.ca processes acquired transthoracic cardiac ultrasound images to support qualified cardiologists, sonographers, or other licensed professional healthcare practitioners in their diagnosis of cardiac amyloidosis. Us2.ca is intended for use only in adult patients with increased left ventricular wall thickness, defined as an interventricular septal thickness (IVSd) or left ventricular posterior wall thickness (LVPWd) ≥ 12 mm. Us2.ca is not intended to provide a diagnosis and does not replace current standards of care. The results from Us2.ca are not intended to exclude the need for further follow-up on cardiac amyloidosis.

Limitations

Please note the following limitations:

- Our software complements good patient care and does not exempt the user from the responsibility to provide supervision, clinically review the patient, and make appropriate clinical decisions.
- During image acquisition, inappropriate use of the echo machine, use of non-cardiac ultrasound probes, use of suboptimal settings (e.g., gain, contrast, or depth), or lack of electrocardiogram capture may lead to lower accuracy of the software.
- Us2.ca does not identify regions of interest or areas of possible pathology in the images.
- Us2.ca does not differentiate different types of cardiac amyloidosis, e.g., hereditary ATTR, wild-type ATTR, and AL.

- Us2.ca was externally validated on cardiac images from GE and Philips ultrasound systems. Use of the device on ultrasound systems other than GE and Philips may lead to lower accuracy of the software.

Summary of Technological Characteristics Comparison

Table 2 shows the similarities and differences between the technological characteristics of the two products. Testing demonstrates that the differences do not raise new questions of safety or effectiveness.

Table 2. Summary of Technological Characteristics Comparison.

Characteristics	Subject Device(Us2.ca)	Predicate (K240860-EchoGo Cardiac Amyloidosis (1.0))
Regulation	21 CFR 870.2200	21 CFR 870.2200
SaMD	Yes	Yes
Generic Type Device	Adjunctive cardiovascular status indicator	Adjunctive cardiovascular status indicator
Indications for Use	Us2.ca processes acquired transthoracic cardiac ultrasound images to support qualified cardiologists, sonographers, or other licensed professional healthcare practitioners in their diagnosis of cardiac amyloidosis. Us2.ca is intended for use only in adult patients with increased left ventricular wall thickness, defined as an interventricular septal thickness (IVSd) or left ventricular posterior wall thickness (LVPWd) $\geq$ 12mm. Us2.ca is not intended to provide a diagnosis and does not replace current standards of care. The results from Us2.ca are not intended to exclude the need for further follow-up on cardiac amyloidosis.	EchoGo Amyloidosis 1.0 is an automated machine learning-based decision support system, indicated as a screening tool for adult patients aged 65 years and over with heart failure undergoing cardiovascular assessment using echocardiography. When utilised by an interpreting physician, this device provides information alerting the physician for referral to confirmatory investigations. EchoGo Amyloidosis 1.0 is indicated in adult patients aged 65 years and over with heart failure. Patient management decisions should not be made solely on the results of the EchoGo Amyloidosis 1.0 analysis.
Targeting disease	Cardiac Amyloidosis	Cardiac Amyloidosis
Intended population	Adults	Adults over the age of 65
Users	Qualified cardiologists, sonographers, or other licensed professional practitioners	Interpreting clinician
Nature of device	Clinical decision –making support tool	Diagnostic aid
Operating platform	Hosted on Us2.ai's platform on 3rd party infrastructure	Hosted on Ultromic's platform on 3rd party infrastructure

Machine Learning-Based algorithm	Yes	Yes
DICOM files	Yes	Yes

Characteristics	Subject Device(Us2.ca)	Predicate (K240860-EchoGo Cardiac Amyloidosis (1.0))
containing echocardiogram as input		
Cybersecurity	Post-market Management of Cybersecurity in Medical Devices. Content of Premarket Submissions for Management of Cybersecurity in Medical Devices. Content of Premarket Submissions for Management of Cybersecurity in Medical Device Containing Off-the-Shelf (OTS) Software: Guidance for Industry.	Post-market Management of Cybersecurity in Medical Devices. Content of Premarket Submissions for Management of Cybersecurity in Medical Devices. Content of Premarket Submissions for Management of Cybersecurity in Medical Devices. Cybersecurity for Networked Medical Devices Containing Off-the-Shelf (OTS) Software: Guidance for Industry.
Pre-clinical performance testing	No animal studies were conducted.	No animal studies were conducted.
Bench Performance Testing	Verification and Validation testings, Regression testing	Technical validation, numerical stability, and regression testing.

Both Us2.ca and the predicate device use AI to analyze echocardiograms and generate reports that support clinical decision making in detecting cardiac amyloidosis. Given the similarity in both devices, Us2.ca does not significantly affect the safety or effectiveness of the devices, and they operate in a similar manner. Thus, Us2.ca is substantially equivalent to the predicate device.

