

focused primarily on Dataphone Digital System (“DDS”) equipment. DDS was an early digital telecommunications technology. I wrote embedded software for this equipment, including as co-lead software designer of a multi-point DDS system. This system included a master device that coordinated communications among the master and multiple slave devices that shared a transmission medium on digital private telephone lines.

4. Since 1994, I have worked at Zoom Telephonics. Zoom was founded in 1977 and is based in Boston, Massachusetts. Zoom produces cable modems, ADSL modems, dial-up modems, wireless products, Voice over Internet Protocol products, and other communications products.

5. While at Zoom, I have worked on products including dialers, routers, Voice over IP (“VoIP”) products, cable modems and Internet TV. I am an inventor or co-inventor on two U.S. patents relating to dialer and VoIP technology, and co-inventor on a patent application related to VoIP technology. All of these patents are assigned to Zoom Telephonics, Inc.

6. For the past ten years, my primary responsibilities at Zoom have been in the areas of engineering and product management. With respect to engineering, my focus has been on issues relating to embedded software and other software in communications products. With respect to product management, I have concentrated on cable modem and VoIP products as well as products that relate to Internet TV.

7. In 2001, I assumed full responsibility at Zoom for firmware development related to cable modems and continue to have that responsibility today. As a result, I

have been actively involved in the certification processes for Zoom’s cable modems from 2001 to the present.

8. Zoom began producing cable modems in 2001. In total, Zoom has offered a total of six cable modem models for sale over the past decade. Currently, Zoom has two models in production: a Data Over Cable Service Interface Specification (“DOCSIS”) 2.0 model; and a DOCSIS 3.0 model.

9. Zoom sells its cable modems primarily through high-volume retailers including Best Buy, Staples, Fry’s, and Micro Center. Zoom is the second-largest provider of cable modems sold at retail in the United States, trailing only Motorola. Zoom also sells cable modems through a few small cable service providers in the United States and overseas. Cable modems comprise approximately one-third of Zoom’s total sales.

10. Cable modems sold in the United States must meet the regulatory and certification requirements of several entities.

11. The Federal Communications Commission (“FCC”) requires that cable modems and other home electronics equipment meet the requirements of Part 15, Subpart B of the Commission’s rules (“FCC Part 15B”). These requirements restrict the electronic emissions of a cable modem or other electronic device radiated into the environment or conducted onto AC power lines. When an independent lab performs testing of a cable modem that meets the FCC’s requirements, the process, including tests, generation of a test report, and receipt of a certificate of FCC conformity from the testing lab, generally takes about four weeks and costs between \$6,000 and \$8,000.

12. Underwriters Laboratories (“UL”) tests cable modems against a set of safety standards. These standards are designed to protect against the risk of fire, and of injury from electric shock and other causes, such as dangerously hot surfaces. Products that meet these standards may be “listed.” Safety listing is not universally required of electronic devices, such as cable modems, that are sold in the United States. However, safety testing under UL60950 or equivalent standards is required for cable models used in workplaces and certain jurisdictions within the United States. The testing may be administered by any nationally recognized testing laboratory (“NRTL”). UL is the oldest, largest, and most widely recognized of these laboratories. Safety testing of a cable modem typically costs between \$6,500 and \$9,500, and takes between six and eight weeks.

13. CableLabs, a research and development consortium of cable operators, tests cable modems for adherence to a set of standards called the Data Over Cable Service Interface Specification (“DOCSIS”). These standards have been developed to make it possible for equipment from all cable modem manufacturers to operate on the networks of all cable operators. The standards relate to the radio frequency interface (“RFI”) to the cable network, to security mechanisms (Baseline Privacy Interface, or “BPI”), to data protocols, to management interfaces, and other items. The RFI standards include specifications designed, among other considerations, to ensure that a cable modem will not inject harmful signals into the network. The BPI standards are designed to ensure that cable modems that adhere to these standards will not facilitate theft of services from cable operators. The protocol standards also ensure that a cable modem will not transmit in a time slot reserved for another cable modem.

