IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TRIDINETWORKS LTD., Plaintiff, v. STMICROELECRONICS, INC., STMICROELECTRONICS INTERNATIONAL, N.V., and DOE-1, d/b/a "STMICROELECTRONICS," Defendants.	No. 19-cv-01064-CFC-CJB JURY TRIAL DEMANDED

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff TriDiNetworks Ltd. brings this action against the defendants for infringement of U.S. Patent No. 8,437,276 B2 (the "'276 Patent"), and alleges as follows:

PARTIES

1. Plaintiff TRIDINETWORKS LTD. ("TDN" or "Plaintiff") is a corporation organized under the laws of Israel, Israel Corporation Number 513983908, with its principal place of business at 195 Derech Bar Yehuda, Nesher 3688307, Israel. TDN has developed, and markets, a cloud-based platform for wireless M2M (Machine-to-Machine) and IoT (Internet of Things) networks, with applications including without limitation lighting, heating, ventilation, and air conditioning (HVAC) control, smart meters, home automation, smart appliances and wearable devices.

2. Defendant STMICROELECTRONICS, INC. ("ST-US") is a corporation incorporated in Delaware with its principal place of business located at 750 Canyon Drive, Suite 300, Coppell Texas 75019.

3. STMICROELECTRONICS N.V. ("ST-NV"), not named as a defendant herein, is a corporation organized under the laws of The Netherlands with its principal place of business at WTC Schiphol Airport, Schiphol boulevard 265, 1118 BH Luchthaven Schiphol, Amsterdam, The Netherlands. ST-NV is the ultimate corporate parent entity of a multinational group of companies in the semiconductor industry, referred to herein as the "STMicroelectronics Group." Defendant ST-US is the principal U.S. member of the STMicroelectronics Group.

4. Defendant STMICROELECTRONICS INTERNATIONAL N.V. ("ST-INTL") is a corporation organized under the laws of The Netherlands with its principal place of business at 39 Chemin du Champ des Filles, 1228 Plan-Les-Ouates, Geneva, Switzerland. ST-INTL is commonly owned and controlled with Defendant ST-US, by ST-NV. ST-INTL manages the headquarters and operational offices of ST-NV, and the worldwide business of the STMicroelectronics Group.

JURISDICTION AND VENUE

5. Defendant ST-US is subject to personal jurisdiction in this Court by reason of its incorporation in Delaware, and further is also specially subject to jurisdiction in this Court by reason of a substantial volume of commercial activity on its part, including activity that gives rise to the claims for patent infringement asserted herein, conducted in and/or purposefully directed at the State of Delaware.

6. Defendant ST-NV, being a foreign corporation, is subject to personal jurisdiction in this Court by reason of a substantial volume of commercial activity on its part, including activity that gives rise to the claims for patent infringement asserted herein, conducted in and/or purposefully directed at the United States as a whole and the State of Delaware in particular.

7. Venue is proper in this district as against defendant ST-US under 28 U.S.C. § 1400(b), in that it is incorporated in Delaware.

8. Venue is proper in this district as against defendant ST-INTL in that it is a foreign corporation, as to which venue is proper in any district wherein personal jurisdiction may be found over it, under applicable controlling judicial decisions. Furthermore, to the extent 28 U.S.C. § 1391 may be deemed to apply to foreign corporations accused of patent infringement, all defendants herein reside in this district under the provisions of 28 U.S.C. § 1391(c), thereby alternatively supporting venue as to defendant ST-INTL under 28 U.S.C. § 1391(b).

9. Plaintiff alleges jurisdiction and venue as to defendant DOE-1 on substantially the same basis as alleged herein with respect to ST-INTL.

THE PATENT IN SUIT

10. On May 7, 2013, U.S. Patent No. 8,437,276 B2 (the aforementioned '276 Patent), titled "CONTROL SYSTEMS, COMMISSIONING TOOLS, CONFIGURATION ADAPTERS AND METHOD FOR WIRELESS AND WIRED NETWORKS DESIGN, INSTALLATION AND AUTOMATIC FORMATION" was duly and legally issued by the United States Patent and Trademark Office. Plaintiff TDN is, and at all times from the date of issue as well as the prior date of publication of the '276 Patent has been, the assignee of all rights, title, and interest in the '276 Patent, and it possesses all rights to sue and recover for any current or past infringement of the '276 Patent and or to license the '276 Patent. A copy of the '276 Patent is attached hereto and incorporated by reference.

11. The '276 Patent represents a breakthrough development in the practical implementation of deploying electronic devices such as remote sensors, controllers, etc., over communications networks. In particular, the '276 Patent discloses and claims systems and

methods for commissioning devices in such an installation, and doing so with greatly reduced labor and expense. For example, it allows workers with only basic skills to set up arbitrarily complex control networks, without the need for special tools, training and documentation while the networks are unpowered.

12. The technology disclosed and claimed in the ’276 Patent confers numerous advantages. For example, the NFC signal employed in accordance with various embodiments of the ’276 Patent also transfers power, in addition to the commissioning information. As a result, devices may be commissioned contactlessly by way of a mere “tap” on each such device from a “commissioning tool” – without a wired electrical connection. The commissioning tool can be an ordinary smartphone, so long as the smartphone is NFC-enabled (as most current smartphones are). Indeed, commissioning can be performed in accordance with the ’276 Patent while the device to be commissioned is still in the box in which it was delivered. NFC typically has a short effective range (under 20 cm). The short range of NFC, limiting commissioning to those in physical proximity to the commissioned device, also enhances the security of device configuration.

13. The ease of use of the invention in the ’276 Patent represents a great advance over prior methods, which necessitated, for example, commissioning over a live network connection (in-band) to the device to be commissioned, typically requiring individual attention to each device by a highly-trained engineer, or factory pre-configuration of each device in accordance with a limited (and very limiting) set of options determined by the manufacturer. Such methods were tedious, required highly trained workers to perform, and were vulnerable to third-party attack. The technology embodied in the ’276 Patent improves over the stated disadvantages of the prior art in every such respect (out-of-band commissioning).

14. The ’276 Patent concerns patent-eligible subject matter. In one aspect, the ’276 Patent concerns configuring devices so that they can automatically form networks. Such networks of devices are also referred to as the Internet of Things (“IoT”) – an interconnection via the Internet of computing devices embedded in everyday objects and other devices, enabling these objects and devices to send and receive data. As further detailed in the paragraphs that follow, the capabilities claimed in the ’276 Patent are made possible by improvements both to the device hardware and in the protocols for configuring the devices.

15. The term “network” as used in the ’276 Patent “substantially refer[s] to a series of devices interconnected by communication links.” (’276 Patent, 10:3-4.) Various “nodes” for example, to implement sensing or controlling functionality (*e.g.*, temperature sensors, pressure sensors, light sensors, motor actuation controls, switch controls, etc.) may be deployed at a number of locations, each having a physical interface through which it can connect to and become part of the network. (*E.g.*, ’276 Patent, Figs. 5, 8.) The network may also have a “master controller” that controls groups of nodes. (’276 Patent, 12:58-60.) The invention of the’276 Patent concerns how to design such a network and easily “commission” node devices with that design – to easily transfer the necessary data from the design to the node devices to enable the node devices to form the network when they are installed and initialized.

