

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

Filed APR 01 2015 RICHARD W. WIEKING CLERK U.S. DISTRICT COURT NORTHERN DISTRICT OF CALIFORNIA SAN JOSE

THE UNITED STATES OF AMERICA

vs.

WEI PANG, HAO ZHANG, HUISUI ZHANG, JINPING CHEN, ZHAO GANG, and CHONG ZHOU

SUPERSEDING INDICTMENT

Count One: 18 U.S.C. § 1831(a)(5)-Conspiracy to Commit Economic Espionage

Count Two: 18 U.S.C. § 1832(a)(5)-Conspiracy to Commit Theft of Trade Secrets

Counts Three-Seventeen: 18 U.S.C. §§ 1831(a)(1),(2), (3), & 2-Economic Espionage; Aiding and Abetting

Counts Eighteen-Thirty Two: 18 U.S.C. §§ 1832(a)(1),(2), (3), & 2-Theft of Trade Secrets; Aiding and Abetting

A true bill.



Foreperson

Filed in open court this 1st day of April A.D. 2015

Patricia A. ...

United States Magistrate Judge

Bail. \$ NO bail arrest warrants as to all defendants

3

1 MELINDA HAAG (CABN 132612)
United States Attorney

2 SEALED BY ORDER
3 OF THE COURT

4 **Filed**
5 APR 01 2015
6 RICHARD W. WIEKING
7 CLERK, U.S. DISTRICT COURT
8 NORTHERN DISTRICT OF CALIFORNIA
9 SAN JOSE

10 UNITED STATES DISTRICT COURT
11 NORTHERN DISTRICT OF CALIFORNIA
12 SAN JOSE DIVISION

13 UNITED STATES OF AMERICA,

14 v.

15 WEI PANG,
16 HAO ZHANG,
17 HUISUI ZHANG,
18 JINPING CHEN,
19 ZHAO GANG, and
20 CHONG ZHOU,

21 Defendants.

) CASE NO. CR-15-00106 EJD

) **VIOLATIONS:** 18 U.S.C. § 1831(a)(5) – Conspiracy
) to Commit Economic Espionage; 18 U.S.C. §
) 1832(a)(5) – Conspiracy to Commit Theft of Trade
) Secrets; 18 U.S.C. § 1831(a) – Economic Espionage;
) 18 U.S.C. § 1832(a) – Theft of Trade Secrets; 18
) U.S.C. § 2 – Aid & Abet; 18 U.S.C. §§ 1834 and 2323
) –Criminal Forfeiture

) **FILED UNDER SEAL**

) SAN JOSE VENUE

22 SUPERSEDING INDICTMENT

23 The Grand Jury charges:

24 Introductory Allegations

25 At all times relevant to this Indictment, unless otherwise indicated (and with all dates and date
26 ranges being both approximate and inclusive):

27 The Victim Companies

28 1. Avago Technologies (“Avago”) was a leading designer, developer and global supplier of
a broad range of analog, digital, mixed signal and optoelectronics components and subsystems with a
focus in semiconductor design and processing. Avago was headquartered in San Jose, California, and

1 Singapore, and had facilities around the United States and the world. The facilities operated by Avago
2 included fabrication plants, one of which was located in Fort Collins, Colorado.

3 2. Skyworks Solutions, Inc. (“Skyworks”) was an innovator of high performance analog
4 semiconductors. Skyworks was headquartered in Woburn, Massachusetts, and had facilities around the
5 United States and the world. The facilities operated by Skyworks included fabrication plants, one of
6 which was located in Woburn.

7 The Technology

8 3. Surface Acoustic Wave (“SAW”) and Bulk Acoustic Wave (“BAW”) filters are used in
9 wireless devices to eliminate interference and improve other aspects of device performance. FBARs are
10 one type of BAW filter.

11 4. Film Bulk Acoustic Resonators (“FBAR”) are tunable acoustical resonators comprising
12 top and bottom electrodes that sandwich piezoelectric material, and which are supported from the ends
13 such that they are suspended over a substrate. FBARs are often referred to as “filters” because they filter
14 incoming and outgoing wireless signals for wireless devices. FBARs are tuned to adjust their resonance
15 frequency to suit various applications. Avago is the leading company in the United States that
16 manufactures and sells FBARs.

17 5. The most common and most profitable application of FBAR technology is as a radio
18 frequency (“RF”) filter for mobile phones and other wireless devices. Filtering unwanted incoming and
19 outgoing wireless signals has become technologically more difficult with the ever-expanding use of
20 wireless signals in modern communications. Technological advances in FBARs have played a
21 substantial role in creating smaller, more efficient wireless devices for both consumer and military
22 applications.

23 Entities Used by the Defendants

24 6. Tianjin University (“TJU”) was a State University and part of the People’s Republic of
25 China (“PRC”) Ministry of Education. TJU includes the College of Precision Instrument and Opto-
26 Electronic Engineering (“College of Precision Instrument”). The College of Precision Instrument
27 contained three pertinent research facilities: the State Key Laboratory for Precision Testing Techniques

1 and Instrument, the Engineering Research Center of the Ministry of Education / Micro-Nano
2 Manufacturing and Measuring Technology, and the Municipal Engineering Center / Micro-Nano
3 Manufacturing Technology. WEI PANG, HAO ZHANG, and JINPING CHEN held the positions of
4 TJU Professors in the College of Precision Instrument.

5 7. TJU was a member institution of PRC 985 Project. The 985 Project was a PRC funding
6 program administered by the Ministry of Education and instituted for the purpose of enabling the PRC to
7 develop world class universities. The PRC Ministry of Education also stated that PRC state universities
8 have a role in bolstering the PRC economy and that this role was more readily fulfilled by utilizing 985
9 Project funds.

10 8. Novana, Inc. ("Novana"), was a shell corporation formed in the Cayman Islands by WEI
11 PANG, HAO ZHANG, and others, at the direction of TJU. Novana was created in part to appear to be
12 the legitimate source of the trade secrets stolen from Avago and Skyworks. TJU dictated this
13 arrangement, including the ownership structure of Novana.

14 9. Tianjin Micro Nano Manufacturing Tech ("MNMT") was located in the PRC's Tianjin
15 Economic Development Area ("TEDA"), a PRC-sponsored high tech development zone, and served as
16 the investment arm of TJU, which was MNMT's sole owner.

17 10. ROFS Microsystems ("ROFS") was an entity created by the joint venture between
18 MNMT and PANG, ZHANG, and others on September 11, 2011. WEI PANG, HAO ZHANG,
19 JINPING CHEN, ZHAO GANG, CHONG ZHOU, and others held positions at ROFS.

20 Other Individuals

21 11. J.Y. was the Academician of the Chinese Academy of Sciences responsible for the TJU
22 College of Precision Instrument and Opto-Electronic Engineering. J.Y. had substantial connections to
23 the PRC government and was a chairman or committee member of numerous PRC political committees,
24 including the National Committee of Chinese People's Political Consultative Conference ("CPPCC"),
25 CPPCC of Tianjin City, China Association for Promoting Democracy ("CAPD"), and Tianjin CAPD.