14. A cable modem manufacturer seeking certification from CableLabs first must demonstrate adherence to the DOCSIS standards by running a suite of tests that verify DOCSIS compliance. The tests may be run by the manufacturer or by some other entity. When the manufacturer submits a cable modem model to CableLabs for certification, the manufacturer must include, as part of the submission, documentation that shows successful completion of the DOCSIS test suites. Success in this part of the CableLabs certification is defined as passing every test, with not a single failure unless CableLabs agrees to a documented exception. From five to thirty samples of the cable modem are also included in the submission. CableLabs may run the sample cable modems through any or all of the tests specified in the DOCSIS test suite. CableLabs also evaluates the robustness of the cable modem in handling large data flows over extended periods and tests for interoperability with other DOCSIS equipment in their laboratories. The interoperability testing provides a method to verify in a realistic setting that the cable modem does not inject harmful signals into the network, and does not transmit at times reserved for other cable modems. CableLabs also verifies the validity of the manufacturer's security certificates and of its implementation of the DOCSIS BPI specification so that the device will not facilitate theft of service from cable service providers.

15. This "full submission" testing conducted by CableLabs generally occurs in a CableLabs "wave" that takes about 12 weeks and currently costs \$75,000 (although a DOCSIS 2.0 cable modem may complete the testing process in as short as eight weeks, again for \$75,000). If a product has previously been certified by CableLabs, then it is also possible to do an "OEM submission" of the same product on a different manufacturer's

brand for a CableLabs charge of \$10,000. OEM stands for Original Equipment Manufacturer. In the case of cable modems, an OEM may certify a product with CableLabs under its own name and then pass on that certification to one or more other manufacturers that would re-brand the product. CableLabs requires that such a previously certified and re-branded product must be re-submitted as an “OEM of a Certified/Qualified Product,” in order to pass on the certification. The review of such a submission generally takes four to six weeks.

16. All of the time and cost estimates mentioned above assume that the cable modem passes each test. Failure in any test requires undergoing and paying for another test cycle, thus adding to both the time and costs associated with the certification process.

17. In some cases, the FCC and UL test cycles may be run at the same time. Technically, the CableLabs testing could also be run in parallel with FCC and UL testing. As a general matter, however, this is typically impractical because failure in the FCC or UL testing could result in design changes to the device. Those design changes would then require that the device be resubmitted to CableLabs, which would cost a manufacturer an additional \$75,000. For a previously CableLabs certified OEM product that also has prior FCC and UL approvals, the risk of failing FCC or UL testing is small enough that it makes sense a manufacturer to submit the device simultaneously to FCC, UL, and CableLabs.

18. In addition to the FCC, UL, and CableLabs testing processes explained above, cable operators have widely different policies when it comes to the question of additional testing.

19. Some cable operators impose no other testing requirements on cable modems before they may be attached to their networks. For example, Time Warner Cable, the nation's second largest cable operator, accepts for attachment to its network any cable modem that has been certified by CableLabs.

20. Charter Communications also initially accepts any cable modem that has been certified by CableLabs for attachment to its network. Charter, however, does request sample cable modems for testing and reserves the right to deny access later to cable modem models with which it finds problems, either in the company's lab or operationally in its network.

21. Conversely, some cable operators require cable modems to undergo additional testing (beyond that performed by the FCC, UL, and CableLabs) before such modems may be attached to their networks. Cox Communications, for instance, requires additional certification testing at the company's own laboratories before a cable modem is permitted to attach to its network.

22. Comcast also requires that any cable modem model must achieve certification through Comcast's proprietary testing in Comcast's laboratories before it will accept that cable modem model for attachment to Comcast's network. This requirement applies to cable modems distributed at retail as well as those that Comcast purchases directly from manufacturers.