16. Creating a network of devices proceeds from a design of the desired network. The design specifies parameters and design configuration data of devices designed to be in the network, such as “startup attributes,” as well as “binding information” – information needed to make connections between the devices that will run the application intended to be operated over the network. (*E.g.*, ’276 Patent, 9:36-38, 12:1-6, 15:41-58, 18:36-48.)

17. The devices in such a network are each "commissioned" to enable them to join the network. Commissioning involves steps such as providing a unique identifier within each device so that it may be identified on the network, entering into each device an identification of the network that the device is to initially join and information for the device to authenticate on that network, physically connecting the device in the network, and "pairing" and/or binding controlled devices with controlling devices on the network in accordance with the entered parameters and information. *See* '276 Patent at 1:54-64.

18. In situations where there were a number of devices to set up, all or most of this information would have to be entered manually for each device. To do this required a trained operator, that the devices be physically close to the PC or workstation being used to configure it, and that the devices be powered and running so that the information could be entered. (These drawbacks of the prior art are discussed in the '276 Patent at 2:1-3:3.)

19. In some simple network schemes, such as pairing a Wi-Fi or Bluetooth-enabled printer to a computer, simplified methods existed for individual device pairing. These involved, for example, putting the device physically in place on the network, powering it up, and inputting configuration information through a wired or wireless connection to the device, to establish immediate pairing with another connected device such as a computer, or a controller or hub. But such techniques still imposed limitations on when and where the commissioning could be performed, and limitations on the complexity of the network that could be formed.

20. The '276 Patent overcomes the limitations described above. The patent makes it possible to perform commissioning quickly and conveniently, with relatively unskilled personnel, in a manner that readily scales to large and complex installations. The technology is wireless, operating via for example Near Field Communications ("NFC") interface, a form of

short-range radio. (*See* '276 Patent, 10:5-6.) It allows the rapid commissioning of multiple devices for different roles, in accordance with the network design, via a simple "NFC tap" operation (*see* '276 Patent, 14:34-39), which can be performed with a simple hand gesture, with the commissioned devices being unpowered and before they are physically put in place in the network. The solution provided by the '276 Patent provides for the design engineering work to be done up front (in the design stage), followed then or later by device configuration, which is done by simply transferring data from the completed design to the device. This in turn allows multiple devices thus configured to be physically deployed and physically attached to the network, by nontechnical workers, at a later time if so desired. Since the devices then internally have their complete configuration setups, the pairing and binding by each device to form their respective network connections takes place automatically when the devices are put in place and turned on. ('276 Patent, 22:55-56.)

21. The '276 Patent achieves these advantages as a result of employing an improved hardware design for the commissioning apparatus. In accordance with the '276 Patent, a network design is created, and data representing the design is accessed by a "commissioning tool." From there, the commissioning tool can transfer the data needed to commission an arbitrary number of devices, be they uniform or non-uniform, automatically. The commissioning tool does this over a connection between the commissioning tool and a "configuration adapter," a specific hardware element within the device to be commissioned. The connection between the commissioning tool and the device's configuration adapter can be contactless, for example it may be via NFC. Preparing the device to join the network can be done as easily as bringing the commissioning tool close to the device (the "NFC tap"), which initiates the transfer of the design configuration data to the device via NFC. (*See* '276 Patent, 14:34-39.) Because NFC transmissions have the

additional property that they generate power in the receiving device, the transfer of data works even while the device to be commissioned is unpowered. ('276 Patent 14:58-65.) The NFC signal can penetrate product packaging too, so that the transmission works even if the device to be commissioned is still in the packaging in which the device was delivered. Once this contactless configuration is done, the device can be physically deployed *any time thereafter*. When it is later deployed and powered, it can initialize itself with the pre-stored commissioning data, and automatically assume its proper place in the network.

22. Thus, one aspect that differentiates the '276 Patent from what came before is that the complete configuration setup can be performed not only without any power applied to the device to be commissioned, but *at a different time and place* than where the device is to be deployed in production. (*See* '276 Patent at 4:19-58, where "installation" and "initialization" *follows* "commissioning.") This aspect is made possible by the configuration adapter that, in accordance with the invention as claimed, is built into each device that is being commissioned. It is the configuration adapter that receives and stores the commissioning data without the necessity of applied power, and makes that data available to the device *later*, when it is initialized.

23. The term "configuration adapter" is in the title of the '276 Patent, and configuration adapters are recited in all of the patent's claims. Configuration adapters are hardware elements that are recited as express structural requirements of the methods of claims 1-16 ("1. A method … comprising … downloading data into a *configuration adapter* comprised in said devices … [and] reading said downloaded data from the *configuration adapter*", '276 Patent, 24:60-25:9 (emphasis added)). Configuration adapters are also stated as literal claim elements in claims 17-25 ("17. A system … comprising … *configuration adapters* comprised in devices to be installed according to said design", *id.* at 27:14-24 (emphasis added)).

24. The term "configuration adapter" is not a generic term of art. Rather, it is a term that is defined in the patent, as a device that "receives and stores configuration data" (*id.* at 9:47-49). A configuration adapter is illustrated in Fig. 7:

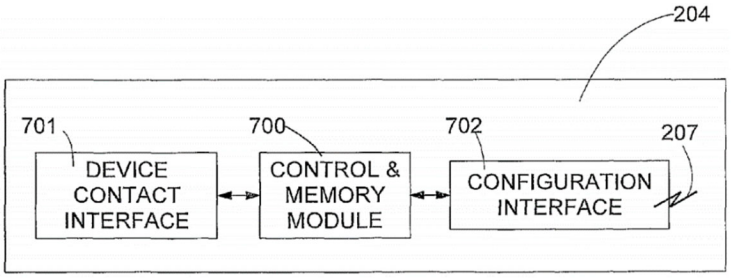


Fig. 7

The figure shows the storage element for the configuration data (box 700 in the middle), and an interface element ("configuration interface" 207, on the right) for receiving the data. Also shown is a "device contact interface" (701, on the left), through which the stored data may later be read, as also recited in the claims. The configuration adapter thus has "dual" (two-sided) interfaces, to be able to share data between *both* an external commissioning tool (*e.g.*, via wireless) on one end of the adapter, and, then or later, with other electronic components wired to the adapter (*e.g.*, on-board processor circuitry), on the other end of the adapter.

25. In addition, further features lie in the manner in which the configuration adapter is used in the claims. In particular, there is a timing aspect to the claims. As stated in claim 17 (as well as in corresponding recitations in claim 1), data from a network design is "download[ed] … into said configuration adapters *before the devices are initialized* … , so that the installed devices form the network and the bindings according to the created design by reading said downloaded data from the configuration adapters *once the devices are initialized*." *Id.* at 27:28-33 (emphasis added).

26. While the later step – that of reading configuration data *from* the configuration adapter, and using the configuration data so read to "form the network" – presumes the application of electrical power to the components involved, the claims also specify that the preceding step – that of downloading the data *into* the configuration adapter – can take place *without* power being applied to the receiving configuration adapter. This further aspect is also in the claims: "wherein of the configuration adapters included in the system, only said configuration adapter of said commissioning tool [*i.e.*, a second, complementary, configuration adapter in the commissioning tool, as opposed to the configuration adapter in the node device] must be powered-up during data communication between said at least one commissioning tool and said devices." *Id.* at 25:13-17 (claim 1), 27:36-40 (claim 17).

