



November 21, 2024

Cepheid
% Riva Dill-Garlow, Ph.D.
Regulatory Affairs Senior Specialist
904 Caribbean Drive
Sunnyvale, California 94089

Re: K243405

Trade/Device Name: Xpert *vanA*
Regulation Number: 21 CFR §866.1640
Regulation Name: Antimicrobial Susceptibility Test Powder
Regulatory Class: Class II
Product Code: NIJ, OOI
Dated: October 31, 2024
Received: November 1, 2024

Dear Riva Dill-Garlow:

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 (CFR), 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 §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 §807); labeling (21 CFR §801 and §809); medical device reporting (reporting of medical device-related adverse events) (21 CFR §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 §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 §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 §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,

Ribhi Shawar 

Ribhi Shawar, Ph.D. (ABMM)
Branch Chief
General Bacteriology and Antimicrobial Susceptibility Branch
Division of Microbiology Devices
OHT7: Office of In Vitro Diagnostics
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known)

K243405

Device Name

Xpert® vanA

Indications for Use (Describe)

The Xpert® vanA test performed on the GeneXpert® Instrument Systems is a qualitative in vitro diagnostic test designed for detection of the vanA gene sequence associated with vancomycin resistance in bacteria obtained from rectal swab specimens from patients at risk for intestinal colonization with vancomycin-resistant bacteria. The test utilizes automated real-time polymerase chain reaction (PCR) to detect the vanA gene that is frequently associated with vancomycin-resistant enterococci (VRE). The Xpert vanA test is intended to aid in the recognition, prevention, and control of vancomycin-resistant organisms that colonize patients in healthcare settings. The Xpert vanA test is not intended to diagnose infections caused by vancomycin-resistant bacteria nor to guide or monitor treatment for vancomycin-resistant bacterial infections. Concomitant cultures are necessary to recover organisms for identification of vancomycin-resistant bacteria, antimicrobial susceptibility testing, and for epidemiological typing.

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.

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510(k) Summary for Xpert *vanA*

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1 510(k) Summary

As required by 21 CFR Section 807.92.

Submitted by: Cepheid
904 Caribbean Drive
Sunnyvale, CA 90489
Phone number: (408) 541-4191

Contact: Riva Dill-Garlow, PhD

Date of Preparation: October 31, 2024

Device:

Trade name	Xpert® <i>vanA</i>
Common name	Xpert <i>vanA</i> test
Type of Test	Qualitative nucleic acid amplification test of the <i>vanA</i> gene directly from rectal swabs
Regulation number:	21 CFR §866.1640
Classification name:	Antimicrobial susceptibility test powder
Product code:	NIJ, OOI
Classification Advisory Panel	Microbiology (83)
Prescription Use	Yes
Predicate Device	Xpert <i>vanA</i> Assay (K092953)

1.1 Device Description

The Xpert *vanA* test is an automated *in vitro* diagnostic test for the qualitative detection of the *vanA* gene sequence associated with vancomycin resistance in bacteria obtained directly from rectal swab specimens. The specimen is collected on a double swab, one of which is placed in a tube containing sample reagent. Following brief vortexing, the content of the sample reagent is transferred to the uniquely labeled Sample Chamber of a disposable fluidic cartridge (the Xpert *vanA* cartridge). The user initiates a test from the user interface of the GeneXpert® instrument system platform and places the cartridge with sample into the GeneXpert® instrument system which performs hands-off real-time, multiplex polymerase chain reaction (PCR) for the detection of *vanA* DNA.

In the GeneXpert® Instrument Systems (comprised of the GeneXpert® Dx System, GeneXpert® System with Touchscreen, and GeneXpert® Infinity System), sample preparation, amplification, and real-time detection are all fully automated and completely integrated. The platform requires the use of single-use disposable cartridges that hold the PCR reagents and host the PCR process. Because the cartridges are self-contained, cross-contamination between samples is minimized.

Depending on the specific instrument, a GeneXpert® instrument system may contain 1–80 modules, each of which are randomly accessible and capable of performing separate sample preparation and real-time PCR tests. Each module contains a syringe drive for dispensing fluids (i.e., the syringe drive activates the plunger that works in concert with the rotary valve in the cartridge to move fluids between chambers), an ultrasonic horn for lysing cells or spores, and a proprietary I-CORE thermocycler for performing real-time PCR and detection.