26 The Defendants

27 12. WEI PANG came to the United States from the PRC as a graduate student at University

1 of Southern California ("USC") on August 10, 2001. After obtaining his PhD in Electrical Engineering
2 ("EE") from USC in 2006, he worked for Avago in Fort Collins, Colorado, until the end of June 2009.
3 PANG was a USC classmate of HAO ZHANG and HUISUI ZHANG.

4 13. HAO ZHANG came to the United States from the PRC as a graduate student at USC on
5 May 19, 2003. After obtaining his PhD in EE from USC in 2006, he worked for Skyworks in
6 Massachusetts until May 2009.

7 14. HUISUI ZHANG came to the United States from the PRC after receiving his Bachelor of
8 Science degree from Peking University in 2002. After obtaining his Master of Science degree in EE
9 from USC in 2006, HUISUI ZHANG worked for Micrel Semiconductor in San Jose, California.
10 HUISUI ZHANG, WEI PANG, and HAO ZHANG were classmates at USC.

11 15. JINPING CHEN was Assistant Dean at TJU, the Deputy General Manager/Vice
12 President of Tianjin Micro Nano Manufacturing Tech ("MNMT"), and a member of the Board of
13 Directors of ROFS. CHEN coordinated Micro-Electronic Mechanical Systems ("MEMS") fabrication
14 equipment lists and led the formation of ROFS as a PRC-based joint venture between WEI PANG and
15 HAO ZHANG's team and TJU/MNMT.

16 16. ZHAO GANG was the general manager of ROFS, was educated at TJU, and had prior
17 TJU-affiliated employment. In 2005, GANG helped TJU and JINPING CHEN form MNMT, which
18 originated as a micro/nano engineering fabrication facility built with PRC government funding.

19 17. CHONG ZHOU was a TJU graduate student working for WEI PANG and HAO
20 ZHANG's TJU design team. CHONG ZHOU worked with Cadence design kit and made source code
21 adjustments, contributed to papers and patent applications on FBAR, edited layouts for FBAR, and
22 altered documents containing Avago's trade secrets.

23 Avago Trade Secrets

24 18. Avago's FBAR technology contained trade secrets, as defined in Title 18, United States
25 Code, Section 1839(3), that were included in products sold worldwide. Avago and its predecessor
26 companies have spent approximately 20 years and \$50,000,000 researching and developing its FBAR
27 technology. Avago's FBAR technology included, but was not limited to, the following trade secrets:

1 a. **P-cells:** Avago used Cadence, a publicly-available computer automated drafting
2 (“CAD”) software platform for engineers to design FBARs. Avago employed software engineers to
3 develop parameterized cells, which Avago called “P-cells,” for use within Cadence. The “Call Back”
4 features of P-cells automatically adjusted remaining dimensions when one or more dimensions were
5 changed by an engineer using the program to design FBARs. The Call Back files were typically saved
6 by noting a “CB” at the end of the file name. These automatic adjustments allowed Avago’s FBAR
7 designers to create and test new FBAR designs quickly. When an Avago P-cell was opened, the window
8 revealed the source code and a banner at the top stating that the file was Avago’s intellectual property.
9 The source code also showed the name of the Avago employee who made every revision to the file,
10 including the date the revision was made. The P-cells in Avago’s Design Kit took many software
11 engineers years to develop.

12 b. **Design Kits:** Avago grouped all of the P-cells it created into a bulk “Design Kit”
13 that was stored on restricted servers. The P-cells in Avago’s Design Kit were critical to Avago’s ability
14 to design high performance FBARs and were not disseminated outside of the company.

15 c. **Air Bridge Design Feature:** Avago’s “Air Bridge” connected the top electrode
16 on an FBAR to the electrical pad. Avago’s Air Bridge contained unique features, such as allowing kinks
17 to remain and machining the air bridge to match the contours of the sloped layers beneath it. Avago’s
18 Air Bridge enhanced the performance of its FBARs by improving the amount of energy an FBAR
19 reflected back.

20 d. **Wings and “Undercut” Design Features:** Avago’s “Wings” feature derived its
21 name from the wing shape of one layer. Avago developed Wings simultaneously with its Air Bridge.
22 Wings had a specific feature called an “undercut.” Avago perfected a wet-etching process to create the
23 undercut and specifically designed its FBARs to have a slight undercut.

24 e. **Silicon Carbide Layers:** Avago’s Silicon Carbide Project combined two
25 passivation layers, or coatings, of silicon carbide in a particular manner proprietary to Avago.

26 f. **Temperature Compensation Layer:** Avago placed a temperature compensation
27 layer between two electrodes as part of its FBAR design, and found that a smoother and more gradual

1 slope avoided cracking and enhanced performance.

2 g. **Coupled Resonator Frequencies (CRF) Project:** Avago's CRF Project was a
3 method for manufacturing an acoustically-coupled device for FBARs. The particular manner in which
4 Avago manufactured the device enhanced the performance of its FBARs.

5 h. **Ion Mill Etching Process and Trimming Code:** Avago's ion mill etching
6 process was a unique FBAR fabrication process. Avago maintained a machine-specific trimming code,
7 or source code, that enabled a specific type of machine (a Roth and Rawl brand) to perform the ion mill
8 etching process. The trimming code and the specific type of machine were both essential components to
9 Avago's ion mill etching process.

10 i. **Microcap, Automatic Parameter Testing (APT), and Wafer Bonding Process:**
11 Avago developed a low-cost packaging technique called "Microcap" that aligned notches and cavities to
12 "sandwich" a lid wafer onto a base wafer (also referred to as "wafer bonding") before cutting the wafer
13 into individual pieces. Avago intentionally placed bumps, treads, and "vias" (that is, passageways
14 through the wafer layers) on and through the backs of wafers, then used gold to fill the aligned cavities
15 between the lid and the base wafers for conductivity. Sandwiching multiple wafers allowed Avago to
16 simultaneously package multiple FBARs before cutting, saving time and money. Avago also developed
17 source code to conduct APT during the wafer bonding process. APT simulated the shape of a base wafer
18 for bonding and automatically generated a matching wafer that can be bonded to the base. Additionally,
19 APT automatically adjusted all parts of both wafers for any modifications to either wafer.

20 j. **Chemical Mechanical Polish (CMP) Process:** CMP was one of the FBAR
21 fabrication process steps performed by technicians at Avago.

22 k **FBAR Design Layouts:** Avago's FBAR design layouts contained critical
23 parameters that affect FBAR performance.

24 l. **Applications for Avago's FBAR Technology:** Avago conducted market and
25 feasibility analyses for potential applications of FBAR technology and protected the results as trade
26 secrets.

27 m. **Aluminum Nitride (AlN) Deposition Details:** AlN was the piezoelectric

1 material that Avago used in its FBARs. Although various methods of depositing AlN on the bottom
2 electrode were available, Avago determined that “sputtering” was the preferred method. Precise
3 sputtering of AlN was critical to the tuning and performance of Avago’s FBARs.

4 n. **High Tone Bulk Acoustic Resonators:** In addition to work on FBAR, Avago
5 also performed Research and Development (“R&D”) on other types of BAW devices, including high
6 tone bulk acoustic resonators (“HBAR”).

