

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY  
DEVICE ONLY TEMPLATE**

**A. 510(k) Number:**

k052656

**B. Purpose of Submission:**

To include Daptomycin on the VITEK<sup>®</sup>2 gram positive AST panel for testing appropriate gram positive isolates.

**C. Analyte:**

Daptomycin at  $\leq 0.5$  -  $\geq 16\mu\text{g/ml}$

**D. Type of Test:**

Qualitative growth based detection algorithm using optics light detection

**E. Applicant:**

bioMerieux, Inc.

**F. Proprietary and Established Names:**

VITEK<sup>®</sup> 2 Gram Positive Daptomycin

**G. Regulatory Information:**

1. Regulation section:  
866.1645 Short-Term Antimicrobial Susceptibility Test System
2. Classification:  
II
3. Product Code:  
LON System, Test, Automated, Antimicrobial Susceptibility, Short Incubation
4. Panel:  
83 Microbiology

**H. Intended Use:**

1. Intended use(s):  
The VITEK<sup>®</sup>2 Gram Positive Daptomycin at concentrations of 0.5, 2, 4, and 8 $\mu\text{g/mL}$  is intended for use with the VITEK 2 System in clinical laboratories as an *in vitro* test to determine the susceptibility of *Enterococcus faecalis*, *Staphylococcus aureus*, *Streptococcus agalactiae*, *Staphylococcus epidermidis* and *Staphylococcus haemolyticus* to antimicrobial agents when used as instructed in the Online Product Information.

The VITEK<sup>®</sup> 2 Antimicrobial Susceptibility Test (AST) is intended to be used with the VITEK<sup>®</sup> 2 System for the automated quantitative or qualitative susceptibility testing of isolated colonies for the most clinically significant aerobic gram-negative bacilli, *Staphylococcus spp.*, *Enterococcus spp.*, *Streptococcus agalactiae*, and *S. pneumoniae*.

2. Indication(s) for use:

This submission is for the addition of the antimicrobial agent Daptomycin at concentrations at 0.5, 2, 4, and 8 $\mu\text{g/mL}$  with a calling range of  $\leq 0.25$ -  $\geq 4\mu\text{g/mL}$

to the VITEK<sup>®</sup> 2 gram positive susceptibility (GPS) CARD for the testing of appropriate gram positive isolates.

3. Special condition for use statement(s):

Prescription Use only.

The current absence of data on resistant strains precludes defining any results other than “Susceptible”. Strains yielding MIC results suggestive of a “non-susceptible” category should be submitted to a reference laboratory for further testing.

4. Special instrument Requirements:

Not applicable

**I. Device Description:**

Each VITEK<sup>®</sup> 2 GPS test card contains 45 microwells. A control well, that contains only microbiological culture medium is resident on all cards, with the remaining wells containing premeasured amounts of a specific antimicrobial agent combined with microbiological culture media. A suspension of organism is made in 0.45-0.5% sterile saline from a pure culture and standardized to a McFarland 0.5 standard using the Vitek Colorimeter. The desired card (s) are placed in the cassette along with an empty tube for the susceptibility card. The cassette is placed into the VITEK<sup>®</sup> 2 instrument where a susceptibility test will be automatically diluted from the ID suspension by the VITEK<sup>®</sup> 2. The cards are then automatically vacuum filled; the tubes are cut and the cards sealed prior to proceeding to the incubator/reader for incubation (35.5° C) and optical scanning during the 6-15 hour incubation cycle. Minimum Inhibitory Concentration (MIC) readings are performed every 15 minutes.

There is also an alternate manual dilution method of the organism that is recommended in the package insert.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):

VITEK<sup>®</sup> 2 Gram Positive AST Panel for Linezolid

2. Predicate K number(s):

K022045

3. Comparison with predicate:

<b>Similarities</b>		
<b>Item</b>	<b>Device</b>	<b>Predicate</b>
Intended Use	AST testing of gram positive isolates	Same
Test organism	Colonies of <i>Staphylococcus spp.</i> , <i>Enterococcus spp.</i> , <i>Streptococcus agalactiae</i>	Same
Test Card	VITEK <sup>®</sup> 2 card format with base broth	Same
Instrument	VITEK <sup>®</sup> 2 System	Same
Performance	Categorical interpretation	same
<b>Differences</b>		

Item	Device	Predicate
Antibiotic	Daptomycin	Linezolid
Reading algorithm	Unique for Daptomycin	Unique for Linezolid

**K. Standard/Guidance Document Referenced (if applicable):**

Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA”; CLSI (Clinical and Laboratory Standards Institute) M7 (M100-S15) “Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard”.

**L. Test Principle:**

VITEK GPS Daptomycin contains aliquots of microbiological culture media that contain the equivalent of individually weighed, premeasured portions of Daptomycin. A suspension of the isolate to be tested is diluted with 0.45-0.5% sterile saline. The VITEK Card is inoculated with the diluted suspension using a vacuum filling process in the VITEK Filling Module. The VITEK® System determines when a well demonstrates growth (positive) based on the attenuation of light measured by an optical scanner. Organism growth is expressed as increased turbidity in the wells. Optical measurements are taken on an hourly basis. If during the 6-15 hour incubation cycle, bacterial growth occurs at levels equal to or greater than a predetermined threshold, regression analysis is utilized, along with the organism’s identification, to determine the appropriate MIC value for the antimicrobial. The MIC result must be linked to organism identification in order to determine an MIC value. An MIC value along with a category interpretation will be reported.