The Xpert *vanA* test includes reagents for the detection of the gene for vancomycin resistance (*vanA*) as well as an internal sample processing control (SPC) to control for adequate processing of the target bacteria and to monitor the presence of inhibitor(s) in the PCR assay. The SPC also ensures that the PCR conditions (temperature and time) are appropriate for the amplification reaction and that the PCR reagents are functional. The Probe Check Control (PCC) verifies reagent rehydration, PCR tube filling in the cartridge, probe integrity, and dye stability.

The Xpert *vanA* test performed on the GeneXpert® Instrument Systems provides results in less than 45 minutes.

Each instrument in the GeneXpert® instrument family is equipped with a Windows OS-based personal computer that is preloaded with software applications for running the tests and viewing the results, as described in **Table 1**.

Table 1: Instrument Systems and Software in the GeneXpert® Instrument Family Members

Instrument Family Members	Instrument Systems	Systems Software	Instruments
GeneXpert® Instrument Systems	GeneXpert® Dx System	<i>GeneXpert Dx</i>	• GX-I[†] • GX-II • GX-IV • GX-XVI
	GeneXpert® System with Touchscreen	<i>Cepheid OS</i>	• GX-II • GX-IV • GX-XVI
	GeneXpert® Infinity System	<i>GeneXpert Xpertise</i>	• GeneXpert Infinity-48s • GeneXpert Infinity-80

[†] No longer manufactured but is in circulation in the market

1.2 Device Intended Use

The Xpert® *vanA* test performed on the GeneXpert® Instrument Systems is a qualitative *in vitro* diagnostic test designed for detection of the *vanA* gene sequence associated with vancomycin resistance in bacteria obtained from rectal swab specimens from patients at risk for intestinal colonization with vancomycin-resistant bacteria. The test utilizes automated real-time polymerase chain reaction (PCR) to detect the *vanA* gene that is frequently associated with vancomycin-resistant enterococci (VRE). The Xpert *vanA* test is intended to aid in the recognition, prevention, and control of vancomycin-resistant organisms that colonize patients in healthcare settings. The Xpert *vanA* test is not intended to diagnose infections caused by vancomycin-resistant bacteria nor to guide or monitor treatment for vancomycin-resistant bacterial infections. Concomitant cultures are necessary to recover organisms for identification of vancomycin-resistant bacteria, antimicrobial susceptibility testing, and for epidemiological typing.

1.3 Technical Characteristics

The Xpert *vanA* test has the same technological characteristics as the predicate device.

1.4 Substantial Equivalence

The purpose of this Special 510(k) submission is to modify the cleared, legally marketed device (Xpert *vanA*) to include the GeneXpert® Infinity System instruments (see Table 1 above). The Xpert *vanA* test was originally cleared for use on the GeneXpert® Dx System (K092953). Both the GeneXpert Dx System and the GeneXpert Infinity System are members of the instrument family “GeneXpert® Instrument Systems” which is now incorporated in the Intended Use/Indications for Use of this device. **Table 2** shows the similarities and **Table 3** shows the differences between the Xpert *vanA* test and predicate device. The differences between Xpert *vanA* test and predicate device do not raise different questions of safety and effectiveness.

Table 2. Similarities between Xpert *vanA* and the Predicate Device

Similarities		
Attribute	Modified Device	Predicate (K092953)
	Xpert® <i>vanA</i>	Xpert® <i>vanA</i>
Regulation	Same	21 CFR §866.1640 Antimicrobial susceptibility test powder
Product Code	Same	NIJ System, Test, Genotypic detection, Resistant markers, Enterococcus species OOI Real Time Nucleic Acid Amplification System
Device Class	Same	Class II
Purpose of Use	Same	Identification of the <i>vanA</i> gene sequence that is associated with vancomycin-resistant enterococci (VRE)
Specimen	Same	Rectal Swab
Test Technology	Same	Nucleic Acid (DNA) Amplification (real time PCR) for qualitative detection of <i>vanA</i> with specific primers and TaqMan probes Detection: Fluorogenic target-specific hybridization
Test Automation	Same	Fully automated DNA extraction, detection, and results interpretation
Test Format	Same	Single-use in disposable, multi-chambered, fluidic cartridge
Test Targets (sequence)	Same	<i>vanA</i>
Internal Controls	Same	• Sample Processing Control (SPC) • Probe Check Control (PCC)
Time to Results	Same	Less than 45 minutes to results
Intended Use Environment	Same	Professional Use, by trained users
Test Access	Same	Prescription Use only