27. Putting these claim features together, it is seen that the '276 Patent provides a hardware configuration that allows the network installer to configure a device first, without the device needing to be plugged in, and to deploy the device later, when unencumbered by any configuration apparatus or procedures. By providing technology that easily allows the installation tasks to be split up in this manner, IoT devices can be completely configured for commissioning in advance, without being under power, and without being installed with the other equipment that will surround the device once physically installed. Having been so set up, the device can then be deployed into actual use, an arbitrary amount of time later, at which point, as soon as turned on in the deployment, the device can automatically read, from the configuration adapter, the commissioning data that was earlier stored on-board, and use that data to initialize itself and take its place in the intended network. By contrast, in the prior art, even in wireless commissioning solutions, "pairing" and other like commissioning operations all had to be performed while the device was physically connected to the network and under power so it

could use the transmitted commissioning information immediately to join the network. There was no provision for storing the data on board the device while in an unpowered state, for later initialization under power.

28. The novel features of this invention make it possible to deploy IoT devices in a manner that couldn't previously have been done: without the need for special tools, training and documentation, and in the field, on-site where the devices are going to be deployed (because the commissioning tool can be small and portable). The patented technology also permits much faster commissioning, which is especially significant where a large number of nodes must be commissioned (and in this regard the claims also address commissioning not just one but a plurality of devices). Furthermore, the short range of NFC, limiting commissioning to those in physical proximity to the commissioned device, provides the further benefit of improved security. In sum, the technology embodied in the '276 Patent improves over the stated disadvantages of the prior art, in every such respect.

29. Nor does the '276 patent represent nothing more than using conventional off-the-shelf components to implement a simple idea such as using radio transmission to transfer configuration information in the same manner that was already being done manually.

30. As of the date of invention of the '276 Patent (which was at least as early as its first filing date in November 2007) there did not exist a commercially available persistent storage device providing both a communication and a device contact interface, as in the configuration adapter of the '276 Patent (as there does today, for example, in ST's own M24LR series of devices introduced in 2010, and further addressed herein at ¶ 51). Nor was there publicly available at that time even a design for using individual lower-level components to construct such a dual-interfaced memory within a device, to facilitate its commissioning. Such a

configuration adapter, as integral to the '276 Patent claims, cannot reasonably be described as a generic or conventionally available electronic part as of the date of the claimed invention.

31. The manner in which the improvements provided by the '276 Patent are brought about, through the use of configuration adapters as detailed above, represents an improvement to the computer and networking apparatus itself that is used to perform the commissioning process, and as such constitutes patent-eligible subject matter. As next addressed, the Defendants knew about the '276 Patent, yet have infringed and are continuing to infringe that patent, willfully and deliberately.

ST-INTL'S PRIOR DEALINGS WITH TDN AND KNOWLEDGE OF THE '276 PATENT

32. TDN had a course of prior dealings with the STMicroelectronics Group, beginning in 2009, when TDN was set up as an "Alpha Customer" through the European Application Support group of "STMicroelectronics," which on information and belief was operating through ST-INTL and/or DOE-1. In this prior course of dealing, ST-INTL and/or DOE-1 learned TDN's IoT deployment and commissioning technology and of TDN's patent applications with respect thereto. Communications and meetings continued between these parties and ST-INTL and/or DOE-1 (holding themselves out as "STMicroelectronics") solicited considerable detailed information from TDN.

33. In May 2012 TDN's Chief Executive Officer, Julian Dinur, sent responsible STMicroelectronics Group officials an email (which the principal recipient acknowledged having received), notifying them of the grant of TDN's European patent and that TDN was awaiting formal allowance of related patents in other countries.

34. In January 2014 Mr. Dinur notified a responsible STMicroelectronics Group official, via email, which the official acknowledged having received, that TDN's technology for

deploying wireless control networks, of which the official was aware, had by then been patented in the U.S., Europe (Germany, France, and England) and in China. Because of that express notice, as well as ST-INTL's own patenting activity and familiarity with patents in the field, it is reasonable to believe that at least ST-INTL (and/or DOE-1) was aware that the '276 Patent had issued, at or about the time of its issuance, or was willfully blind with respect thereto.

35. In the January 2014 email, TDN proposed to "collaborate with ST in providing the customers a cloud-managed development platform based on our technology and ST SPWF01S Wi-Fi module and M24LR device used for configuration." The STMicroelectronics Group officials turned down this proposal, but shortly thereafter the Group, including ST-INTL (and/or DOE-1) and ST-US, developed and launched, by themselves, the platform that TDN had proposed, using TDN's technology.

36. The STMicroelectronics Group, through actors including at least ST-INTL, DOE-1, and ST-US went on shortly thereafter to develop substantial lines of products, literature, and videos that incorporate TDN's patented technology, as alleged in detail below, completely cutting out TDN from any commercial participation.

37. Said unauthorized appropriation of the '276 Patent's technology has grown to wholesale adoption, as reflected by the NFC commissioning capability increasingly being embedded in current ST product lines, and aggressively promoted in ST trade show demonstrations, product literature, and videos.

38. In the period following the 2013 issuance of the '276 Patent, promotion of contactless NFC commissioning solutions with ST products, through trade shows (including trade shows in the U.S.), documents, and videos, participated in by ST-INTL, DOE-1, and ST-US, have driven

considerable sales of ST components that were designed to implement technology covered by the '276 Patent.

39. On June 11, 2018, TDN, through its counsel, sent ST-NV, ST-INTL, and ST-US a demand letter, again bringing the issued '276 patent to ST's attention, accusing them of direct and indirect infringement and explaining the basis for these allegations. This notice opened discussions between the parties, but a resolution was not met. All of the relevant STMicroelectronics Group entities, including without limitation ST-INTL, DOE-1, and ST-US have been well aware of the '276 Patent and of the manner in which it is alleged to infringe and induce and contribute to infringement thereof, and lack any good faith basis to assert that they are not infringing, rendering their infringement willful and egregious.

40. Following said repeated notices, discussions, and correspondence, ST-INTL and/or DOE-1, and ST-US have continued, and indeed only ramped up, their willful infringement.

ST'S ADOPTION OF THE PATENTED TECHNOLOGY AND INFRINGEMENT OF THE '276 PATENT

41. The website at https://www.st.com serves as the Internet presence of the entire STMicroelectronics Group, worldwide. The domain name st.com is registered in the name of "STMicroelectronics" (on information and belief, by ST-INTL or DOE-1), at the address of ST-INTL stated above. The owner of the domain controls the name servers for the domain, which control which servers will provide content for the st.com domain, thereby giving the owner complete control over the content that appears on the st.com website. The name servers designated for the st.com domain include a server which on information and belief is in Carrolton, Texas.