7 Avago Confidentiality Protections

8 19. Avago took reasonable measures to keep its trade secrets, including those referred to in
9 paragraph 18 above, secret, including the following:

10 a. Avago employees were required to sign a Non-Disclosure Agreement (NDA) as
11 part of accepting employment.

12 b. Avago employees attended annual training on confidential information and on
13 business standards of conduct.

14 c. Avago employees were required to wear access badges to enter Avago facilities.

15 d. Avago maintained security cameras both inside and outside Avago facilities.
16 Security Guards monitored these cameras 24/7.

17 e. Access to Avago’s computer system required an assigned log-in and password.
18 Avago computer monitors also displayed a Security Banner/Warning.

19 f. Access to Avago’s “T” Drive required a separate, assigned log-in and password,
20 and required the user to view and accept a confidentiality warning and agreement before logging on.
21 Further access inside the “T” drive was limited to folders relevant to each particular user. Initial access
22 was granted by a system administrator, who limited an employee’s access to the areas for which he or
23 she had a legitimate need.

24 g. Access to Avago’s computer system required an assigned log-in and password,
25 and was only given to employees with a need for access.

26 h. Publication of any Avago FBAR information required prior approval from Dr.
27 Richard Ruby.

- 1 i. Avago physically marked relevant items “Confidential.”
- 2 j. When disclosing approved information to other companies, Avago used
- 3 Confidential Disclosure Agreements (CDA) that ranged from three to five years, or, in the rare instance
- 4 in which the disclosure contained source code, ten years.
- 5 k. Avago required employees to dispose of confidential information in designated
- 6 bins with slots, the contents of which were subsequently shredded.
- 7 l. Avago used code names for projects.
- 8 m. Avago marked relevant emails: “Confidential - Do Not Forward.”
- 9 n. Avago required employees to disclose inventions deriving from work at Avago.
- 10 o. Avago placed strict limitations on information that could be included in academic
- 11 papers or presentations.

12 Skyworks Trade Secrets

13 20. Skyworks developed BAW filter technology that it intended to include in products that

14 were to be sold worldwide. Skyworks exited the BAW/FBAR business in early 2009, sold some of its

15 patents and patent applications to Avago, and retained some of the information as trade secrets, as

16 defined in Title 18, United States Code, Section 1839(3), including the following:

- 17 a. **Recipes and Process for Deposition of AlN:** The key step in manufacturing
- 18 Skyworks’ filters was the deposition of AlN by sputtering. Skyworks developed uniform and precise
- 19 deposition recipes and processes for AlN sputtering that directly affected the quality of BAW filters.
- 20 b. **fxP Tool Equipment Specifications:** Skyworks also developed precise
- 21 specifications and customizations for the fxP tool Skyworks used to deposit AlN.
- 22 c. **Omega AlN Etching Tool Equipment Specifications:** Skyworks used an Omega
- 23 etching tool to etch the AlN after it had been deposited, and spent considerable time developing its
- 24 etching process, including precise specifications and customizations.
- 25 d. **Equipment Specifications Stored on Shared Drives:** Skyworks
- 26 compartmentalized and stored its intellectual property (“IP”) in controlled-access, shared drives. These
- 27 shared drives contained numerous trade secrets, such as recipes, equipment specifications, facility setup

1 information, pricing information, project plans, and testing reports.

2 e. **Wafer Chemical Quantity Calculation Recipes:** Skyworks developed and
3 maintained recipes that listed the optimal, precise chemical quantities for making BAW wafers.

4 f. **Mask Layouts:** Skyworks' mask layouts were layouts for Skyworks' integrated
5 circuits ("ICs"). Skyworks developed masks that allowed etching and application of other process steps
6 to certain areas of a filter.

7 g. **Module Performance Data:** Power Amplifier Modules ("PAMs") and Front End
8 Modules ("FEMs") were combinations of several parts. Skyworks sold PAMs and FEMs and protected
9 data regarding their performance in testing as trade secrets.

10 h. **Skyworks' Internal Power Point Presentations:** Skyworks engineers often used
11 PowerPoint presentations containing trade secrets during internal department/team meetings to explain
12 and illustrate Skyworks' processes and test results.

13 i. **BAW Project Plans:** PowerPoints and other files outlined BAW future
14 performance goals, R&D techniques, and technology applications.

15 Skyworks Confidentiality Protections

16 21. Skyworks took reasonable measures to keep its trade secrets, including those referred to
17 in paragraph 20 above, secret, including the following:

18 a. Skyworks required keycard/badge access to BAW facilities.

19 b. Skyworks required employees to establish a username and password in order to
20 access Skyworks' IT network.

21 c. Skyworks restricted employee access to directories containing proprietary
22 information and trade secrets. Employee access to restricted shared drives required approval from the
23 employee's manager. There were several layers of access that required approval, including site access,
24 group and user folder access, and application access. Once the manager approved the appropriate layers
25 of access, the employee was provided a username and login password based upon the requirements of
26 the position. For access to closed directories for projects and other items outside the control of the
27 employee's manager, approval of access from the owner of the project directory structure was required.

1 d. Skyworks restricted the availability of Virtual Private Network access only to
2 those who had a demonstrated need, and required group manager approval prior to sending a username
3 and password to those employees.

4 e. Skyworks had procedures in place to handle departing employees, including a
5 checklist entitled "Employee Clearance Process." Skyworks conducted exit interviews for departing
6 employees, including having the employee complete and sign a form entitled "Confidential Exit
7 Interview." Skyworks also required departing employees to sign forms entitled "Information for
8 Terminating Employees Regarding Inventions and Proprietary/Confidential Information," and
9 "Standards of Business Conduct."

10 f. Skyworks used IP banner warnings as a default in Cadence software designs and
11 as standard practice on most documents and templates.

12 g. Skyworks required employees to obtain specific permission before they could
13 publish material related to the BAW department.

14 h. Skyworks' BAW department undertook specific IP protection training and other
15 related training.

16 i. Skyworks employees were required to sign employment agreements that specified
17 NDAs as conditions of employment. These agreements also stated that inventions and technology
18 belonged to Skyworks and that employees could not disclose information pertaining to Skyworks'
19 inventions or technology.

20 COUNT ONE: (18 U.S.C. § 1831(a)(5) – Conspiracy to Commit Economic Espionage)

21 22. The factual allegations contained in Paragraphs 1 through 21 are realleged and
22 incorporated as if fully set forth here.

23 23. Beginning in 2006 and continuing to the present, in the Northern District of California
24 and elsewhere, the defendants,

25 WEI PANG,
26 HAO ZHANG,
27 HUISUI ZHANG,
28 JINPING CHEN,
ZHAO GANG, and
CHONG ZHOU,

1 together with others known and unknown to the Grand Jury, knowing and intending that the offenses
2 would benefit a foreign government, namely the PRC, and foreign instrumentalities, namely TJU,
3 MNMT, TEDA and ROFS, conspired:

4 a. knowingly to steal, and without authorization appropriate, take, carry away, conceal, and
5 by fraud, artifice, and deception obtain trade secrets belonging to Avago and Skyworks;

6 b. knowingly and without authorization to copy, duplicate, sketch, draw, download,
7 upload, alter, photocopy, replicate, transmit, deliver, send, communicate, and convey trade
8 secrets belonging to Avago and Skyworks; and

9 c. knowingly and without authorization to receive, buy, and possess trade secrets
10 belonging to Avago and Skyworks, knowing the same to have been stolen and appropriated,
11 obtained, and converted without authorization.