23. Comcast's tests are by far the most extensive of those performed by any cable operator. Moreover, Comcast charges manufacturers for these tests, and I am unaware of any other cable operator in the United States that does so.

24. Before Zoom may submit a new cable modem model to Comcast for testing, it first must be certified by CableLabs and to the best of my knowledge must receive relevant FCC and UL approvals.

25. For Comcast's most recent testing of a new Zoom cable modem model, it charged Zoom a fee of \$25,000. The testing regime lasted approximately six weeks, with an additional three weeks for a beta test and for provisioning the Comcast network to accept the cable modem. In the Comcast beta test, cable modems are placed in live operating networks and monitored for any performance or other issues.

26. If a cable modem device fails Comcast's initial round of testing, then it must be submitted again for another six-week cycle of testing. In addition, if the device fails the beta test, then the testing cycle must start from the beginning. Last spring, a Zoom DOCSIS 3.0 cable modem model did not pass Comcast's initial round of testing so Zoom had to submit it for a second round. Comcast did not charge Zoom for the additional testing, but reserved the right to do so in the future in an April 22, 2010 e-mail message from Jason Livingood, Executive Director, Internet Systems Engineering, National Engineering & Technical Operations at Comcast.

27. Any cable modem model sold nationwide in the United States must be accepted on the Comcast network in order for it to be a commercially viable product. This is because Comcast accounts for approximately 39% of all cable customers in the United States. Nationwide retailers typically put a nationally carried product in all of their stores, including the many stores that are in areas where Comcast service is offered. A cable modem that does not have Comcast certification and that is offered, for example, in all Best Buy and Staples stores will suffer crippling return rates.

28. It is very unlikely that a cable modem conforming to CableLabs requirements would inject harmful signals into a cable used for cable service, or otherwise cause electronic or physical harm to a network. This is because CableLabs certification testing verifies that a cable modem adheres to DOCSIS specifications. The DOCSIS specifications define spectral, amplitude and other characteristics with which transmitted signals must comply. The DOCSIS specifications also define protocols that ensure one cable modem will not broadcast at the same time as another. DOCSIS standards specify within very stringent limits that a cable modem's signals will neither harm the provider's network nor interfere with other cable modems or equipment connected to that network.

29. It is also very unlikely that a CableLabs-certified cable modem will facilitate theft of service from a cable operator. The DOCSIS specifications define a comprehensive security infrastructure called BPI that the CableLabs certification ensures is fully implemented. BPI minimizes nearly to the vanishing point the possibility that someone could steal service using a cable modem.

30. I cannot recall an instance in Zoom's experience with manufacturing cable modems when a Zoom device has caused harm to a cable operator's network, or when a Zoom device facilitated theft of service from a cable operator.

31. A cable modem can have interoperability issues on a particular network when new equipment, technologies or configurations and procedures are introduced to that network. During the several-year lifetime of a typical Zoom cable modem, the company may confront a handful of such issues. For a particular cable operator, that means Zoom typically does not confront any interoperability issues, but Zoom may

encounter one or more issues with some operators. Zoom works with cable operators to resolve any such issues. To my recollection, Zoom has not encountered an issue that posed a threat of harm to any operator's network.

32. In January 2010, Zoom contacted Comcast's testing group to alert them that Zoom wanted to submit a new DOCSIS 3.0 cable modem model for Comcast certification. Zoom and Comcast employees then exchanged e-mail messages over the course of several weeks, discussing both technical and logistical issues relating to Zoom's upcoming submission.

33. During that exchange, Zoom was informed that its new cable modem device would be required to participate in Comcast's Physical and Environmental ("P&E") testing, in addition to the company's standard "certification" testing described above.

34. I was unfamiliar with Comcast's P&E testing and what it entailed. Such testing had not been previously required for Zoom's cable modem models. At that time, I was unaware that this P&E testing had been previously applied only to cable modems that were sold directly to Comcast (rather than cable modems sold at retail).

