Supporting the entire process to pass the official test

PCI Express®
Pre-compliance Test Execution /
Compliance Testing Support Services

Keysight helps customers' PCI Express-based products pass official tests at every stage

Applications of the PCI Express standard are not limited to PCs and servers but also extend to various kinds of other products. Events for official PCI Express tests are held mostly in the United States up to four times a year by PCI-SIG® so as to ensure interoperability between PCI Express-based products. Keysight Technologies provides total support for those who need to pass the tests, leveraging its extensive experience in participating in the official tests.

Are you sure you fully understand the compliance tests?

Information on the official PCI-SIG tests is released to PCI-SIG members in various forms. Unfortunately, the updates on some pieces of information are late, and some pieces of information are not adequately communicated. Some people become anxious about which pieces of information distributed by PCI-SIG are relevant to what will actually be evaluated in the compliance tests, and to what extent. We have also heard from some customers, who have performed pretests on their own, that they were not completely confident whether they had done the tests properly.

To solve such problems, Keysight Technologies' experienced engineers provide paid services to assist customers in passing the final tests (pre-compliance tests) prior to the official tests.

Pre-compliance tests performed by experienced, knowledgeable engineers through procedures precisely identical to the official tests

There are two kinds of tests in the official tests (Compliance Workshops) held by PCI-SIG: one is the compliance tests run by PCI-SIG called Gold Suites, and the other is interoperability testing carried out among the participating companies. Since the 36th Workshop (December 2003), where PCI Express was the test target for the first time, Keysight Technologies has been participating in every Compliance Workshop by sending representatives not only from the US but also from Japan on a regular basis, to obtain the latest information and improve its testing experience.

Keysight Technologies' PCI Express Pre-compliance Test Service, provided by engineers experienced with the PCI-SIG Gold Suite tests, performs pre-compliance tests in advance in accordance with the official test procedures and descriptions by using the official equipment specified by PCI-SIG (or equivalent equipment), eliminating customers' anxiety about participating in Compliance Workshops.

Issuance of test result reports

We issue a report that summarizes the test results, which can be used to compare with the results of tests done on your own, used for internal reports as reliable test results, or brought to the official test sites as reference data in preparation for the possibility that official test results may not be as expected.

Benefits of Keysight's pre-compliance tests for those who don't attempt the official tests

We often receive requests for "verification (inspection) of a product using test procedures equivalent to the official tests" even when the product isn't required to pass the compliance tests, for example, products for an OEM or products being built into other products. To meet such demand, Keysight Technologies' PCI Express Pre-compliance Test Service offers test results in accordance with the official test procedures performed with the official equipment. Although the test results are neither official nor acknowledged by PCI-SIG, they are certainly the most reliable test results that can be obtained outside of the Compliance Workshops.

> ∗ **Pre-compliance tests**
> A company that is trying to pass the official PCI-SIG tests at a Compliance Workshop generally conducts tests equivalent to the official tests on its own prior to the official tests. This kind of preliminary test is called a "pre-compliance test."

KEYSIGHT TECHNOLOGIES

PCI Express® Pre-compliance Test Execution / Compliance Testing Support Services

Additional support for passing tests through accompanying customers to test sites

Engineers from Keysight Technologies can accompany you to the official test venues and provide necessary support to ensure smooth and successful tests at the sites (paid service).

Currently, the official tests are held overseas up to four times a year. If the tests are failed, it may waste not only the overseas travel and lodging expenses, but also the man-hours spent on the tests. Failing the tests will inevitably have further consequences in business since product development is directly linked to the subsequent marketing of the product. In fact, you may end up waiting several months for the next tests, which would have an extraordinarily serious impact on your business.

Because the equipment and evaluation procedure used for the PCI-SIG Gold Tests are already decided, the pre-compliance test allows you to assess in advance whether you are likely to pass the tests. The interoperability testing, however, verifies normal operations using an arbitrary combination of an add-in card and a motherboard, neither of which are announced prior to the official tests, and therefore, cannot be tested in advance, leaving some uncertainty. A communication link cannot be established if either the card or the motherboard has a problem; in such a case, an appropriate and flexible on-site response becomes important. The On-Site Test Support Provided by Engineers is a service in which an experienced Keysight engineer accompanies the customer to the official test sites and provides strong support for on-site responses.