12 Manner and Means of the Conspiracy

13 24. The object of the conspiracy was to steal trade secrets from Avago and Skyworks and use
14 them to set up an FBAR/BAW fabrication facility in the PRC. In effect, and in the words of one of the
15 defendants, the objective was “moving Avago to China.”

16 25. To accomplish this transfer, WEI PANG, HAO ZHANG, HUISUI ZHANG, and others,
17 communicated with JINPING CHEN, ZHOU GANG, CHONG ZHOU, J.Y., and others in the PRC to
18 develop a scheme by which the sources and origins of the trade secrets stolen from Avago and Skyworks
19 would be disguised and the technology contained within those trade secrets be used by entities in the
20 PRC to develop products for civilian and military use.

21 26. TJU authorized WEI PANG, HAO ZHANG, and others to incorporate Novana in the
22 Cayman Islands in 2009. TJU guided PANG in establishing Novana and approved its ownership
23 structure. Although PANG, ZHANG, and two unindicted co-conspirators each contributed seed money
24 to Novana, PRC entities paid for the equipment purchases and fabrication facility in Tianjin.

25 27. To achieve their goal of creating a fabrication facility in the PRC, WEI PANG, and HAO
26 ZHANG needed to justify their hiring as full professors at TJU by having patent applications in their
27 names in both the United States and the PRC. Those two defendants applied for patents in both

1 countries using technology and trade secrets stolen from Avago and Skyworks. To conceal the sources
2 of the technology that formed the basis of their patent applications and to prevent Avago from
3 discovering the theft, WEI PANG and HAO ZHANG applied for U.S. patents based on the Avago
4 technology under ZHANG's name only, keeping former Avago employee PANG's name out of those
5 patent applications. At approximately the same time, the defendants applied for patents in the PRC for
6 some of the same stolen Avago technology, but did so under both WEI PANG and HAO ZHANG's
7 names. This subterfuge allowed both defendants to use the PRC patent applications to enhance their
8 credentials in applying for full professorships with TJU, while hiding their actions from Avago by using
9 only ZHANG's name in the applications filed in the United States. By filing for the patents, PANG and
10 ZHANG also disguised the fact that they had stolen the technology from their respective employers,
11 which enabled them to present themselves to potential investors and suppliers as the developers and
12 owners of that stolen intellectual property.

13 28. During the same period, acting through its wholly-owned investment arm, MNMT, and in
14 a further effort to disguise and obfuscate the source of the stolen trade secrets and the manner by which
15 TJU would come to possess them, TJU entered into a joint venture with WEI PANG, HAO ZHANG,
16 and others. The entity created by this joint venture, ROFS, served as the vehicle to "launder" the trade
17 secrets for later use by TJU in setting up its fabrication facility.

18 29. In October 2008, while they were still employed by the victim companies, PANG and
19 ZHANG provided and coordinated the information necessary to complete applications for PRC
20 government funding, including applications to Tianjin Science and Technology Development Zone;
21 State Key Laboratory (National Laboratory) & Introduction of Overseas High Level Talent; 985 Project
22 Application; 211 Project Application; and MEMS Engineering Research Center of Ministry of
23 Education. Each of these applications required the defendants to supply detailed information about their
24 plans and personnel. The applications often emphasized the benefit of MEMS technology to the PRC,
25 particularly the military benefits, as well as to make the PRC the leading country in the commercial RF
26 industry.

Overt Acts

1
2 30. On or about the following dates, in furtherance of the conspiracy and to effect its objects,
3 the defendants committed the following overt acts, among others, in the Northern District of California
4 and elsewhere:

5 a. On October 29, 2006, HUISUI ZHANG emailed WEI PANG and HAO ZHANG
6 his notes from a planning meeting for creating an FBAR fabrication facility in the PRC. One subsection
7 of the notes was entitled: "Cost saving by moving Avago to China."

8 b. On October 30, 2006, WEI PANG emailed a warning to maintain secrecy to HAO
9 ZHANG and HUISUI ZHANG:

10 Please try not to check personal email accounts in company. It could be
11 tracked as long as in company's network. It is very important. Even in
12 Avago, I have seen several law cases, where the previous employee's
13 emails has been investigated, we are faced with two law cases relating

14 with FBAR right now.

15 c. On November 6, 2006, HUISUI ZHANG emailed WEI PANG and
16 HAO ZHANG regarding their need for intellectual property, stating that "IP is our
17 biggest problem." [Translation from Chinese.]

18 d. On November 9, 2006, WEI PANG emailed HAO ZHANG and HUISUI ZHANG
19 discussing potential conflicts for their PRC company concerning Avago's and Skyworks' IP:

20 IP is almost impossible if we are still engaged with current company, but
21 sample demonstration will be good enough for VC according to a veteran
22 in a high-tech start up company. The prototype doesn't need to be perfect
23 in the very beginning. But.... how can we build filter outside of Avago
24 and Skyworks?

25 e. On November 13, 2006, WEI PANG sent an email to a PRC national
26 and former colleague at USC to help set up a business plan to sell FBARs in the PRC:

27 We (Hao, Huisui, and I) have made decision to form a company and
28 establish a factory in China to produce FBAR filters mainly for cell phone
29 manufacturers (such as Nokia, Motorola, Samsung, LG, etc.) by
30 leveraging our technology and experience accumulated in both of
31 academics and industry through the past five years. The filter market for
32 cell-phone alone is estimated to be more than \$1 Billion in 2006. We are
33 confident with our technology and business model (i.e., cost advantages

1 over competitors) and are preparing for business plan to attract venture
2 capitals.

3 f. On November 13, 2006, WEI PANG sent a follow-up email stating, "Since we
4 (Hao and I) are still working in FBAR company, please keep it as secret."

5 g. On December 10, 2006, WEI PANG emailed his notes of a meeting that took
6 place on December 9, 2006, to HAO ZHANG and HUISUI ZHANG stating, "My work is to make every
7 possible effort to find out about the *process's* every possible detail and *copy* directly to China."

8 [Translation from Chinese, italicized words in English in original.]

9 h. On January 25, 2007, WEI PANG emailed HAO ZHANG and HUISUI ZHANG
10 agreeing that they could beat out competitors because they would not need to conduct research and
11 development:

12 However, in the company point of view, another significant cost is R&D
13 and management (such as labor cost) fee (>25%) in any typical western
14 company, we save that money a lot, and . . . no filter (FBAR or SAW)
15 company can compete with us.

16 i. On May 25, 2007, WEI PANG emailed HAO ZHANG and HUISUI ZHANG
17 suggesting a name for their company in the PRC, "I want to call the company 'clifbaw'. How about
18 your names?" When HUISUI ZHANG responded by asking PANG to "explain the inside meaning,"
19 PANG replied: "China lift BAW technology ~ Clifbaw. haha."