35. When Comcast informed Zoom about the need for P&E testing, it did not provide Zoom with any documentation of what the testing covered. However, Comcast did provide us with a flow chart that outlined the P&E testing process. That flow chart and one or more e-mail messages from Comcast employees also mentioned a "on-site evaluation" requirement as part of the P&E testing process.

36. When Zoom brought up the P&E testing with our OEM supplier, it suggested that this testing was inappropriate for a retail product and that Zoom should ask Comcast to waive this requirement.

37. I do not remember the details of discussions relating to P&E testing as they unfolded in the winter of 2010. However, based on an e-mail sent by Charles Cusson, Director, Physical and Environmental Evaluations at Comcast, on March 29, 2010, Zoom inferred that Comcast had decided that the P&E testing would not apply to Zoom's new DOCSIS 3.0 cable modem model because it was only to be sold at retail. Accordingly, this model was never submitted for such testing.

38. Zoom received CableLabs certification for its DOCSIS 3.0 cable modem model on February 23, 2010, and was working towards submitting it to Comcast on March 1, 2010, for an anticipated completion of Comcast laboratory and beta testing in mid-April. As the project progressed, it may not have been possible for Zoom to prepare and submit sample cable modems to Comcast by March 1. In any case, Comcast, in February, raised technical issues with the software for the Texas Instruments chipset that Zoom was using in its new DOCSIS 3.0 cable modem model. Comcast wanted to make sure that these potential problems were addressed in any code that Zoom submitted to them for testing. None of the issues related to harm to Comcast's network, or to potential theft of Comcast services.

39. Moreover, on February 22, 2010, Chris Griffiths of Comcast, who is generally responsible for selecting and scheduling cable modems for testing in Comcast's labs, informed Zoom that Comcast was putting the test schedule for Zoom's new DOCSIS 3.0 cable modem model on hold as Comcast worked through its testing process.

He informed Zoom that he would be back in touch if and when Comcast decided to proceed with certifying Zoom's device on the Comcast network.

40. I was very disturbed by this development and reached out to Comcast to seek clarification of what was going on. Chris Griffiths and Jason Livingood, who is Executive Director, Internet Systems Engineering, National Engineering & Technical Operations at Comcast, indicated that Comcast was experiencing a bottleneck in testing a large number of DOCSIS devices to be offered for sale at retail. They informed me that new investments in lab space and equipment should expedite the process in the future and asked for Zoom's patience. Notwithstanding Comcast's claim that it was experiencing a bottleneck in its testing of DOCSIS devices, Comcast has only added two retail cable modems to its list of approved cable modems in the last year.

41. This delay in testing was unacceptable to Zoom. Zoom informed Comcast that it was under pressure from its retail partners to deliver the DOCSIS 3.0 cable modem for sale in thousands of stores across the United States by April 15 and that Comcast's testing delay was severely jeopardizing Zoom's ability to meet this deadline. Zoom let Comcast know that if Zoom was not able to meet this deadline, its relationship with retailers would be jeopardized and its revenues would be diminished.

42. Following further communications with Comcast, Zoom was allowed to submit its new DOCSIS 3.0 cable modem for testing on April 1, 2010. Unfortunately, the modem did not pass Comcast's tests because of an issue that was introduced in the course of resolving the issues that Comcast had previously identified with the software for the modem's Texas Instruments chipset. The issue identified by Comcast did not threaten Comcast's network in any way. Rather, it related to the time that it took the

cable modem to register with the network after a power outage or similar disruption to service.

43. Zoom worked to address Comcast's concern and resubmitted the modem to Comcast on May 1, 2010. This time, the cable modem passed Comcast's tests, and was cleared for attachment to Comcast's network as of June 23, 2010.

