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September 8, 2017

FILED BY EDGAR

United States Securities and Exchange Commission
Mail Stop 3030
Washington, D.C. 20549
Attn: Amanda Ravitz, Assistant Director, Office of Electronics and Machinery

Re: Axcelis Technologies, Inc. Form 10-K for the fiscal year ended December 31, 2016; Filed March 14, 2017 — No. 000-30941

Dear Sir or Madam:

This letter is in response to your comment letter to Mary G. Puma, President and Chief Executive Officer of Axcelis Technologies, Inc. (“Axcelis” or the “Company”) dated September 6, 2017, and signed by Tim Buchmiller for Amanda Ravitz, Assistant Director, Office of Electronics and Machinery (the “Comment Letter”). The response contained herein is numbered to correspond to the number used in the Comment Letter.

Item 1. Business, page 2.

1. In your future filings, disclose the name of any customer and its relationship, if any, with you or any of your subsidiaries if sales to the customer are made in an aggregate amount equal to 10 percent or more of your consolidated revenues and the loss of such customer would have a material adverse effect on you and your subsidiaries taken as a whole.

Response:

In our future filings, we will disclose the name of any customer and its relationship, if any, with Axcelis or any of our subsidiaries if sales to the customer are made in an aggregate amount equal to 10 percent or more of our consolidated revenues and the loss of such customer would have a material adverse effect on Axcelis and our subsidiaries taken as a whole.

If you have any questions or request additional information, please do not hesitate to contact the undersigned at 978-787-4120 or at Lynnette.fallon@axcelis.com

Very truly yours,

/s/ Lynnette C. Fallon

Lynnette C. Fallon
Executive Vice President HR/Legal and General Counsel

Mary G. Puma, President and CEO, Axcelis
Kevin J. Brewer, Executive Vice President and CFO, Axcelis