Keysight Technologies already has abundant experience in on-site test support. The service is especially beneficial for those who haven't experienced the official tests yet.

Agent services are also available for compliance tests

Keysight Technologies may be able to provide test-taking agent services by having a Keysight employee sit in for a customer at a Compliance Workshop and the official tests. If you are interested, we will individually discuss the conditions, fees, and other matters for the service.

∗ Service is currently available in Japan. For other countries, please contact your local sales reps for service availability.

Target devices and test conditions of the PCI Express Pre-compliance Test Service

Keysight Technologies provides the PCI Express Pre-compliance Test Service, whose target devices and implementation conditions are described below. Please contact us for any other requests or more details.

Target devices:

Add-in cards and motherboards developed in accordance with the PCI Express CEM 2.0 specifications

Test conditions:

Target version of specifications:
PCI Express 2.0 (PCI-SIG)

Description:
The test consists of the following compliance tests as specified by PCI-SIG. Keysight Technologies conducts the tests based on the latest information that Keysight is aware of.

– Electrical Test (Signal Quality)
– Link and Transaction Test (add-in cards only)
– Configuration Space Test (available as reference)
– Platform BIOS Test (motherboards only)

Location:
Keysight Technologies' Hachioji office (9-1 Takakura-cho, Hachioji, Tokyo; in front of JR Kita-Hachioji Station)

Schedule:
Based on individual arrangements (three hours in the afternoon in principle)

Testing conducted by:
Keysight Technologies' engineers who have participated in past PCI-SIG Compliance Workshops

Result reports (upon request):
One copy of written report

The client company is required to be a member of PCI-SIG on the test day.
(Because the tests involve tools and information released only to PCI-SIG members)

Keysight Technologies Measurement Consulting Services

User Case Study : Axell Corporation   **AXELL CORPORATION**

Passed the official PCI Express® tests on the first attempt and achieved its goal of announcing its new product as scheduled

A manufacturer of advanced LSIs that leads the graphics industry

Axell Corporation (Axell, http://www.axell.co.jp/en/) is a fabless semiconductor manufacturer specializing in R&D on and sales of graphics and sound LSIs. The company boasts extensive research and design experience centering on compression/decompression technology. Axell designs and sells unique, highly functional LSIs by leveraging its superior capabilities in product development.

In 2009, Axell developed and launched a new product called the AG10 to enter a new market. The AG10 is the only graphics LSI that can support four screens with just one chip, and the company is expanding sales to the embedded device and computer markets.

The AG10 has adopted PCI Express as its host interface.

Decision was made to take the official tests

While Axell has a large share in the amusement equipment market, its name is not necessarily well known in the embedded device and computer markets, which are the target of the AG10. Also, while amusement equipment tends to use local bus communication to fulfill cost and performance requirements, the data rate of 2.5 Gbps realized by the PCI Express used for the AG10 is a rate tens of times higher than that of existing product lines. Further, connectivity with the host is important in this new market. Axell, therefore, thought it was important to objectively prove the performance of the PCI Express in the AG10 to help the target manufacturers feel confident about using the AG10.

Then, the company considered providing its users with a sense of security by participating in the PCI-SIG Compliance Workshop and passing the official PCI Express tests.

If Axell had not passed the tests held overseas, however, the overseas travel and lodging expenses and the man-hours engineers spent on the tests would have been in vain.

In general, the impact would not have been limited to the costs and man-hours. The direct link from product development to subsequent product marketing meant that the business consequences of failing the tests would have been inevitable. In fact, Axell would have had to wait several months till the next tests, which could have had a huge impact on the company's business.

And specifically, Axell was concerned about the possible impact on its press release schedule as well as sales commitments.

The AG10 can control four displays, all of which can display different contents simultaneously. This capability is suited for digital signage and kiosk terminals as well as embedded devices built into equipment such as POS and ATM systems, which are expected to have multiple displays and higher resolution. Its low power consumption is also its beauty. The AG10 requires neither a cooling fan nor a heat sink, which is said to allow the development of low-cost, low-noise systems. (The photo shows an AG10 evaluation board)

Keysight's solutions

Considering the customer's situation, Keysight proposed two support products as solutions. One was the Pre-compliance Test Service, and the other was the On-site Test Support Provided by Engineers.