44. In an e-mail informing Zoom that the new cable modem model had passed testing, Earle Iveson of Comcast wrote, "Zoom has passed our lab-based certification tests for a retail-only device. As noted before, this means we did not execute physical and environmental tests since these are not devices to be purchased by Comcast."

45. This two-month delay beyond our original shipment date of April 15 caused Zoom considerable difficulty in dealing with its retailers. It was only through Zoom's strenuous efforts and extraordinary logistics, including pre-shipping units to two major retailers' warehouses in anticipation of a probable Comcast certification in June, that Zoom was able to retain its shelf space.

46. Changing the registration timeframe had nothing to do with preventing harm to Comcast's network; the registration delay simply would have been an inconvenience to the owner of the cable modem. Moreover, once a cable modem has registered, it is likely to remain connected for a considerable length of time, typically months or even years depending on the reliability of the electrical power and the cable network, before the cable modem experiences a service disruption. During that time, a code update could have been propagated to users, so that the vast majority of users would never have experienced the issue at all. I therefore believe that Comcast should not have rejected Zoom's DOCSIS 3.0 cable modem during its first round of testing.

47. Once Zoom's new DOCSIS 3.0 cable modem was accepted for attachment to Comcast's network, Comcast asked us to improve the behavior of a feature that relates to Internet Protocol version 6 (IPv6). Comcast currently uses Internet Protocol version 4 (IPv4) for handling Internet addresses, but is concerned about running out of such addresses. IPv6 provides a vastly increased supply of Internet addresses, and Comcast has publicly stated that it plans to migrate its system towards IPv6. Zoom has been working with our OEM supplier to provide the support Comcast needs for IPv6 in an upcoming code release.

48. In this instance, Comcast is continuing to accept attachment of the cable modem to its network as Zoom cooperates with Comcast to upgrade its modem to support improved operations.

49. During the summer of 2010, Zoom made the determination that it needed to bring a new DOCSIS 2.0 cable modem model to market in early 2011. Zoom must introduce a new DOCSIS 2.0 model because it soon will become impossible for Zoom to manufacture its current DOCSIS 2.0 model. The current model is now several years old, and among other issues, it is becoming difficult to find certain parts to manufacture it. We discussed introducing a direct replacement for the current model with a wired Ethernet Local Access Network ("LAN") port, and another DOCSIS 2.0 model that included a wireless LAN port.

50. DOCSIS 2.0 cable modems continue to be extremely popular at retail. Zoom's DOCSIS 2.0 cable modem currently outsells its DOCSIS 3.0 cable modem by a ratio of greater than two-to-one. I believe that this is because Zoom's DOCSIS 2.0 cable modem model sells at retail for approximately \$70, whereas its DOCSIS 3.0 cable

modem model costs approximately \$90. It is also because service tiers that require DOCSIS 3.0 cable modems typically cost more than basic service tiers. Comcast offers services it calls Performance (12Mbps) and Blast (20Mbps) at \$44.95 and \$54.95 per month, respectively. There is also an Economy service (1.5Mbps) offered for \$26.95 per month. These services are available with DOCSIS 2.0 cable modems. Comcast also offers services it calls Ultra (30Mbps) and Extreme (50Mbps) at \$64.95 and \$99.95 per month, respectively. These services require DOCSIS 3.0 cable modems. These prices are for customers who already subscribe to Comcast cable television services. The difference between standard cable Internet service (Performance, at \$44.95 per month.) and the minimum service that requires a DOCSIS 3.0 cable modem (Ultra, at \$64.95 per month.) is \$20.00 a month, or \$240.00 annually.

51. On August 31, 2010, I wrote an e-mail message to appropriate Comcast personnel to alert them that Zoom would be submitting a new DOCSIS 2.0 cable modem model for Comcast’s certification testing. A week later, on September 8, 2010, Comcast’s lab director, Earle Iveson, replied and informed me that he wasn’t certain that Comcast would certify any more DOCSIS 2.0 cable modems for attachment to its network.