Special Controls

Per the regulation 21 CFR 870.2200, there are special controls which the Us2.ca has to fulfil. All supporting documentation and/or data for the implementation of the special controls are found within the actual submission.

(1) Software description, verification, and validation based on comprehensive hazard analysis must be provided, including:

- (i) Full characterization of technical parameters of the software, including any proprietary algorithm(s);
- (ii) Description of the expected impact of all applicable sensor acquisition hardware characteristics on performance and any associated hardware specifications;
- (iii) Specification of acceptable incoming sensor data quality control measures; and
- (iv) Mitigation of impact of user error or failure of any subsystem components (signal detection and analysis, data display, and storage) on accuracy of patient reports.

(2) Scientific justification for the validity of the status indicator algorithm(s) must be provided. Verification of algorithm calculations and validation testing of the algorithm using a data set separate from the training data must demonstrate the validity of modeling.

(3) Usability assessment must be provided to demonstrate that risk of misinterpretation of the status indicator is appropriately mitigated.

(4) Clinical data must be provided in support of the intended use and include the following:

- (i) Output measure(s) must be compared to an acceptable reference method to

- demonstrate that the output measure(s) represent(s) the predictive measure(s) that the device provides in an accurate and reproducible manner;
- (ii) The data set must be representative of the intended use population for the device. Any selection criteria or limitations of the samples must be fully described and justified;
 - (iii) Agreement of the measure(s) with the reference measure(s) must be assessed across the full measurement range; and
 - (iv) Data must be provided within the clinical validation study or using equivalent datasets to demonstrate the consistency of the output and be representative of the range of data sources and data quality likely to be encountered in the intended use population and relevant use conditions in the intended use environment.
- (5) Labeling must include the following:
- (i) The type of sensor data used, including specification of compatible sensors for data acquisition;
 - (ii) A description of what the device measures and outputs to the user;
 - (iii) Warnings identifying sensor reading acquisition factors that may impact measurement results;
 - (iv) Guidance for interpretation of the measurements, including warning(s) specifying adjunctive use of the measurements;
 - (v) Key assumptions made in the calculation and determination of measurements;
 - (vi) The measurement performance of the device for all presented parameters, with appropriate confidence intervals, and the supporting evidence for this performance;
 - (vii) A detailed description of the patients studied in the clinical validation (e.g., age, gender, race/ethnicity, clinical stability) as well as procedural details of the clinical study.

All special controls listed below have been implemented within Us2.ca.

Performance Data

Us2.ca was developed and tested in accordance with Us2.ai's Design Control processes. The device has been subject to extensive safety and performance testing. Non-clinical verification and validation test results established that the device meets its design requirements and intended use. Specifically, software verification was conducted at unit, module, and system integration levels. Risk management analysis generated multiple risk mitigation measures and verification activities. A Cybersecurity Analysis and data security testing were conducted to verify that data and patient protected health information security measures are included in the design of the software. A Human Factors/Usability Engineering study performed according to the principles of AAMI/ANSI HE75 was performed to validate the device's usability within the intended user population.

Us2.ca uses a video-based deep-learning approach for CA detection. The model analyzes Apical 4-Chamber (A4C) clips and identifies the presence of CA. The primary objective of the Us2.ca performance test protocol is to validate the performance of Us2.ca, developed for the detection of cardiac amyloidosis in apical four-chamber (A4C) echocardiographic images of adult patients with IVSd or LVPWd ≥ 12 mm. The testing data involved two cohorts: Cardiac Amyloidosis Group (CA Group) and Control Group.

The primary performance metrics were sensitivity and specificity. The benchmark used in deriving the acceptance criteria of Us2.ca was made with reference to current standards of care and existing relevant publications.

Us2.ca device performance was evaluated in accordance to a retrospective case-control study across various sites in the USA and Japan. Data was obtained using a range of PACS system to

represent the types of machines used.

Results for Us2.ca

Us2.ca was developed using a training dataset comprising 4,371 patients and externally validated on an independent pooled dataset of 1,647 patients. The training and external validation datasets were sourced from entirely separate data providers, ensuring no overlap and maintaining full independence between development and evaluation. The external validation cohort included a demographically and geographically diverse population, collected from six clinical sites across the United States and Japan. All echocardiographic studies were retrospectively obtained from routine clinical evaluations and provided in standard DICOM format. Ultrasound data were obtained from GE, Philips, and Siemens systems to train the machine learning-based software device, but the testing data were only obtained from GE and Philips systems.

