



DIVISION OF
CORPORATION FINANCE

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

Mail Stop 6010

August 28, 2007

VIA U.S. MAIL and FACSIMILE

Stephen G. Bassett
Chief Financial Officer
Axcelis Technologies, Inc.
108 Cherry Hill Drive
Beverly, Massachusetts 01915

RE: Axcelis Technologies, Inc.
Form 10-K for the fiscal year ended December 31, 2006
Filed March 15, 2007
Form 10-Q for the quarterly period ended March 31, 2007
File No. 000-30941

Dear Mr. Bassett:

We have reviewed your response dated August 17, 2007 and related filings and have the following comments. We have limited our review of your filing to those issues we have addressed in our comments. Where indicated, we think you should revise your document in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Mr. Bassett
Axcelis Technologies, Inc.
August 28, 2007
Page 2

Form 10-K for the fiscal year ended December 31, 2006

Consolidated Statements of Operations, page F-2

1. We reference your response to prior comment one in our letter dated July 20, 2007. We note that you do not separately track costs in a format that would enable you to separately report costs of systems, services and royalties. However, we see that services revenue is approximately 40% of total revenue. Under Article 5-03(b) (1) and (2) of Regulation S-X, you should separately state costs and expenses applicable to each category of sales and revenues. To the extent that you are able to estimate the costs applicable to each category of sales presented on the face of the income statement, future filings should be revised to reflect this presentation.
2. As a related matter, we continue to believe that the gross profit for systems and services should be separately discussed in the results of operations section of MD&A.

As appropriate, please respond to these comments within 10 business days or tell us when you will provide us with a response. Please furnish a cover letter with your response that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your responses to our comments.

You may contact Kristin Lochhead at (202) 551-3664 or me at (202) 551-3676 if you have questions. In this regard, please do not hesitate to contact Martin James, Senior Assistant Chief Accountant, at (202) 551-3671 with any other questions.

Sincerely,

Brian Cascio
Accounting Branch Chief