52. The next day, Frank Manning, President and CEO of Zoom, responded to this development. He directed his email to Jason Livingood of Comcast, stating that he was “very sure that the FCC and Congress would not accept the notion of Comcast effectively preventing any new DOCSIS 2.0 cable modems from being offered by national retailers like Best Buy and Staples.” Jason Livingood replied later that day,

indicating that he was turning Zoom’s query over to Comcast’s legal department, because Frank Manning had mentioned the FCC.

53. Over the course of the next month, Frank Manning exchanged e-mail messages, letters and phone conversations relating to the testing of Zoom’s new DOCSIS 2.0 cable modem model with Comcast Vice President and Deputy General Counsel Jeffrey Smith.

54. In particular, Frank Manning, on September 13, 2010, sent a letter to Jeffrey Smith. In this letter, Mr. Manning asked that Comcast agree to test two new Zoom DOCSIS 2.0 cable modem models, one with wireline Local Area Network (“LAN”) connectivity only, and the other with wireless LAN connectivity. Mr. Manning pointed out that DOCSIS 2.0 cable modems continue to vastly outsell DOCSIS 3.0 models at retail and that Comcast was continuing to supply some of its own customers with DOCSIS 2.0 cable modems. Moreover, he noted that while all DOCSIS 1.0 and 1.1 cable modem models shown on Comcast’s list of approved modems appear to be marked End of Life, many DOCSIS 2.0 modems are not so marked. Mr. Manning also emphasized that it was important for Comcast to act in a manner consistent with Section 629 of the Communications Act, which he referred to as Section 304A of the Telecommunications Act of 1996.

55. Jeffrey Smith responded to Mr. Manning’s letter on October 6, 2010. He indicated that because Comcast desired to migrate its network to the higher speeds possible under the DOCSIS 3.0 standard, it had ceased certifying new DOCSIS 2.0 cable modems approximately one year ago and had scaled back its own purchases of DOCSIS 2.0 models for distribution to its customers.

56. Additionally, Mr. Smith claimed that “Comcast is under no obligation to certify Zoom’s or any other vendor’s high speed Internet devices for use with Comcast’s broadband Internet network. The provision you cited from the Telecommunications Act of 1996 clearly and solely applies to converter boxes and other equipment used to access multichannel video programming and services. That provision never has been applied to cable modem devices or services.”

57. Nevertheless, Mr. Smith indicated to Zoom that Comcast would agree to test one Zoom DOCSIS 2.0 cable modem model to replace the model that Zoom would no longer be able to manufacture.

58. While I was disappointed that Comcast would not agree to test Zoom’s new DOCSIS 2.0 cable modem model with wireless connectivity, I was relieved that Comcast at least had agreed to test one new DOCSIS 2.0 cable modem model. I proceeded to work with the OEM supplier for Zoom’s new DOCSIS 2.0 cable modem model to arrange FCC and UL approvals, and to prepare for a CableLabs submission as well as a subsequent submission to Comcast for testing.

59. The week after Zoom received Jeffrey Smith’s letter, I received an e-mail message from the P&E group at Comcast stating that Zoom’s new DOCSIS 2.0 model would be subject to this group’s evaluation. Attached to this e-mail message were three documents that described in some detail the requirements for this evaluation.

60. I was surprised to be contacted by Comcast’s P&E group since Zoom’s cable modems had never before been subject to P&E testing and Comcast had agreed earlier in the year to waive P&E testing for Zoom’s new DOCSIS 3.0 cable modem model because it was to be sold only at retail.

61. I quickly responded to the e-mail message from Comcast and asked for the P&E tests to be waived for the new DOCSIS 2.0 cable modem model, just as they had been waived for Zoom’s DOCSIS 3.0 cable modem earlier in the year, since Zoom would also be selling this device at retail only.