42. The U.S. OEM and reseller market for electronic components is a very important market to the STMicroelectronics Group, and thus to ST-INTL and DOE-1. On information and

belief, the name server for st.com located in Texas was chosen for its proximity to users in the U.S., to better serve the U.S. market. The IP address mapped to by the domain st.com is in a block of IP addresses assigned to Amazon Web Services, in Seattle, Washington, also in the U.S. and in proximity to U.S. users, which, on information and belief, was also chosen by ST-INTL and DOE-1 to better serve the U.S. market.

43. The st.com website features solutions "[t]o fully unleash all the possibilities [of] the Internet of Things (IoT)," including "pre-integrated … provisioning … libraries … as well as Software Development Kits (SDK) to support architectures with nodes directly connected to Cloud." https://www.st.com/en/applications/cloud-connectivity/directly-connected-iot-nodes.html .

44. The st.com website claims to provide "the simplest, fastest and most robust way to develop applications for the Internet of Things (IoT)." https://web.archive.org/web/20180618191849/http:/www.st.com/en/applications/internet-of-things-iot.html. As developed in further detail below, the "robust way to develop applications," as advertised by ST, also includes the ability to "commission" the "things" being so developed via contactless near-field communications (NFC) – as taught and claimed by the '276 Patent. Indeed, the suite of products provided by ST also includes everything a user needs to incorporate such NFC commissioning into those devices ("things"), together with detailed instructions and encouragement on exactly how to do so. ST-US practices these methods itself and thus directly infringes the '276 Patent, and causes numerous others to do the same, while purchasing large volumes of ST products designed by ST to practice this mode of infringement.

45. The solutions offered on the st.com website include, among others, a range of "evaluation kits" (also referred to as "Discovery Kits," or "function packs"), which can be used

as-is as IoT device nodes, or as prototypes for custom devices built on the same designs, but from individual ST components. These products include implementations including multiple devices on a single circuit board (*e.g.*, the STM32L4 Discovery Board for IoT node (B-L475E-IOT01A)), as well as combinations ("stacks") of ST's STM32 processor boards with ST's NFC boards and configuration adapters (based on ST's aforementioned ML24R dual interface storage chips), such as (for example) various "STM32 ODE Function Packs." Such assemblies, sold as separate board components as well as complete units by ST-US and its distributors in the U.S., are adapted and intended for use to infringe the '276 Patent. The latter include various "X-NUCLEO" and "P-NUCLEO" evaluation boards and associated modules including the SPWF01SA module and the NFC04A1 NFC expansion board, which provide NFC functionality to any STM32 Nucleo controller board – or the similar STM32L4 Discovery Board (the single-board implementation referred to above).

46. The above-referenced ST development kits and function packs are designed for prototyping and testing proof-of-concept implementations for the IoT. The object is to use these kits themselves, or corresponding custom assemblies built to the same patterns as the kits from individual ST chips and components, to massively deploy node devices over the IoT. In the design of these kits, a connection is made over Wi-Fi or Ethernet local networks, to connect sensors, motor control, and like devices, over the Internet, to a wider network including central control facilities on the Microsoft Azure cloud (and alternatively to like facilities on comparable other "cloud" infrastructures, such as those provided by IBM ("Watson"), Amazon ("AWS"), and Google ("Google Cloud IoT")). With the NFC04A1 NFC expansion board (or similar boards and updates) the wireless communication links of these products are configurable via NFC, in violation of the '276 patent. The st.com website also provides software, detailed documentation

(User manuals, board manufacturing specifications and data files, Bill of Materials (BOM), and schematics) and instructions for creating network designs in which such devices are interconnected over Microsoft Azure or to similar "cloud" systems, and commissioned for such deployment via NFC, within the claims of the '276 Patent.

47. Variations of the boards identified above are provided for a number of IoT cloud infrastructures (Microsoft Azure, Amazon AWS, IBM Watson, etc.) supported by ST. Customers in the U.S. may deploy these devices directly as purchased from ST-US or its distributors. Alternatively, they can devise a custom manufacturing run, using ST chips and components (also purchased in the U.S. from ST-US or its distributors), on a design whose concept has been proven with the ST development devices, as prototypes. Infringement occurs when these components are used to commission network nodes via NFC, which is a manner of use specifically recommended and detailed on the st.com website.

48. The st.com website also promotes other infringing activity, such as commissioning devices for "Smart Street Lighting" deployments via NFC. https://www.st.com/content/ccc/resource/sales_and_marketing/presentation/product_presentation/ca/44/91/5d/f3/92/40/d0/Smart_street_lighting_marketing_pres.pdf/files/Smart_street_lighting_marketing_pres.pdf/jcr:content/translations/en.Smart_street_lighting_marketing_pres.pdf.

49. ST-INTL or DOE-1 is responsible for the content on the st.com website that instructs as to the use of ST-branded components, sold in the U.S. by ST-INTL's affiliate ST-US, in a manner that infringes the '276 Patent.

50. Said content includes documents and videos that instruct purchasers or prospective purchasers of ST components as to how to implement at least the method of claim 1 of the '276 patent (and bay the same couse of conduct to implement the corresponding system of claim 17),

and similarly how to infringe several dependent claims that depend from claims 1 and 17. The following are examples of these instructional items (herein referred to as the "ST Publications"):

(1) User Manual – UM2043 – Rev 6 – May 2018 ("UM2043 Rev 6")

(2) Quick Start Guide for STM32 ODE function pack for IoT node with Wi-Fi or Ethernet, NFC, sensors and motor control, connected to Microsoft Azure cloud (FP-CLD-AZURE1) – Version 3.3.0 (May 14, 2018) ("QSG 3.3.0")

(3) Data Brief – DB2891 – Rev 6 – May 2018 ("DB2891 Rev 6")

downloaded June 6, 2020 from https://www.st.com/content/st_com/en/products/embedded-software/mcu-mpu-embedded-software/stm32-embedded-software/stm32-ode-function-pack-sw/fp-cld-azure1.html (all in software download, en.fp-cld-azure.zip), downloaded June 6, 2020

(4) Smart street lighting solutions (ST Slide Deck), at 17 ("Smart street lighting smart deck")

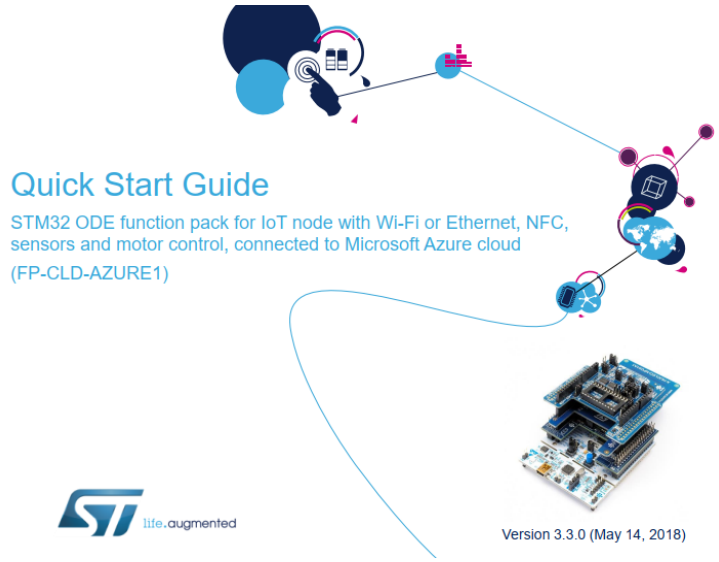
(5) ST25DV04K ST25DV16K ST25DV64K Datasheet (DS10925 - Rev 7 - November 2018)