20 j. On June 14, 2007, HUISUI ZHANG emailed WEI PANG and HAO ZHANG
21 about his meeting with a venture capital ("VC") firm representative that same day. HUISUI ZHANG
22 summarized the VC's concerns, in part, as follows (bullets not in original text):

- 23 • The main points he concerns are two: IP and detail investigations on costumers [*sic*].
- 24 • Also he mentioned if the potential members are working at a BAW company, it will be a
25 conflict.
- 26 • The detail investigation is to know what exactly costumer [*sic*] needs and the detail
27 requirement they will buy. We actually know these but I cannot tell VC because the
28 information is from currently BAW providers which are your employers.

29 k. On June 20, 2007, HUISUI ZHANG emailed WEI PANG and HAO ZHANG
30 explaining that he had met with patent agents in the PRC to discuss when and where to file patent
31 applications. HUISUI ZHANG recommended they file patent applications in both the United States and

1 the PRC. HUISUI ZHANG continued that, “if they got caught, the best situation they can hope for will
2 be that the U.S. BAW patent holder has not applied for BAW patent in China.” [Translation from
3 Chinese.]

4 l. On June 29, 2007, WEI PANG emailed HAO ZHANG and HUISUI ZHANG
5 that he had already provided applications for FBAR oscillators for cell phones and microphones,
6 including detailed market and feasibility analyses, to HAO ZHANG.

7 m. Beginning in July 2007 and continuing to at least January 2008, WEI PANG
8 solicited a number of universities and institutes in the PRC regarding the proposed FBAR fabrication
9 company.

10 n. On January 21, 2008, WEI PANG traveled to the PRC to present a lecture at an
11 FBAR symposium for a number of PRC government institutes at TJU College of Precision Instrument.
12 J.Y. attended that lecture and met with PANG.

13 o. On February 20, 2008, J.Y. emailed WEI PANG requesting information for his
14 job application at TJU.

15 p. On February 20, 2008, WEI PANG emailed J.Y. unpublished Avago draft United
16 States patent applications as well as other documents relating to his employment at TJU. [Translation
17 from Chinese.]

18 q. On June 2, 2008, WEI PANG traveled to the PRC to visit MNMT at TEDA and
19 have meetings with TJU’s Dean and Vice President.

20 r. On July 16, 2008, WEI PANG forwarded to HAO ZHANG and others an email
21 and attached letter from a TJU Vice-President (“VP”) welcoming PANG to TJU, requesting information
22 on other personnel, and asking for further confirmation regarding “[p]otential intellectual property
23 dispute with the work you will be doing in China vs. patent application/company trade secret in the
24 U.S.” [Translation from Chinese.] The letter also contained details about a visit to the United States by
25 the Dean of the College of Precision Instrument and the Vice President of TJU to meet with WEI
26 PANG, HAO ZHANG, and other co-conspirators.

27 s. On July 20, 2008, WEI PANG emailed HAO ZHANG and others to say that

1 officials from TJU would be coming to the United States to meet with them the week of August 30,
2 2008.

3 t. On August 31 and September 1, 2008 the TJU VP and the Dean of the College of
4 Precision Instrument met with WEI PANG, HAO ZHANG, and others at a residence in San Jose,
5 California.

6 u. On September 8, 2008, a TJU VP emailed WEI PANG, HAO ZHANG, and
7 others to say that TJU would give PANG's team full support by actively obtaining the funding,
8 equipment, and space required to conduct the work. TJU asked PANG to provide details for the plan
9 including equipment requirements, staffing requirements, development plans, and to note specifically
10 any information that needed to be kept confidential. [Translation from Chinese.]

11 v. On September 11, 2008, WEI PANG emailed HAO ZHANG the file
12 "WCDMA_TX_070803.gds" containing Avago trade secrets.

13 w. Between October 12 and October 26, 2008, WEI PANG and HAO ZHANG
14 coordinated with TJU officials to apply for PRC government funding, including applications to the
15 Tianjin Science and Technology Development Zone; the State Key Laboratory (National Laboratory) &
16 Introduction of Overseas High Level Talent program; the 985 Project; the 211 Project; and the MEMS
17 Engineering Research Center of Ministry of Education.

18 x. Between October 25 and November 22, 2008, HAO ZHANG emailed his co-
19 conspirators the specifications and pricing for the Aviza AlN sputter deposition tool, the Omega AlN
20 etching tool, and the Sigma deposition tool, all containing Skyworks trade secrets, in order to prepare to
21 build an FBAR fabrication facility at TJU.

22 y. Between November 2 and November 6, 2008, WEI PANG traveled to the PRC to
23 meet with TJU and MNMT officials, as well as with equipment vendors.

24 z. On November 10, 2008, WEI PANG sent an email to an unindicted co-
25 conspirator (H.I.) that included a PowerPoint slide containing Avago's deep silicon via etching
26 technique.

27 aa. On November 10, 2008, an unindicted co-conspirator (H.I.) sent an email to an

1 equipment vendor used by Avago stating, "I am working for China Tianjin University now to help them
2 set up a MEMS pilot line for student training purposes (This is the 985 project, \$ comes from education
3 funding.)" H.I. then forwarded this email to WEI PANG.

4 bb. On November 11, 2008, WEI PANG sent an email containing the subject
5 line, "equipment details," and an attached spreadsheet of tools and the specifications at which the tools
6 would need to operate. Specifically, the list contained Avago's "AlN etch recipe."

7 cc. On December 9, 2008, HAO ZHANG emailed to WEI PANG an unredacted slide
8 from Avago's Confidential Process Flow PowerPoint.

9 dd. On December 11, 2008, WEI PANG sent an email to HAO ZHANG containing
10 photos of the Avago device packaging process which allowed two silicon wafers to be sandwiched
11 together, called the "microcap process."

12 ee. Between January 31 and February 1, 2009, WEI PANG and HAO ZHANG
13 traveled to San Jose, California, for a team meeting and to meet with equipment vendors.

14 ff. On February 12, 2009, HAO ZHANG emailed a TJU official proposing that
15 because he did not previously have access to the Skyworks technology to which he had recently been
16 assigned, he should stay at Skyworks long enough to "master the technology," and then join TJU at the
17 beginning of May 2009. [Translation from Chinese.]

18 gg. On February 19, 2009, WEI PANG emailed HAO ZHANG Avago P-cells and
19 Design Kits (v.5 and v.6).

20 hh. On February 19, 2009, HAO ZHANG emailed WEI PANG a PowerPoint for
21 Skyworks AlN and Molybdenum ("Mo") deposition that contained over 25 slides with computer screen
22 snapshots of detailed process specifications.

23 ii. On March 25, 2009, HAO ZHANG emailed WEI PANG, while PANG was in
24 the PRC, a PowerPoint entitled, "Planarization Rate at FBAR CMP," that included detailed photographs,
25 screenshots, and specifications of Avago's CMP process. ZHANG also emailed PANG a screenshot
26 entitled "BAW process flow snapshot," containing Skyworks' process flow.

27 jj. On April 5, 2009, WEI PANG emailed several of his co-conspirators informing

1 them that he had communicated with TJU officials and that the plan was to set up a company in the
2 Cayman Islands and then form a joint venture in Tianjin with MNMT, which was “a Tianjin University
3 100% controlled company.”

4 kk. On April 12, 2009, HAO ZHANG emailed WEI PANG, while PANG was in the
5 PRC, a PowerPoint containing Avago’s “Parametric Summary of Air Bridge and Wing Structure.”