**M. Performance Characteristics (if/when applicable):**

1. Analytical performance:

a. **Precision/Reproducibility:**

Ten on-scale gram positive organisms were tested in triplicate at each of three sites for three days for an overall inter and intra reproducibility of >95%. This testing was performed using the manual dilution method of the inoculum.

b. **Linearity/assay reportable range:**

Not applicable

c. **Traceability (controls, calibrators, or method):**

Quality Control was performed during the studies using the manual method of diluting the organisms. The two recommended QC organisms were tested with the following results.

ORGANISM	VITEK® Conc.	Manual dilution	Reference Conc.	Reference
<i>E. faecalis</i> ATCC 29212 Range 1-8 ug/mL			≤0.125	
	0.25		0.25	
	0.5		0.5	
	1	28	1	8
	2	40	2	77
	4	18	4	1
	8		8	

	16		16	
			≥32	

<b>ORGANISM</b>	<b>VITEK® Conc.</b>	<b>Manual dilution</b>	<b>Reference Conc.</b>	<b>Reference</b>
<i>S. aureus</i> ATCC 29213 Range 0.25-1 ug/mL			≤0.125	
	0.25	94	0.25	91
	0.5	1	0.5	2
	1		1	2
	2		2	
	4		4	
	8		8	
	16		16	
			≥32	

Inoculum density control: Internal verification of inoculum density was performed on each of the first five days of testing and then weekly for the duration of the study using 3 ATCC organisms and five instruments with 50 results available for each organism. The clinical sites also calibrated the colorimeter used at that site. All recorded calibrated values were within acceptable parameters.

*d. Detection limit:*

Not applicable

*e. Analytical specificity:*

Not applicable

*f. Assay cut-off:*

Not applicable

2. Comparison studies:

*a. Method comparison with predicate device:*

A comparison of the clinical data was performed to the broth microdilution reference method as described in the CLSI M7. *Enterococcus faecalis*, *Staphylococcus aureus*, *Streptococcus agalactiae*, *Staphylococcus epidermidis* and *Staphylococcus haemolyticus* were tested at three sites that included both clinical and challenge isolates. All of the test organisms that provided results did so in <16 hours. Results of testing performed using the manual dilution feature are presented in the table below:

	<b>total</b>	<b>CA</b>	<b>%CA</b>	<b>NS</b>	<b>min</b>	<b>maj</b>	<b>vmj</b>
<b>Clinical</b>	471	468	99.4	0	0	3	0
<b>Challenge</b>	97	97	100	0	0	0	0
<b>Combined</b>	568	565	99.5	0	0	3	0

Since the Staphylococcus and Beta Streptococcus have a different break-point (BP) from the Enterococcus, they are presented separately in the table below for the clinical testing:

	total	CA	% CA	NS
<b>Staphylococcus /Beta Strep</b>	362	359	99.2	0
<b>Enterococcus</b>	109	109	100	0
<b>Combined</b>	471	468	99.4	0

**EA**- essential agreement

**NS**-non-susceptible

**CA**-Category Agreement

**maj**-major error

**min**-minor error

**vmj**-very major error

CA is when the interpretation of the VITEK<sup>®</sup> 2 results agrees exactly with the interpretation of the reference method. EA was not established at the time of testing because a minimum of five discrete dilutions is necessary to perform essential agreement (EA) based on +/- one two fold dilution. The CA was acceptable for a break-point [sensitive-intermediate-resistant (SIR)] categorization as described in the FDA guidance document, "Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA".

The challenge set of organisms was also tested at one site using the manual method of inoculation with the following performance:

Manual testing:

	total	CA	%CA	NS
<b>Staph</b>	75	75	100	0
<b>Strep</b>	22	22	100	0
<b>Combined</b>	97	97	100	0

The test device had a growth rate of >95%.

b. *Matrix comparison:*

Not applicable

3. Clinical studies:

a. *Clinical sensitivity:*

Not applicable

b. *Clinical specificity:*

Not applicable

c. *Other clinical supportive data (when a and b are not applicable):*

Not applicable

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

*Staphylococcus spp.* ≤1 (S)

*Streptococcus agalactiae* ≤1 (S)

*Enterococcus spp.* ≤ 4 (S)

The expected value range, interpretive criteria and QC are the same as recommended in CLSI and FDA.

The current absence of data on resistant strains precludes defining any results other than “Susceptible”. Strains yielding MIC results suggestive of a “non-susceptible” category should be submitted to a reference laboratory for further testing.

**N. Proposed Labeling**

The labeling is sufficient and it satisfies the requirement of 21 CFR Part 809.10

**O. Conclusion:**

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.