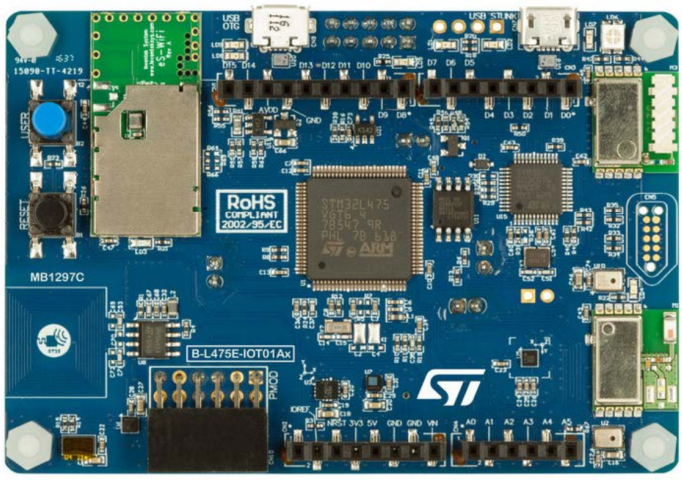
(6) Smart Home: NFC Dynamic Tags to Simplify the Set Up and Use of IoT Devices, Gianmarco Ferrari (Oct. 2016), https://www.youtube.com/watch?v=DUiXAweNAWA

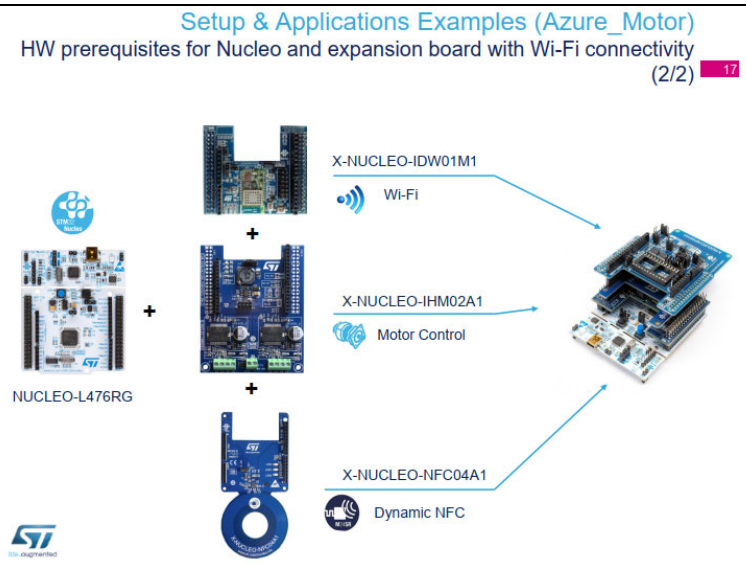
On information and belief, ST-INTL (and/or DOE-1) is responsible for the ST Publications at least insofar as managing their international publication and approving their content, and ST-US is responsible for disseminating those publications in the U.S.

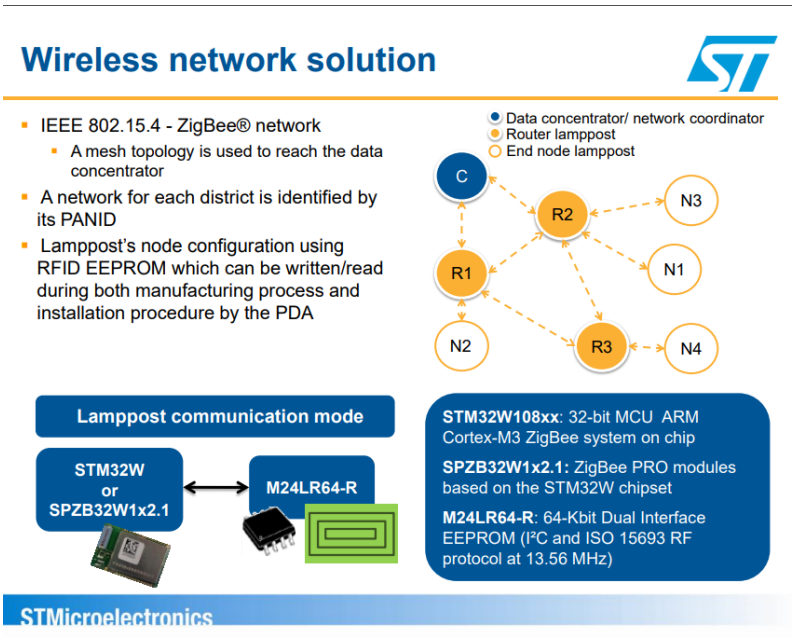
51. The ST Publications instruct the purchasers and prospective purchasers of ST-branded components to use ST-branded components in a manner that infringes the '276 Patent when performed in the U.S. – which those purchasers do, and as ST-US itself does when

demonstrating and testing the products identified herein. The elements and limitations of the independent claims of the ’276 patent, claims 1 and 17 (which are corresponding top-level method and system claims), map onto defendants’ products and instructions as set forth in the following chart, which show that all of the limitations of claims 1 and 17 of the ’276 Patent are met when a person uses the identified ST products as directed in the ST Publications:

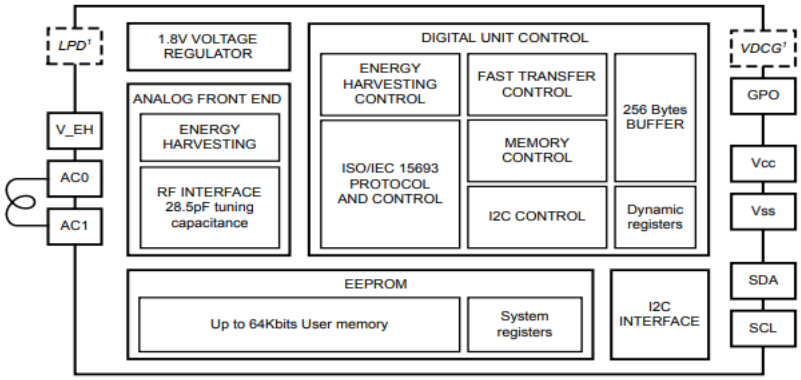
Claim 1	Claim 17	Defendants’ Instructions
1. A method of design, installation, and formation, of a network that comprises wired and wireless devices and wired and wireless links, the method comprising the stages of:	17. A system for forming and controlling of networks that comprises wired and wireless devices and wired and wireless links, the system comprising:	**A method of design, installation, and formation, of a network [A system for forming and controlling of networks]** ST makes node devices (as in the first diagram shown above (the “network” diagram)), particularly configured to practice the ’276 Patent. These devices include an ST family of products known “function pack(s) for IoT node.” The ST “function packs” incorporate functionality for designing, installing, and forming an IoT network, using ST-branded components. The ST Publications teach how to use the ST function packs to practice the ’276 Patent. *See, e.g.*, QSG 3.3.0 at 1 (an example of a function pack is illustrated at the bottom -right):  Alternately, ST provides a single-board node embodiment, the STM32L4 Discovery Board for IoT node (B-L475E-IOT01A), covered in the same instructional manuals that deal with the “function packs”:

Claim 1	Claim 17	Defendants' Instructions
		Figure 49. STM32L4 Discovery kit for IoT node  As further addressed below, with respect to the claim elements that follow, the ST Discovery Kits and function packs identified herein provide, together with an ordinary NFC-enabled smartphone or tablet, which the customer provides, a *complete system* for infringing the '276 Patent.. Any Android or Apple phone capable of using Google Pay or Apple Pay will suffice for this purpose. In other words, all that is needed to infringe is the ST-provided hardware package (as detailed in this chart), plus a commodity smartphone that is readily available to every customer and already possessed by most of them, and a smartphone app (the ST25 NFC Mobile App), which is available without charge through the official Apple and Google App Stores. On information and belief, ST-INTL or DOE-1 is responsible for creating the ST25 NFC Mobile App. **that comprises wired and wireless devices and wired and wireless links** The ST function packs, also referred to as "Discovery Kits," provide hardware and software to create nodes for data collection (temperature, motion, etc.), or controlling local items (such as motors, etc.), as the user's technical application may require, which may be deployed to join, on a wireless link, an existing (wired) network of a cloud-based IoT hub. The network thus formed comprises wired and wireless links. More particularly, the Discovery kits include a plurality of circuit boards (modules) that can be assembled by the user, through plugs and sockets on the individual boards, to form a "stack" (as shown in the illustration above), which functions as a node device. Among the modules included in the kits, in addition to a base ST32 controller module, are a Wi-Fi module, a Bluetooth module and an NFC module. A representative package (*id.* at 17) is shown below:

Claim 1	Claim 17	Defendants' Instructions
		 The NFC module provides the ability to communicate with the node device at short range via NFC, including the ability to configure the device, including the device's other (non-NFC) communications interfaces, over the NFC interface. The Wi-Fi and Bluetooth modules, as either of them may be incorporated in the stack by the user, provide wireless network connectivity, enabling the assembled node devices to join a network over wireless links. The network so being joined, in addition to having such wireless links from the node(s), also has wired links to a remote IoT hub facility, which serves as a master controller for the network. Thus, the network formed as a result of adding the node(s), per the defendants' instructions, to an existing IoT infrastructure technically supported by the defendants, comprises wired and wireless devices and wired and wireless links. ST's X-Nucleo products also include other stacks with sensor functionality (*e.g.*, X-NUCLEO-IKS01A2 board), and it provides single-board solutions (*e.g.*, the B-L475E-IOT01A) and P-Nucleo products as well (*e.g.*, P-Nucleo-Azure1), with similar functionality.
creating a design of said network, said design comprising parameters and design configuration data of devices designed to be in said network and binding information defining bindings to allow connection between devices to run an application;	a design system for creating and storing a design of a network, said design comprises parameters and design configuration data of devices designed to be in said network and binding information defining bindings to allow connection between devices	**creating a design of said network [A design system for creating and storing a design of a network]** In the STM32 ODE example (stack-based implementation on an STM32 base processor board), the design, including a design for a node's local Wi-Fi connection as well as its longer-range cloud connection (to a Microsoft Azure IoT Hub) is created on a PC, using Microsoft Azure IoT Hub and Microsoft Device Explorer and on a smartphone, using ST's ST25 NFC mobile app. QSG 3.3.0 shows, at slides 24-27 creation of Azure IoT Hub and generation of device connection string with unique device ID. As seen in the following illustration from slide 34 of the QSG 3.3.0, the ST25 NFC App provides functionality to "compose" an "NDEF" – an NFC Data Exchange Format message, which encapsulated configuration data for a design.

Claim 1	Claim 17	Defendants' Instructions
	to run an application;	 QSG 3.3.0 shows, at slides 34-36, an Android phone running the ST25 Mobile App being used to set Wi-Fi parameters or Ethernet parameters (encryption type, network key), as well as set a device connection string *HostName=ST-test.azure-devices.net;DeviceId=IOT01A2;SharedAccessKey=TGgOTyQv5Rf4PCNauRVR1hWPn6N6Rw3DwJsdBbZvVSY*, that includes *unique Device Id* (page 26 from Quick Start Guide), for a remote system (in this example, Microsoft Azure)). *See also* Smart street lighting solutions slide deck, at 4 and 17 ("PDA with RF connectivity"), used similarly to the smartphone above.  **said design comprises parameters and design configuration data of devices designed to be in said network**

Claim 1	Claim 17	Defendants' Instructions
		In the above example, in QSG 3.3.0 slide 34, and in UM2043 Rev 6 at 20, "parameters" being set include the Wi-Fi Authentication Type and Encryption Type. Design configuration data ('276 Patent, 9:51-54) includes attributes such as radio ID and startup attribute set, which in turn includes (id., 18:36-45) the PAN (personal area network) ID of the network, the network key, among other parameters. These are reflected in ST's instructions, *e.g.*, QSG 3.3.0 at slides 34 (Network Key). *See also*, Smart street lighting solutions slide deck, at 4 and 17 ("PDA with RF connectivity") loads "node configuration," which includes PANID). **and binding information defining bindings to allow connection between devices to run an application** In the STM32 ODE example, the bindings to be formed include making a local Wi-Fi connection, as well as a remote connection to the Azure IoT hub. Binding information includes the SSID (slide 34) for the Wi-Fi connection (the name of the Wi-Fi network), and the "Device Connection String" (slide 36), for the device to connect to the Azure IoT hub. The specified procedure applies as well and in the same manner to all of the other ST-provided systems having NFC capability.
[the configuration adapter (as referenced in the language of claim 17 to the right), is reflected in the limitation of claim 1 that follows directly below]	configuration adapters comprised in devices to be installed according to said design; and	The ST25DV04K chip on the X-NUCLEO-NFC04A1 board in this kit is a configuration adapter (as is, by way of further example, the M24SR chip on the X-Nucleo-NFC01A1 board and the ST25 chip on the B-L475E-IOT01A1 board). This is shown in Slide 5 of QSG 3.3.0 (among other documents):  A block diagram of the ST25DV04K chip shows that it corresponds to the configuration adapter in Fig. 7 of the '276 Patent:

Claim 1	Claim 17	Defendants' Instructions
		Figure 1. **ST25DVxxx block diagram**  DS10925 Rev 8, at 3. As is evident, this device has the storage and control components (Digital Unit Control and EEPROM) of the '276 Patent's configuration adapter, plus its communication interface (RF Interface and antennas AC0 and AC1) and device contact interface (I2C Interface). The M24SR chip is comparable in this regard as well. (The M24SR chip is a successor to the M24LR chip mentioned above, and backward-compatible with it.)
installing said devices according to said created design by accessing said created design by a commissioning tool and downloading data from said commissioning tool into a configuration adapter comprised in said devices before the devices are initialized; and forming said network and bindings according to said created design by initializing said devices and by reading said downloaded data from the configuration adapter once the	a control system comprising at least one commissioning tool, the control system is for installing said devices by accessing said created design by a commissioning tool and downloading data from said commissioning tool into said configuration adapters before the devices are initialized, so that the installed devices form the network and the bindings according to the created design by reading said downloaded data from the configuration adapters once the	**a control system comprising at least one commissioning tool,** The "control system" comprises "at least one commissioning tool." In the STM32 ODE example, the NFC reader subsystem, its controlling circuitry, and the NFC antenna on the back of the smartphone serves as a commissioning tool. **installing said devices according to said created design by accessing said created design by a commissioning tool [the control system is for installing said devices by accessing said created design by a commissioning tool]** The created design is stored on the Smartphone in the NDEF (see composing NDEF above), which is accessed by the commissioning tool so it can transfer the NDEF via NFC. **and downloading data from said commissioning tool into a configuration adapter comprised in said devices [and downloading data from said commissioning tool into said configuration adapters]** *See* "Write to tag" on slides 34 and 36 of QSG 3.3.0. *See also* DB 2891 3.3.0, at 1: **Description** FP-CLD-AZURE1 is an STM32Cube function pack which lets you safely connect IoT node to Microsoft Azure IoT, transmit sensor data and receive commands fro Azure cloud applications. It fully supports Azure device management primitives and includes a sample implementation for firmware update over the air (FOTA) and one for motor control using a mobile device with NFC, Wi-Fi and Ethernet connectivity links are easily configured. **before the devices are initialized**

Claim 1	Claim 17	Defendants' Instructions
devices are initialized; and	devices are initialized; and	Initialization occurs on powering up or resetting the device. '276 Patent at 22:55-56: "The wireless devices (202) and wired devices (201) may be powered up and automatically initialize themselves." **and forming said network and bindings according to said created design by initializing said devices and by reading said downloaded data from the configuration adapter once the devices are initialized [so that the installed devices form the network and the bindings according to the created design by reading said downloaded data from the configuration adapters once the devices are initialized]** Upon initialization, the installed devices read the downloaded data from their configuration adapters to form the network and the bindings, per the created design. Per QSG 3.3.0, the device then reads from NFC (QSG 3.3.0 at each of slides 34, 35, and 36), and then uses the device connection string to contact to the Azure IoT server ("sample application contact[s] to IoT hub," *id.* at 37). When the STM32 processor starts or resets, the sample application loaded therein (see QSG 3.3.0 at slide 30) reads the downloaded NDEF data from the ST25DV configuration adapter, stores it in Flash memory, and uses that information to form the network and bindings. *See, e.g.*, UM2043 Rev 6 at 18.
wherein said commissioning tool comprises a configuration adapter for a complementary configuration link, wherein of the configuration adapters included in the system, only said configuration adapter of said commissioning tool must be powered-up during data communication between said at least one commissioning tool and said devices.	wherein said commissioning tool comprises a configuration adapter for a complementary configuration link, wherein of the configuration adapters included in the system, only said configuration adapter of said commissioning tool must be powered-up during data communication between said at least one commissioning tool and said devices.	**wherein said commissioning tool comprises a configuration adapter for a complementary configuration link,** The ST25 Mobile App on an NFC-enabled smartphone utilizes an NFC chip on the smartphone as a configuration adapter, such as the ST21NFCA chip, for a complementary configuration link to the ST25DV configuration adapter on the device to be commissioned. **wherein of the configuration adapters included in the system, only said configuration adapter of said commissioning tool must be powered-up during data communication between said at least one commissioning tool and said devices.** The NFC "Write to tag" operation from the smartphone app may be performed regardless of whether the Nucleo device is powered. With the ST25DV04K NFC chip (for example) the "RF link [is] activated when [the chip] act[s] as a contactless memory powered by the received carrier electromagnetic wave." DS10925 - Rev 7, at page 3, paragraph 1.

52. Several dependent claims of the '276 Patent are infringed as well, including without limitation claims concerning automatic network formation (claim 2), storing designs (claim 3), and configuration adapters (claim 23).

53. The publications and videos identified herein, as well as the ST-branded chips and components identified herein in connection therewith, are representative only. There exist many other demonstrations, publications, and videos on st.com, and ST-branded chips and components, which are pertinent to ST's infringement.

54. On information and belief, ST-US follows its own company's published instructions, including the ST Publications identified herein, as to how to use ST products.

55. ST-US, and on information and belief DOE-1, participate as "STMicroelectronics" at trade shows in the U.S., including without limitation the U.S. Consumer Electronics Show, held annually in Las Vegas, and the ST Developers Conference, held annually in California. On information and belief, ST-US and DOE-1 have conducted demonstrations of NFC commissioning at such U.S. trade shows since the issuance of the '276 Patent, in a manner as shown in the above-referenced videos, and taught in the ST Publications, in which, at a minimum, every step of claim 1 of the '276 Patent is practiced as addressed above. ST-US and/or DOE-1 do this to promote U.S. sales of ST-branded products by ST-US. One such demonstration, recorded on video, is "Smart Home: NFC Dynamic Tags to Simplify the Set Up and Use of IoT Devices," presented by Gianmarco Ferrari, held out as "Marketing Manager, NVM and NFC Americas, STMicroelectronics," at the ST Developer's Conference, Santa Clara Convention Center, Mission City Ballroom, on October 4, 2016.

56. On information and belief, ST-US has trained its own personnel in the U.S. in the infringing methods promoted on the st.com website, so that they may more effectively market and sell the ST-branded components utilized in said methods. On information and belief, such training, and testing related thereto, has been carried out by ST-US personnel in the U.S. On

information and belief, ST-US personnel also test the ST products described herein to verify that they work correctly as described in the ST Publications.

COUNT I - DIRECT INFRINGEMENT - 271(a)
(against ST-US only)

57. Plaintiff repeats and realleges paragraphs 1 - 56 as if fully set forth at length herein.

58. The demonstrations by ST-US, including without limitation those conducted as trade shows in the U.S., which as alleged above in Para. 51 include performing each and every step of at least claim 1 of the ’276 Patent, and using a system comprising each and every element of claim 17, arranged as in claim 17, and dependent claims including without limitation claims 2, 3, and 23, took place without TDN’s permission, in the U.S., and during the term of the ’276 Patent constitute direct infringement of the ’276 Patent by ST-US under 35 U.S.C. § 271(a), either literally and/or under the doctrine of equivalents. Further, such direct infringement by ST-US occurs when its personnel test development kits referenced above, which include NFC commissioning features, in the U.S.

59. TDN has suffered and continues to suffer damages including lost profits by reason of the direct infringement of ST-US and is entitled to recover the same or in any case not less than a reasonable royalty with respect thereto.

60. TDN has been and continues to be irreparably harmed by said infringement, in a manner not fully compensable by monetary damages, with the balance of hardships tipping strongly in TDN’s favor such that TDN is entitled to injunctive relief.

61. ST has willfully infringed, and continues to willfully infringe, the ’276 Patent despite having knowledge of the ’276 Patent and of the manner in which it infringes the same.