The Pre-compliance Test Service provides the same tests as the official tests in advance in the customer's home country, which are positioned as preparatory test practice. Customers can be confident of passing the official tests with the preparation process that involves the same equipment and steps used in the official tests. The tests in this service are performed by engineers with rich experience in participating in the official tests. The customers, thus, will have no anxiety about the equipment or procedures other than preparing for the tests on their own.

The official PCI Express tests consist of a section called Gold Tests and one called interoperability testing. The Gold Tests are pass/fail tests using measurement instruments and special software for testing. The equipment and evaluation procedure are specified in advance, which allows the assessment of the likelihood of passing the test through the Pre-compliance Test Service. On the other hand, the interoperability tests are performed by involving an add-in card and motherboard, which verifies normal operations with arbitrary combinations of add-in cards and motherboards.

The concern here is that neither the add-in cards nor the motherboards are announced prior to the official tests and are not publicly available in advance.

An appropriate, flexible on-site response becomes important since a problem with either the card or the motherboard would prevent the communication link from being established. In the On-site Test Support Provided by Engineers, an experienced Keysight engineer can provide support for on-site responses by accompanying the customer to the official test site.

Passed on the first attempt

Axell took on the challenge of the Compliance Workshop using these two paid services.

With the Pre-compliance Test Service, the company was able to take the electric signal quality, link/transaction, and configuration space tests included in the official add-in card tests and passed all of these tests. During preparation, we also identified and discussed the equipment to take to the test sites before departure.

At the test sites, Axell passed the Gold Tests without difficulty, but in the interoperability test, Axell encountered a motherboard with which a connection could not be established. The schedule for the interoperability test is predetermined, but a retest can be negotiated in case of failure on the first test. A test-taker passes the interoperability test if interoperability with 80% of the counterpart devices is confirmed, meaning that it is also important to arrange for the connection of a sufficient amount of counterpart devices (the number of counterparts required to ensure 80% connectivity). Axell was able to successfully complete the interoperability testing thanks to the support from the accompanying engineer who facilitated such negotiations and arrangements.

User's comments

"Actually, we really needed to pass the official tests on the first attempt, because the date of the announcement following the tests had already been set. This is why we decided to use the pre-compliance test service and the on-site engineer service. I didn't worry about technical matters because our technical staff was also accompanying us, but when we needed to contact the PCI-SIG staff, Keysight referred us to an appropriate person so that we could reliably and efficiently carry out necessary negotiations and checks. If we had not chosen to have the Keysight engineer accompany us, not only would it have been inefficient, but, I think, in the worst-case scenario, we could have failed the tests due to reasons that we were not responsible for. By the last day of the test event, we had completed all of the tests and we were confident that we would pass them."
(Technical Group, Axell Corporation)

"After the tests, you need to apply for the inclusion of the tested product in the PCI-SIG Integrators List, which is a list of products that have passed the tests. Thanks to the advice of Mr. Arai of Keysight, who accompanied us, we were able to check the details of our application at the official test site and smoothly carry out the subsequent application. As a result, the AG10 was included in the Integrators List in only three weeks or so, and we were able to post a press release only six weeks after the tests. We are really happy that we have been able to achieve our initial goal."
(Technical Group, Axell Corporation)

PCI Express Pre-compliance Test Service

This service is to perform tests positioned as preliminary exercises for taking the official tests with the same or equivalent equipment and procedures as the official tests to assess the likelihood of passing. This service supports tests other than the interoperability testing.

On-site test support, accompanying customers to the PCI-SIG Compliance Workshop

Keysight staff members accompany customers to the official test sites (overseas) and provide necessary support to facilitate the tests on site.

The official test venue

Representatives of Axell Corporation who participated in the PCI-SIG Compliance Workshop

∗ PCI Express and PCI-SIG are registered trademarks of PCI-SIG.

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:

www.keysight.com/find/contactus

KEYSIGHT TECHNOLOGIES