Table 3. Differences Between Xpert *vanA* and the Predicate Device

Differences		
Attribute	Modified Device	Predicate (K092953)
	Xpert® <i>vanA</i>	Xpert® <i>vanA</i>
Intended Use / Indications for Use	The Xpert® <i>vanA</i> test performed on the GeneXpert® Instrument Systems is a qualitative <i>in vitro</i> diagnostic test designed for detection of the <i>vanA</i> gene sequence associated with vancomycin resistance in bacteria obtained from rectal swab specimens from patients at risk for intestinal colonization with vancomycin-resistant bacteria. The test utilizes automated real-time polymerase chain reaction (PCR) to detect the <i>vanA</i> gene that is frequently associated with vancomycin-resistant enterococci (VRE).	The Cepheid Xpert® <i>vanA</i> Assay performed in the GeneXpert® Dx System is a qualitative <i>in vitro</i> diagnostic test designed for rapid detection of the <i>vanA</i> gene sequence associated with vancomycin resistance in bacteria obtained from rectal swab specimens from patients at risk for intestinal colonization with vancomycin-resistant bacteria. The test utilizes automated real-time polymerase chain reaction (PCR) to detect the <i>vanA</i> gene that is frequently associated with vancomycin-resistant enterococci (VRE).

Differences		
Attribute	Modified Device	Predicate (K092953)
	Xpert® <i>vanA</i>	Xpert® <i>vanA</i>
	The Xpert <i>vanA</i> test is intended to aid in the recognition, prevention, and control of vancomycin-resistant organisms that colonize patients in healthcare settings. The Xpert <i>vanA</i> test is not intended to diagnose infections caused by vancomycin-resistant bacteria nor to guide or monitor treatment for vancomycin-resistant bacterial infections. Concomitant cultures are necessary to recover organisms for identification of vancomycin-resistant bacteria, antimicrobial susceptibility testing, and for epidemiological typing.	The Xpert <i>vanA</i> Assay is intended to aid in the recognition, prevention, and control of vancomycin-resistant organisms that colonize patients in healthcare settings. The Xpert <i>vanA</i> Assay is not intended to diagnose infections caused by vancomycin-resistant bacteria nor to guide or monitor treatment for vancomycin-resistant bacterial infections. Concomitant cultures are necessary to recover organisms for identification of vancomycin-resistant bacteria, antimicrobial susceptibility testing and for epidemiological typing.
Instrument Systems	• GeneXpert Dx System • GeneXpert System with Touchscreen • GeneXpert Infinity System	• GeneXpert Dx System • GeneXpert System with Touchscreen
Systems Software for instrument family	• GeneXpert Dx software • Cepheid OS software • Xpertise software	• GeneXpert Dx software • Cepheid OS software

1.5 Summary of Performance Data

The performance of the Xpert *vanA* test when used with the GeneXpert Infinity System instruments was assessed through verification studies, including a prepared cartridge hold time study and functional testing.

Hold time refers to the duration between the preparation of the cartridge (i.e., addition of sample) and the initiation of the test. The maximum acceptable hold time for a prepared cartridge was verified as 4 hours.

Functional testing was conducted using both contrived positive (vancomycin-resistant (*vanA*) *Enterococcus faecalis* cells added to negative matrix) and negative (negative matrix only) samples. The study results showed 100% agreement of reportable results, with no statistically significant differences in Ct values observed between assay runs in instruments of the GeneXpert Dx System and GeneXpert Infinity System. This study demonstrated equivalent performance of the Xpert *vanA* test when performed on any member of the GeneXpert® Instrument Systems family.

The assessment of the results from these studies determined that the performance claims of the Xpert *vanA* test were not impacted by the modifications made to the predicate device.

1.6 Conclusion

The results of the verification studies demonstrated that the performance of the modified Xpert *vanA* test on the GeneXpert Infinity System is equivalent to the performance of the predicate

device, the original Xpert *vanA* (K092953), and that the modifications proposed in the modified device have not changed the fundamental scientific technology of the predicate device.