Carbapenemase activity in isolates of \textit{K. pneumoniae}

Explanation of indications for confirmatory tests for carbapenemase activity

Questions:

\textit{If a \textit{K. pneumoniae} isolate has an MIC = 2 \text{ug/ml} to ertapenem and an MIC of 2 to 4 \text{ug/ml} to imipenem or meropenem, what additional testing is warranted?}

\begin{itemize}
  \item \textit{Test for inducible Clindamycin resistance}
  \item \textit{Modified Hodge test for carbapenemase activity}
  \item \textit{ESBL test for extended spectrum beta-lactamase activity}
  \item \textit{PBP2a or mec A test for oxacillin resistance}
\end{itemize}

Discussion:

The following specific information for \textit{Enterobacteriaceae} is provided in the Clinical and Laboratory Standards Institute (CLSI) guidelines:

\textit{Enterobacteriaceae that are resistant to one or multiple agents in cephalosporin subclass III and that demonstrate elevated MICs to carbapenems may produce a carbapenemase, despite the fact that the MICs may fall within the current susceptible range.}\textsuperscript{1}

\textit{MICs listed below may indicate carbapenemase production despite the fact that they are in the current susceptible interpretive categories. For confirmation perform the modified Hodge test.}\textsuperscript{2}

\begin{itemize}
  \item \textit{Ertapenem 2 \text{ug/mL}}
  \item \textit{Imipenem 2-4 \text{ug/mL}}
  \item \textit{Meropenem 2 to 4 \text{ug/mL}}
\end{itemize}

Answers:

\textit{Modified Hodge test for carbapenemase activity}
\(^1\) CLSI M100-S19 Table 2A, Pg 40
\(^2\) CLSI M100-S19, Appendix G, Pg 137