62. Jason Livingood responded to my message. He stated that Comcast’s test requirements had evolved, and that P&E testing now applied to all devices connecting to Comcast’s network, including devices provided by third parties at retail. When I subsequently asked Mr. Livingood when this policy change had occurred, he stated: “I’m not sure why that matters” and indicated that any questions concerning the policy change would have to be directed to Jeffrey Smith.

63. I conferred with employees of Zoom’s OEM supplier for the model in question to discuss Comcast’s P&E testing regime. Personnel from the OEM supplier informed us that they believed the device would not pass the ingress requirements spelled out in a test suite referred to as SCTE 40 that is part of the P&E tests. Ingress refers to extraneous signals that might enter a cable network, such as from a broadcast radio or television station. My understanding is that Zoom’s OEM supplier meant ingress also to refer to bleeding of signals from adjacent channels into a channel under test, and may also have meant other sources of interference.

64. Comcast’s SCTE 40 requirements go beyond any requirements under the DOCSIS specifications in demanding that a cable modem successfully decode a weak signal in the presence of multiple severe impairments. Cable modem designers, including Zoom’s OEM partner for our proposed DOCSIS 2.0 model, have typically not sought to meet these requirements. Ingress does not relate to harmful signals that the cable modem

might inject into the network, nor does it relate to potential theft of a cable operator's services.

65. Zoom's OEM supplier further informed us that it doubted that any current DOCSIS 2.0 cable modem device would be able to pass Comcast's requirements, including devices that Comcast was continuing to distribute to its subscribers. It also informed Zoom that meeting the ingress requirements as well as satisfying other elements of the P&E testing regime would require a redesign of the modem and cost considerable time and money. Finally, it indicated that any attempt at such a redesign might not succeed on the first attempt and therefore might have to be repeated.

66. Independent of this new DOCSIS 2.0 cable modem device, Zoom had been discussing the possibility of producing a new DOCSIS 3.0 cable modem model with a wireless LAN capability provided by an OEM manufacturer. When Zoom made the manufacturer aware that Comcast was now applying its P&E requirements to devices sold at retail, the manufacturer made some independent inquiries to Comcast and concluded that Comcast's P&E testing would cost Zoom approximately an additional \$40,000. Part of this cost relates to a site inspection that Comcast conducts at the manufacturer's factory. According to Hitron, Comcast requires that the manufacturer pay for several Comcast personnel to travel via business class and stay at a five-star hotel for approximately two weeks while the site inspection is carried out. For a trip to Asia, which is where Zoom's products are manufactured, these inspections account for a substantial part of the \$40,000 cost of the P&E testing.

67. Based on this information as well as Zoom's internal evaluation, I concluded that, given the time constraints we faced in replacing our older DOCSIS 2.0

cable modem model, the risks associated with attempting to meet Comcast's P&E requirements, and the costs of the tests, Zoom could not realistically plan to bring its new DOCSIS 2.0 cable modem model to market if it was subject to the P&E requirements.

68. Having studied Comcast's P&E requirements, it is my conclusion that the bulk of Comcast's P&E testing program is irrelevant to whether a cable modem device would cause harm to Comcast's network, or facilitate the theft of Comcast services. I also believe that the P&E testing program is filled with unreasonable requirements for a cable modem that is to be sold at retail. (I do not object to Comcast applying these requirements to cable modems that Comcast buys itself).

69. For example, Comcast's P&E testing requires cable modems to meet the following standards that have no bearing on causing harm to Comcast's network, or of protecting against theft of Comcast's services.

a.

[REDACTED]

[REDACTED] Zoom's cable modems support operation at ambient temperatures from 0° to 40°C (32° to 104°F). For reference, the Apple iPad is specified to operate from 0° to 35°C (32° to 95°F), and a typical HP PC (for example, the model HP Pro 3130 Minitower) is specified to operate from 5° to 35°C (41° to 95°F).

b.