6 ll. On May 20, 2009, HAO ZHANG emailed WEI PANG Skyworks’ BAW
7 PowerPoint and 2D recipe.

8 mm. On June 9, 2009, HAO ZHANG left Skyworks and relocated to the PRC, where
9 he began full-time employment as a professor at TJU.

10 nn. On June 29, 2009, WEI PANG left Avago and relocated to the PRC, where he
11 began full-time employment as a professor at TJU.

12 oo. On July 27, 2009, WEI PANG emailed JINPING CHEN a proposal for funding a
13 TJU MEMS lab to the Tianjin Science and Technology Commission. [Translation from Chinese.]

14 pp. On September 10, 2009, WEI PANG registered Novana in the Cayman Islands.

15 qq. On October 12, 2009, HAO ZHANG filed a United States patent application
16 based on stolen Avago Air Bridge technology, listing himself as the sole inventor. On the same date,
17 ZHANG’s oath form was filed with the United States Patent and Trademark Office (PTO),
18 acknowledging the requirement for providing truthful information to the PTO about the inventor and
19 invention status, as well as the penalties for violating Title 18, United States Code, Section 1001
20 (making a false statement).

21 rr. On October 15, 2009, WEI PANG emailed HAO ZHANG and others Avago’s ion
22 milling process specifications.

23 ss. On October 15, 2009, HUISUI ZHANG emailed WEI PANG and HAO ZHANG
24 to set up a conference call to discuss potential collaboration regarding FBAR/BAW and the smart grid.

25 tt. On October 20, 2009, HUISUI ZHANG followed up by circulating a short agenda
26 for the conference call described in the preceding subparagraph.

27 uu. On November 3, 2009, WEI PANG forwarded an email to HUISUI ZHANG

1 about funding from the PRC Ministry of Education and said: "As you can see, we are suggested to work
2 on smart grid project from University. There is money there, do you have any ppt slide?" HUISUI
3 ZHANG responded the same day, saying that he did not have a slide but could come up with something.
4 [Quoted portion in English; referenced email in Chinese.]

5 vv. On December 9, 2009, HAO ZHANG emailed CHONG ZHOU and others a
6 layout marked "Skyworks Solutions Inc, 20 Sylvan Road, Woburn, MA 01801 / Proprietary Information
7 No Dissemination Or Use Allowed Without Prior Written Permission," that also contained the names of
8 Skyworks employees and the dates of revisions to the layout made by the named Skyworks employees.

9 ww. On December 18, 2009, HAO ZHANG filed a United States patent application
10 based on stolen Avago Wings technology, listing himself as the sole inventor. On the same date,
11 ZHANG's oath form was filed with the U.S. Patent and Trademark Office (PTO), acknowledging the
12 requirement for providing truthful information to the PTO about the inventor and invention status, as
13 well as the penalties for violating 18 U.S.C. § 1001.

14 xx. On March 16, 2010, HAO ZHANG filed a United States patent application based
15 on stolen Avago Temperature Compensation ("Tempco") project technology, listing himself as the sole
16 inventor. On the same date, ZHANG's oath form was filed with the U.S PTO, acknowledging the
17 requirement for providing truthful information to the PTO about the inventor and invention status as
18 well as the penalties for violating 18 U.S.C. § 1001.

19 yy. On May 11, 2010, HAO ZHANG filed a United States patent application based
20 on stolen Avago Coupled Resonator Filters ("CRF") technology, listing himself as the sole inventor. On
21 the same date, ZHANG's oath form was filed with the U.S. PTO, acknowledging the requirement for
22 providing truthful information to the PTO about the inventor and invention status as well as the penalties
23 for violating 18 U.S.C. § 1001.

24 zz. On June 10, 2010, HAO ZHANG filed a United States patent application based
25 on stolen Avago Silicon Carbide technology, listing himself as the sole inventor. On the same date,
26 ZHANG's oath form was filed with the U.S. PTO, acknowledging the requirement for providing truthful
27 information to the PTO about the inventor and invention status as well as the penalties for violating 18

1 U.S.C. § 1001.

2 aaa. On June 23, 2010, CHONG ZHOU emailed to HAO ZHANG an altered, stolen
3 Avago design kit FBAR Resonator P-cell generator file, "resonator12b.il."

4 bbb. On August 15, 2010, CHONG ZHOU emailed to HAO ZHANG an altered, stolen
5 Avago design kit FBAR Resonator P-cell generator file, "resonator13b.il."

6 ccc. On August 20, 2010, WEI PANG and HAO ZHANG filed a PRC patent
7 application based on stolen Avago Wings technology, listing themselves as the co-inventors.

8 ddd. On August 24, 2010, CHONG ZHOU emailed a file, "Band I and Band II
9 Parameters for Layout" files containing stolen Avago Design Kits and P-cells to HAO ZHANG

10 eee. On August 28, 2010, HAO ZHANG emailed CHONG ZHOU a PowerPoint
11 presentation entitled "Temperature Compensated BAW Resonator with Embedded Silicon Dioxide
12 Layer Underneath Piezoelectric Layer," marked "Skyworks Solutions Confidential and Proprietary."

13 fff. On August 31, 2010, WEI PANG and HAO ZHANG filed a PRC patent
14 application based on stolen Avago Air Bridge technology, listing themselves as the co-inventors.

15 ggg. On September 7, 2010, WEI PANG and HAO ZHANG filed a United States
16 patent application based on stolen Skyworks Composite Bulk Acoustic Wave Resonator technology,
17 listing themselves as the co-inventors. On the same date, PANG's and ZHANG's oath forms were filed
18 with the U.S. PTO, acknowledging the requirement for providing truthful information to the PTO about
19 the inventor and invention status as well as the penalties for violating 18 U.S.C. § 1001.

20 hhh. On September 27, 2010, WEI PANG and HAO ZHANG filed a PRC patent
21 application based on stolen Avago Tempco project technology, listing themselves as the co-inventors.

22 iii. On October 21, 2010, defendants WEI PANG and HAO ZHANG filed a PRC
23 patent application based on stolen Avago Silicon Carbide project technology, listing PANG and
24 ZHANG as the inventors.

25 jjj. On November 5, 2010, WEI PANG and HAO ZHANG filed a PRC patent
26 application based on stolen Avago CRF technology, listing PANG and ZHANG as the inventors.

27 kkk. On December 7, 2010, CHONG ZHOU emailed a PowerPoint entitled "Mask

1 FE901 Design and Layout Review,” marked, “MEMS Group, Tianjin University,” and containing
2 FBAR layout views, among other slides, to HAO ZHANG.

3 iii. On December 12, 2010, JINPING CHEN emailed co-conspirators and officials
4 from TJU a copy of a contract between TJU and MNMT. The contract committed TJU to give 26
5 million RMB to MNMT to purchase MEMS fab equipment. TJU was also supposed to provide tax free
6 forms for all of the purchases and pay any relevant fees. [Translation from Chinese.]

7 mmm. On December 20, 2010, CHONG ZHOU altered a stolen Avago design kit FBAR
8 Resonator P-cell generator file, “resonator 13b.il,” and emailed it to HAO ZHANG. The source code
9 text matched that of the “resonator13b.il” file sent on August 15, 2010.