Summary Demographic Data:

Clinical Characteristic	Training Data (N=4371)		Testing Data (N=1647)	
	CA Cases (N=2241)	Control Cases (N=2130)	CA Cases (N=664)	Control Cases (N=983)
Age, years, n (%)				
<=50	48 (2.1%)	487 (22.9%)	23 (3.5%)	143 (14.5%)
51-60	138 (6.2%)	384 (18%)	43 (6.5%)	173 (17.6%)
61-70	454 (20.3%)	445 (20.9%)	136 (20.5%)	225 (22.9%)
71-80	989 (44.1%)	453 (21.3%)	271 (40.8%)	263 (26.8%)
>80	612 (27.3%)	357 (16.8%)	186 (28%)	175 (17.8%)
Not reported	0 (0%)	4 (0.2%)	5 (0.8%)	4 (0.4%)
Sex, n (%)				
Female	382 (17%)	816 (38.3%)	151 (22.7%)	350 (35.6%)
Male	1859 (83%)	1314 (61.7%)	508 (76.5%)	631 (64.2%)
Not reported	0 (0%)	0 (0%)	5 (0.8%)	2 (0.2%)
Race, n (%)				
African American	260 (11.6%)	140 (6.6%)	240 (36.1%)	315 (32%)
White	1895 (84.6%)	396 (18.6%)	217 (32.7%)	397 (40.4%)
Hispanic or Latino	0 (0%)	0 (0%)	5 (0.8%)	0 (0%)
Asian	86 (3.8%)	1594 (74.8%)	182 (27.4%)	228 (23.2%)
Others/ Not reported	0 (0%)	0 (0%)	20 (3%)	43 (4.4%)
Other Clinical Variables				
BMI, kg/m2, mean $\pm$ SD	26.3 $\pm$ 4.0	26.3 $\pm$ 5.6	25.8 $\pm$ 5.3	29.1 $\pm$ 7.4

Subgroup analyses were conducted across key variables including age, sex, race, ultrasound vendor, and clinical site, which met the acceptance criteria. Us2.ca performance analysis was conducted at the patient level; therefore, the number of samples is equal to the number of patients.

Results for Us2.ca:

When tested on a total of 1647 patients, Us2.ca was able to generate a confident prediction for 1434 patients (CA group: 574 patients; Controls group: 860 patients), in which Us2.ca

performed with a sensitivity of 86.9% (95% CI: 84.2%-89.7%) and specificity of 87.4% (95% CI: 85.2%-89.7%). The overall yield, which refers to the proportion of total tested patients for whom the device was able to generate a confident prediction, was sufficiently high at 87.1%.

The outcomes of the subgroup analysis are provided in the following breakdown,

Stratified by Age

Subgroup	Primary Analyses	
	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
Age		
< 65 years	78.02 (69.51, 86.53)	88.63 (85.27, 91.99)
>= 65 years	88.7 (85.87, 91.54)	86.58 (83.63, 89.52)

Stratified by Gender

Subgroup	Primary Analyses	
	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
Gender		
Female	85.61 (79.62, 91.59)	87.83 (84.15, 91.5)
Male	87.41 (84.3, 90.52)	87.21 (84.43, 89.99)

Stratified by Race

Subgroup	Primary Analyses	
	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
Race		
Asian	92.31 (88.13, 96.49)	85.29 (80.43, 90.15)
African American	85.38 (80.62, 90.13)	87.5 (83.57, 91.43)
Hispanic or Latino	100 (100, 100)	-
White	83.7 (78.36, 89.03)	88.73 (85.4, 92.06)
Others	83.33 (53.51, 113.15)	90.91 (73.92, 100)

Stratified by Vendor

Us2.ca is externally validated on data from Philips and GE vendors.

Subgroup	Primary Analyses	
Vendor	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
Philips	84.17 (80.58, 87.76)	88.42 (85.31, 91.54)
GE	93.14 (89.4, 96.89)	86.41 (83.24, 89.58)

Stratified by Data Source

Subgroup	Primary Analyses	
Data Source	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)
Center 1	86.55 (82.63, 90.48)	87.91 (85.25, 90.57)
Center 2	78.21 (69.04, 87.37)	92.11 (83.53, 100)
Center 3	86.27 (76.83, 95.72)	86.67 (76.73, 96.6)
Center 4	92.26 (88.05, 96.47)	85.35 (80.43, 90.28)

Substantial Equivalence Conclusion

Us2.ca is an image processing software which has similar intended use and indications for use statement as the predicate device. The two devices have similar technological characteristics: both use machine learning algorithms to automate the measurement of transthoracic cardiac images. As both the subject and predicate devices support the detection of cardiac amyloidosis, this does not in and of itself produce different questions of safety and effectiveness. This 510(k) submission includes information on the Us2.ca technological characteristics, as well as performance data and verification and validation activities. Given the similarity of both devices, the enclosed information demonstrates that Us2.ca is as safe and effective as the predicate, and does not raise different questions of safety and effectiveness.