[REDACTED]

[REDACTED] Zoom's cable modems meet UL safety standards (UL 60950) that a plastic case of an electronic device may nowhere exceed 70°C, when the device is operated at an ambient temperature of 25°C.

c. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

d. [REDACTED]

[REDACTED]

[REDACTED]

e. [REDACTED]

[REDACTED]

[REDACTED]

f. [REDACTED]

[REDACTED]

g. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

h. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] UL safety testing already

confirms that Zoom’s cable modems meet relevant overvoltage protection requirements.

i. [REDACTED]

[REDACTED]

[REDACTED] The criteria listed for this test do not include testing for harm to the network, or for the potential theft of services.

j. [REDACTED]

[REDACTED]

[REDACTED] Zoom’s cable modems include a reset button that is very unlikely to be pressed even 100 times in the product’s lifespan.

70. Additionally, based on my review of the documents provided by Comcast, many of Comcast’s P&E requirements are so vaguely defined that they are open to almost any interpretation Comcast wishes to give to them, and there is no guarantee that Comcast will interpret them consistently from one product to another.

71. For example, instead of providing Zoom with an acceptable weight range for cable modems, [REDACTED]

[REDACTED]

[REDACTED] This requirement is vague, and the results of the testing could depend on the stiffness, length, or angle of attachment of the cable that is connected to the cable modem. In addition, there is no authoritative third party to review whatever conclusions are reached by Comcast during the testing.

72. Finally, setting aside Zoom’s other objections to Comcast’s P&E testing, the significant expense, added time and uncertainty imposed by the P&E tests makes it unlikely that Zoom will ever introduce another cable modem model at retail if Zoom is

required to participate in P&E testing before a new modem may be attached to Comcast's network.

73. As I mentioned before, Comcast's P&E testing imposes direct costs on Zoom of approximately \$40,000 per cable modem tested. It also imposes substantial delays in bringing products to market. The P&E testing cycle runs seven weeks, including allowances for buffers, and may require multiple extra weeks if there are any failures. For our new DOCSIS 2.0 cable modem device, there is significant doubt that it could ever meet all of Comcast's requirements. Moreover, I have been informed by an OEM manufacturer that Comcast's P&E requirements would increase by five to seven dollars the previous unit price quote for Zoom's volume purchase of a new DOCSIS 3.0 cable modem model with wireless connectivity. The higher price is caused by design changes that would need to be made to the cable modem to attempt to meet the P&E requirements. These changes are not necessary to prevent harm to the network or theft of service.

74. Zoom is a significant participant in the cable modem market, selling more devices at retail than any company other than Motorola, but Zoom works on thin margins. The testing regime as it existed prior to Comcast's application of its P&E testing to our retail devices was challenging. However, Zoom was sufficiently confident in its ability to navigate through the multiple testing requirements that it was willing to take the attendant risk. But now, with the added burden of Comcast's P&E testing, Zoom has concluded that the balance has tipped in the opposite direction, and Zoom is unlikely to bring additional cable modem products to the retail market if this requirement stands. In

particular, if Comcast's P&E testing requirement is allowed to stand, Zoom likely will no longer be able to sell DOCSIS 2.0 cable modems within a year.

75. If Comcast's current test standards for retailer-offered cable modems continue in effect, the availability of such modems from Zoom and others is likely to diminish. This reduced competition to cable modems leased by Comcast and other service providers will lead to fewer choices for consumers, and is likely to lead to less innovation in the marketplace and higher costs for cable modems.

76. Because cable modems represent such a significant proportion of the Zoom's revenues, a significant reduction in sales for this market would jeopardize Zoom's profitability and its very existence.

I am familiar with the contents of the foregoing Complaint. The factual assertions made in the Complaint are true to the best of my knowledge and belief.

Dated: November 17, 2010

A handwritten signature in black ink, appearing to read "William Hume Vance", is written above a horizontal line.

William Hume Vance

# EXHIBIT 4