10 nnn. On January 23, 2011, HAO ZHANG emailed a representative of ZTE (the PRC’s
11 largest listed telecoms equipment company) a PowerPoint entitled, “Bulk Acoustic Wave (BAW) RF
12 Filters For Wireless Communications,” that displayed his work at both Novana and TJU on the cover
13 slide. In addition to discussing the importance and performance of Novana’s BAW products, the
14 presentation contained specific Avago product information to illustrate Novana’s products, and
15 performance charts that referenced Skyworks product performance.

16 ooo. On August 16, 2011, GANG ZHAO emailed WEI PANG, HAO ZHANG, and
17 JINPING CHEN regarding business dealings with UMC (a wafer fabrication company in the PRC).
18 ZHAO stated, “[t]he material which you sent UMC last time shows very clearly the word AVAGO,” and
19 concluded “...[I] suggest the necessary revisions be made just to avoid any unnecessary problems for us
20 later.” [Translation from Chinese; “Avago” in English.]

21 ppp. On September 22, 2011, JINPING CHEN emailed officials at TEDA to verify the
22 agreement between TEDA and the ROFS MEMS project. The agreement clarified that WEI PANG,
23 HAO ZHANG, JINPING CHEN, ZHAO GANG, and others held positions at ROFS. [Translation from
24 Chinese.]

25 qqq. On October 16, 2011, HAO ZHANG emailed CHONG ZHOU and others a
26 PowerPoint presentation entitled “Single to Balanced Circuits” on a template entitled “Skyworks
27 Template.”

1 rrr. Avago became aware of WEI PANG's thefts after it saw HAO ZHANG's United
2 States patent applications covering Avago trade secrets in the fall of 2011. In late 2011, WEI PANG's
3 former boss at Avago, Dr. Rich Ruby, traveled to the PRC to attend a conference in Shenzhen. While he
4 was in the PRC, Dr. Ruby visited TJU to see PANG and ZHANG's new MEMS lab. When he toured
5 the facility, Dr. Ruby recognized that it was using stolen Avago technology. Dr. Ruby confronted
6 JINPING CHEN and WEI PANG about stealing and using Avago trade secrets. PANG falsely denied
7 having an FBAR company or any company.

8 sss. On December 9, 2011, Dr. Ruby memorialized the verbal confrontation with WEI
9 PANG and JINPING CHEN in an email. CHEN forwarded Ruby's email to WEI PANG, HAO
10 ZHANG, and ZHAO GANG on the same day.

11 ttt. On December 14, 2011, JINPING CHEN emailed Dr. Ruby that, "[b]ased on our
12 inspection, we can make sure that Tianjin University is not the assignee of any patent you have
13 mentioned, neither US ones nor Chinese ones. On the same day, CHEN forwarded this response to WEI
14 PANG, HAO ZHANG, and ZHAO GANG.

15 uuu. On November 11, 2012, WEI PANG emailed CHONG ZHOU and HAO ZHANG
16 warning ZHOU never to include unpublished figures or materials from Avago or any other company in
17 ZHOU's Master's degree thesis. [Translation from Chinese; "Avago" in English.]

18 vvv. On July 5, 2012, CHONG ZHOU received an email notification about the status
19 of the backup of ROFS's layout server that listed files contained in the directories of individual ROFS
20 design team members that referenced specific Avago employees, internal Avago project names, design
21 kits, and P-cells.

22 www. On March 3, 2013, CHONG ZHOU emailed a stolen Avago design kit FBAR
23 Resonator P-cell generator file, "resonator13c.il," in an email with a subject line that simply read,
24 "code." This revision was the same as the "resonator13b.il" file sent on August 15 and December 20,
25 2010, except that it also contained an additional revision attributed to CHONG ZHOU, dated November
26 29, 2011.

27 All in violation of Title 18, United States Code, Section 1831(a)(5).

1 COUNT TWO: (18 U.S.C. § 1832(a)(5) – Conspiracy to Commit Theft of Trade Secrets)

2 31. The factual allegations contained in Paragraphs 1 through 30 are realleged and
3 incorporated as if fully set forth here.

4 32. Beginning in 2006 and continuing to the present, in the Northern District of California
5 and elsewhere, the defendants,

6 WEI PANG,
7 HAO ZHANG,
8 HUISUI ZHANG,
9 JINPING CHEN,
ZHAO GANG, and
CHONG ZHOU,

10 together with others known and unknown to the Grand Jury, intending to convert a trade secret, that was
11 related to a product and service used in and intended for use in interstate and foreign commerce, to the
12 economic benefit of anyone other than the owner of that trade secret, and knowing and intending that the
13 offense would injure the owner of that trade secret, conspired:

14 a. knowingly to steal, and without authorization appropriate, take, carry away,
15 conceal, and by fraud, artifice, and deception obtain trade secrets belonging to Avago and
16 Skyworks;

17 b. knowingly and without authorization to copy, duplicate, sketch, draw, download,
18 upload, alter, photocopy, replicate, transmit, deliver, send, communicate, and convey trade
19 secrets belonging to Avago and Skyworks; and

20 c. knowingly and without authorization to receive, buy, and possess trade secrets
21 belonging to Avago and Skyworks, knowing the same to have been stolen and appropriated,
22 obtained, and converted without authorization.

23 Manner and Means of the Conspiracy

24 33. The objects of the conspiracy were carried out, in part, as alleged in Paragraphs 24
25 through 29 above.

26 Overt Acts

27 34. In furtherance of the conspiracy and to effect its objects, in the Northern District of

1 California and elsewhere, the defendants committed, among others, each of the overt acts alleged in
2 Paragraph 30, including its subparagraphs.

3 All in violation of Title 18, United States Code, Section 1832(a)(5).

4 COUNTS THREE THROUGH SEVENTEEN: (18 U.S.C. §§ 1831(a)(1),(2),(3), & 2 – Economic
5 Espionage; Aiding and Abetting)

6 35. The factual allegations contained in Paragraphs 1 through 30 are realleged and
7 incorporated as if fully set forth here.

8 36. On the dates set forth below, in the Northern District of California and elsewhere, the
9 defendants listed in the separate counts below, together with others known and unknown to the Grand
10 Jury, knowing and intending that the offenses would benefit a foreign government, namely the PRC, and
11 foreign instrumentalities, namely TJU, MNMT, TEDA and ROFS, as specifically alleged in each of the
12 Counts 3 through 17 below:

13 a. knowingly stole, and without authorization appropriated, took, carried away,
14 concealed, and by fraud, artifice, and deception obtained trade secrets belonging to Avago and
15 Skyworks;

16 b. knowingly and without authorization copied, duplicated, sketched, drew,
17 downloaded, uploaded, altered, photocopied, replicated, transmitted, delivered, sent,
18 communicated, and conveyed trade secrets belonging to Avago and Skyworks; and

19 c. knowingly and without authorization received, bought, and possessed trade
20 secrets belonging to Avago and Skyworks, knowing the same to have been stolen and
21 appropriated, obtained, and converted without authorization:

COUNT	DATE	DEFENDANT(S)	ACTION	TRADE SECRET
3	March 16, 2010	HAO ZHANG	U.S. patent application	Avago Temperature Compensation (“Tempco”) project technology
4	May 11, 2010	HAO ZHANG	U.S. patent application	Avago Coupled Resonator Filters (“CRF”) technology
5	June 10, 2010	HAO ZHANG	U.S. patent application	Avago Silicon Carbide technology

6	June 10, 2010	WEI PANG and HAO ZHANG	U.S. patent application	Skyworks Composite Bulk Acoustic Wave Resonator technology
7	June 23, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P-cell generator, "resonator12b.il" file
8	August 15, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P- cell generator, "resonator13b.il" file
9	August 20, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Wings technology
10	August 24, 2010	CHONG ZHOU and HAO ZHANG	email	"Band I and Band II Parameters for Layout" files containing Avago Design Kits and P- cells to HAO ZHANG
11	August 28, 2010	CHONG ZHOU and HAO ZHANG	email	Skyworks PowerPoint presentation entitled "Temperature Compensated BAW Resonator with Embedded Silicon Dioxide Layer underneath Piezoelectric Layer," marked "Skyworks Solutions Confidential and Proprietary."
12	August 31, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Air Bridge technology
13	September 27, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Temperature Compensation ("Tempco") project technology

14	December 7, 2010	CHONG ZHOU and HAO ZHANG	email	Avago FBAR layout views, Mask FE901 Design and Layout Review
15	December 20, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P-cell generator, "resonator13b.il" file
16	October 16, 2011	CHONG ZHOU and HAO ZHANG	email	Skyworks PowerPoint presentation entitled "Single to Balanced Circuits" and prepared on a PowerPoint template titled "Skyworks Template."
17	March 3, 2013	CHONG ZHOU	email	Avago design kit FBAR Resonator P-cell generator, "resonator13c.il" file in an email with the subject line entitled "code"

All in violation of Title 18, United States Code, Sections 1831(a)(1), (2), (3), & 2.

COUNTS EIGHTEEN through THIRTY-TWO: (18 U.S.C. §§ 1832(a)(1),(2),(3), & 2 – Theft of Trade Secrets; Aiding and Abetting)

37. The factual allegations contained in Paragraphs 1 through 30 are realleged and incorporated as if fully set forth here.

38. On the dates set forth below, in the Northern District of California and elsewhere, the defendants listed in the separate counts below, together with others known and unknown to the Grand Jury, intending to convert a trade secret, that was related to a product and service used in and intended for use in interstate and foreign commerce, to the economic benefit of anyone other than the owner of that trade secret, and knowing and intending that the offense would injure the owner of that trade secret, as specifically alleged in each of the Counts 18 through 32 below:

1 a. knowingly stole, and without authorization appropriated, took, carried away,
2 concealed, and by fraud, artifice, and deception obtained trade secrets belonging to Avago and
3 Skyworks;

4 b. knowingly and without authorization copied, duplicated, sketched, drew,
5 downloaded, uploaded, altered, photocopied, replicated, transmitted, delivered, sent,
6 communicated, and conveyed trade secrets belonging to Avago and Skyworks; and

7 c. knowingly and without authorization received, bought, and possessed trade
8 secrets belonging to Avago and Skyworks, knowing the same to have been stolen and
9 appropriated, obtained, and converted without authorization:

COUNT	DATE	DEFENDANT(S)	ACTION	TRADE SECRET
18	March 16, 2010	HAO ZHANG	U.S. patent application	Avago Temperature Compensation ("Tempco") project technology
19	May 11, 2010	HAO ZHANG	U.S. patent application	Avago Coupled Resonator Filters ("CRF") technology
20	June 10, 2010	HAO ZHANG	U.S. patent application	Avago Silicon Carbide technology
21	June 10, 2010	WEI PANG and HAO ZHANG	U.S. patent application	Skyworks Composite Bulk Acoustic Wave Resonator technology
22	June 23, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P-cell generator, "resonator12b.il" file
23	August 15, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P-cell generator, "resonator13b.il" file
24	August 20, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Wings technology

1	25	August 24, 2010	CHONG ZHOU and HAO ZHANG	email	"Band I and Band II Parameters for Layout" files containing Avago Design Kits and P- cells to HAO ZHANG
2					
3					
4					
5	26	August 28, 2010	CHONG ZHOU and HAO ZHANG	email	Skyworks PowerPoint presentation entitled "Temperature Compensated BAW Resonator with Embedded Silicon Dioxide Layer Underneath Piezoelectric Layer," marked "Skyworks Solutions Confidential and Proprietary."
6					
7					
8					
9					
10					
11					
12					
13	27	August 31, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Air Bridge technology
14	28	September 27, 2010	WEI PANG and HAO ZHANG	PRC patent application	Avago Temperature Compensation ("Tempco") project technology
15					
16					
17	29	December 7, 2010	CHONG ZHOU and HAO ZHANG	email	Avago FBAR layout views, Mask FE901 Design and Layout Review
18					
19	30	December 20, 2010	CHONG ZHOU and HAO ZHANG	email	Avago design kit FBAR Resonator P-cell generator, "resonator13b.il" file
20					
21					
22	31	October 16, 2011	CHONG ZHOU and HAO ZHANG	email	Skyworks PowerPoint presentation entitled "Single to Balanced Circuits" and prepared on a PowerPoint template entitled "Skyworks Template."
23					
24					
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26					
27					

32	March 3, 2013	CHONG ZHOU	email	Avago design kit FBAR Resonator P- cell generator, "resonator13c.il" file.
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All in violation of Title 18 United States Code, Sections 1832(a)(1), (2), (3), and 2.

FORFEITURE ALLEGATION: (18 U.S.C. §§ 1834 and 2323 – Proceeds and Property Involved in Economic Espionage and Theft of Trade Secrets)

39. The allegations contained in Counts 1 through 32 of this Indictment are hereby realleged and incorporated as if fully set forth here. Upon conviction of any of those offenses, the defendants,

WEI PANG,
HAO ZHANG,
HUISUI ZHANG,
JINPING CHEN,
ZHAO GANG, and
CHONG ZHOU,

shall forfeit to the United States of America, pursuant to Title 18, United States Code, Sections 1834 and 2323, any property used, or intended to be used, in any manner or part to commit or facilitate the commission of the offenses, and any property constituting or derived from any proceeds obtained directly or indirectly as a result of the commission of the offenses.

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1 40. If any of the property described above, as a result of any act or omission of the
2 defendants:

- 3 a. cannot be located upon the exercise of due diligence;
4 b. has been transferred or sold to, or deposited with, a third party;
5 c. has been placed beyond the jurisdiction of the court;
6 d. has been substantially diminished in value; or
7 e. has been commingled with other property which cannot be divided without
8 difficulty,

9 the United States of America shall be entitled to forfeiture of substitute property pursuant to Title 21,
10 United States Code, Section 853(p), as incorporated by Title 18, United States Code, Section 2323(b).

11 All pursuant to Title 18, United States Code, Sections 1834 and 2323.

13 DATED:

14 4/11/15

15 A TRUE BILL

16 FOREPERSON

17 MELINDA HAAG
18 United States Attorney

19 
20 MATTHEW A. PARRELLA
21 Chief, Computer Hacking/Intellectual Property Unit

22 (Approved as to form: )
23 AUSA's Parrella/Callaway