COUNT II - INDUCED INFRINGEMENT - U.S. - 271(b)
(against all defendants)

62. Plaintiff repeats and realleges paragraphs 1 - 61 as if fully set forth at length herein.

63. U.S. law establishes a separate cause of action for the act of inducing another to infringe a patent. In this regard, 35 U.S.C. §271(b) provides that "[w]hoever actively induces infringement of a patent shall be liable as an infringer."

64. ST-INTL, as a result of its responsibility for the st.com website, and ST-US, as a result of its promotional demonstrations in the U.S., have induced and continue to induce direct infringement by others of the '276 Patent in the U.S., literally and/or under the doctrine of equivalents.

65. TDN hereby identifies numerous direct infringers of the '276 Patent, induced to infringe the same in the United States by ST-INTL and ST-US. For example, persons who practice the NFC commissioning steps prescribed in the ST Publications referenced above, and/or use design systems, configuration adapters, commissioning tools, interface chips and /or gateways described therein, and/or integrate such components into their own products, perform each and every step of at least claim 1 of the '276 Patent, and make and use systems comprised and arranged as in claims 17 of the '276 Patent, and its dependent claims including without limitation claims 2, 3, and 23, literally and/or under the doctrine of equivalents, and thereby directly infringe the '276 Patent literally and/or under the doctrine of equivalents. In addition to the publications and videos cited above with respect to the ST Nucleo device, ST-INTL also provides (and on information and belief ST-US uses in connection with its demonstrations and marketing in the U.S.) numerous publications and videos more broadly directed at its product lines that similarly teach network designs implemented through NFC commissioning, using ST chips and components. *See, e.g.*, *ST Developers Conference 2016 - Dynamic NFC Tags to*

Simplify the Set-Up and Use of IoT Devices, https://www.slideshare.net/ST_World/track-4-session-5-st-dev-con-2016-simplifying-the-setup-and-use-of-iot-devices , at 6-9; *From ST Developers Conference 2016 - Smart Home: NFC Dynamic Tags*, https://www.youtube.com/watch?v=DUiXAweNAWA at 4:30-8:45; *UM2043 User Manual,* http://audentia-gestion.fr/STMicroelectronics/PDF/en.DM00280570.pdf at 11, 16, and 22; The *ST25NFC Tap* mobile application, available at https://play.google.com/store/apps/details?id=com.st.st25nfc&hl=en_US ; *ST Developers Conference 2016 - Simplifying Cloud Connectivity*https://www.slideshare.net/ST_World/track-2-session-3-st-dev-con-2016-simplifying-cloud-connectivity at 3-18 , NFC Technology is simplifying the IoT (Nov. 29, 2016), https://blog.st.com/nfc-technology-is-simplifying-the-iot/ ; *NFC-Near Field Communication*, https://www.st.com/content/ccc/resource/sales_and_marketing/presentation/product_presentation/group0/68/55/f1/7b/ce/07/4e/13/SensorExpo2018_NFC_Demo/files/SensorExpo2018_NFC_Demo.pdf/jcr:content/translations/en.SensorExpo2018_NFC_Demo.pdf at 5 ; *Simplifying Integration of Sensor Data Using the NFC Enabled Multi-Sensors node* (Hands-on Workshop Minneapolis MN 2019) https://www.st.com/content/dam/AME/2019/technology-tour-2019/minneapolis/presentations/T4S2_Minneapolis_STEVAL-SmarTAG1_J.Tran.pdf .

66. On information and belief, there are a substantial number of such direct infringers in the fields of lighting, heating, ventilation, and air conditioning (HVAC), and computer control industries, who purchase ST chips and components and/or components that incorporate ST chips and components, and practice the claimed methods and use the claimed systems in accordance with directions supplied by ST-INTL and ST-US, such as those instructions referenced above.

67. ST-INTL and ST-US actively, knowingly, and intentionally induced, and continues to actively, knowingly, and intentionally induce, infringement of the ’276 Patent by said direct infringers, by providing the above-referenced and other demonstrations, publications, and videos on NFC commissioning of connected devices, thereby teaching said direct infringers how to infringe the ’276 Patent, and encouraging them to do so, and by profiting therefrom by selling such direct infringers, directly and/or indirectly through distributors, large volumes of ST chips and components to implement what ST has thus taught, including without limitation design software, detailed documentation (User manuals, board manufacturing specifications (Gerber files), Bill of Materials (BOM), schematics), configuration adapters, commissioning tools, gateways, and chips therefor, which said direct infringers use to directly infringe, literally and/or under the doctrine of equivalents.

68. At least by reason of TDN’s demand letters as aforesaid, ST-INTL and ST-US each do the foregoing with knowledge of the ’276 Patent and its claims; with knowledge that said direct infringers will use, market, sell, and offer to sell such infringing methods and systems, and with the knowledge and intent to encourage and facilitate infringing sales and uses thereof through the creation and dissemination of promotional and marketing materials, instructional materials and videos, product manuals, and technical materials related thereto, including but not limited to those examples of such materials, videos, manuals, and software hereinabove described. Such creation and dissemination are carried out by ST-INTL and ST-US through its personnel and the st.com website, which ST-INTL owns and controls.

69. Accordingly, ST-INTL (and/or DOE-1) and ST-US are each liable for inducing infringement under 35 U.S.C. § 271(b).

70. TDN has suffered and continues to suffer damages including lost profits by reason of such induced infringement by ST-INTL, DOE-1, and ST-US, and is entitled to recover the same or in any case not less than a reasonable royalty with respect thereto. The damages for this and related forms of indirect infringement as alleged herein extends not only to the particular pre-built demonstration boards and systems such as the Nucleo evaluation boards and associated modules described herein, but to every instance in which downstream purchasers from ST have infringed and provided products that infringe or are readily used to infringe the '276 Patent by using or integrating ST chips and components and other convoyed items in combinations and procedures as taught by the aforementioned ST printed materials, demonstrations, and videos.

71. TDN has been and continues to be irreparably harmed by said induced infringement, in a manner not fully compensable by monetary damages, with the balance of hardships tipping strongly in TDN's favor such that TDN is entitled to an injunction.

72. ST-INTL's, DOE-1's, and ST-US's induced infringement of the '276 Patent has been and continues to be willful.

PRAYER FOR RELIEF

WHEREFORE, TDN respectfully requests that this Court enter judgment against defendants as follows:

a. adjudging that ST-US has directly infringed and/or that all defendants have each induced infringement of, literally or under the doctrine of equivalents, U.S. Patent No. 8,437,276 B2;

b. adjudging that each of said defendants' infringement has been willful;

c. awarding TDN the damages to which it is entitled under 35 U.S.C. § 284 for defendants' past infringement and any continuing or future infringement up until the

date defendants are finally and permanently enjoined from further infringement, including both compensatory damages and enhanced/treble damages for willful infringement, and ordering a full accounting of same;

d. awarding TDN temporary, preliminary, and permanent injunctive relief;

e. finding that this case is exceptional and awarding TDN its reasonable attorneys' fees under 35 U.S.C. § 285;

f. awarding TDN pre-judgment and post-judgment interest on its damages; and awarding TDN such other and further relief in law or equity that the Court deems just and proper.

Dated: July 13, 2020

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