(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 September 2020 (17.09.2020)

WIPO | PCT

(10) International Publication Number
WO 2020/185212 A1

(51) International Patent Classification:
G06K 19/077 (2006.01) *G06K 19/07* (2006.01)

(21) International Application Number:
PCT/US2019/021709

(22) International Filing Date:
11 March 2019 (11.03.2019)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **GOOGLE LLC** [US/US]; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US).

(72) Inventors: **HOGHOLT, Egil**; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US). **CAGGIONI, Lorenzo**; Porta Nuova Isola, Building C, Via Federico Confalonieri, 4, 20124 Milano (IT).

(74) Agent: **BATAVIA, Neil M.** et al.; Dority & Manning, P.A., P.O. Box 1449, Greenville, South Carolina 29602-1449 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) Title: ACTIVATABLE TRANSPONDER DEVICE COMPRISING A PHYSICALLY CONFIGURABLE ANTENNA

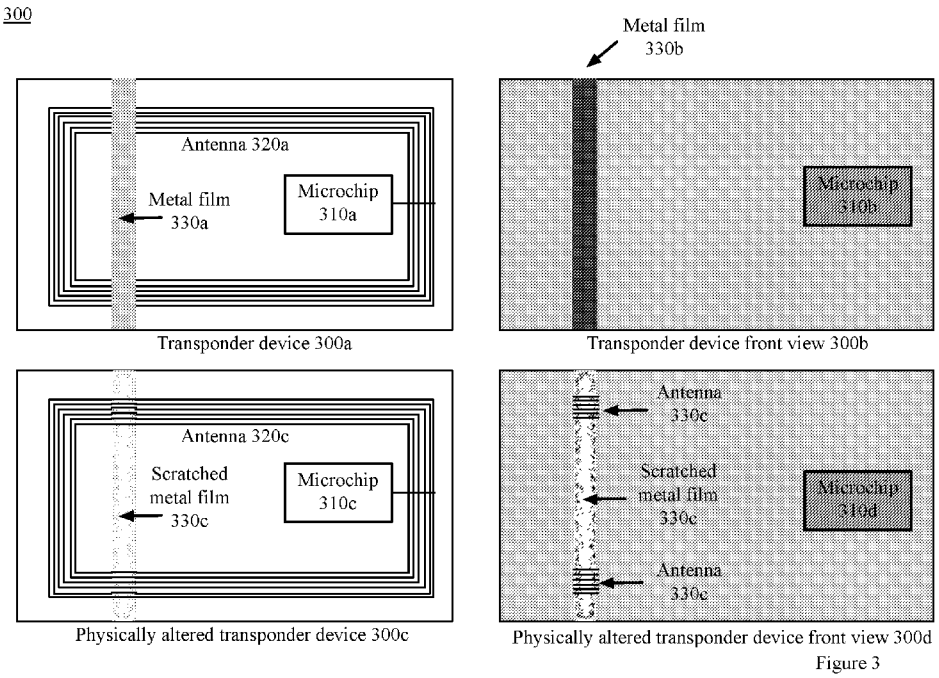


Figure 3

(57) **Abstract:** A method to manufacture a transponder device comprising a physical interface component. Producing transponder device comprising an electronic circuit and an antenna in contact with the electronic circuit. The electronic circuit is configurable to store data. Including a physical interface component in contact with the antenna, the antenna being configured to receive radio signals of a specified frequency when the physical interface component is activated. A transponder device is activatable via a physical interface component in contact with an antenna and comprises: an electronic circuit storing data; an antenna in contact with the electronic circuit, the antenna being configured to receive radio signals of a specified frequency; and a physical interface component in contact with the antenna that, when activated, prevents the antenna from receiving the radio signals of the specified frequency.

WO 2020/185212 A1

[Continued on next page]

UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

ACTIVATABLE TRANSPONDER DEVICE COMPRISING A PHYSICALLY CONFIGURABLE ANTENNA

TECHNICAL FIELD

[0001] The present disclosure relates generally to activating transponder devices for transmission of data, specifically to activating transponder devices by physically configuring transponder device antennas.

BACKGROUND

[0002] Conventional stored value cards comprise a single use code that can be used to access stored data from a server or from another computing device. In certain examples, scratching the card reveals the code and indicates to the user that the code has been previously used. However, conventional transponder devices that communicate data via wireless communication, for example, near field communication ("NFC") or Radio-frequency identification ("RFID"), are capable of data transmission upon manufacture. However, any previous use of the conventional transponder device is not evident to users. Further, conventional transponder devices are vulnerable to data theft by illegitimate computing devices that are placed within communication range of the respective conventional transponder device.

SUMMARY

[0003] Conventional technology does not enable manufacture of transponder devices that are in a disabled state and that are physically configurable for transmission of data to other computing devices.

[0004] Techniques herein provide computer-implemented methods to manufacture transponder devices comprising manufacture transponder devices, comprising: providing a transponder device comprising an electronic circuit and an antenna in contact with the electronic circuit, wherein the electronic circuit is configurable to store data, the antenna being configured to receive radio signals of a specified frequency; and providing an interface component in contact with the antenna to activate the antenna to receive the radio signals of the specified frequency.

[0005] In certain other example aspects described herein, a transponder device comprising an electronic circuit storing data, an antenna in contact with the electronic circuit, the antenna being configured to receive radio signals of a specified frequency, and an interface

component in contact with the antenna to activate the antenna to receive the radio signals of the specified frequency.

[0006] These and other aspects, objects, features, and advantages of the examples will become apparent to those having ordinary skill in the art upon consideration of the following detailed description of illustrated examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 is a block diagram depicting a system to activate a transponder device via a physically configurable antenna to enable transmission of data, in accordance with certain examples.

[0008] Figure 2 is a block flow diagram depicting a method to activate a transponder device via a physically configurable antenna to enable transmission of data, in accordance with certain examples.

[0009] Figure 3 is an example illustration of a transponder device comprising an antenna that is activatable via a removable metal film, in accordance with certain examples.

[0010] Figure 4 is an example illustration of a transponder device comprising an antenna that is activatable via a reversible mechanism, in accordance with certain examples.

[0011] Figure 5 is a block flow diagram depicting a method for manufacturing a transponder device comprising an antenna that is irreversibly activatable via physical alteration, in accordance with certain examples.

[0012] Figure 6 is a block flow diagram depicting a method for manufacturing a transponder device comprising an antenna that is reversibly activatable via physical alteration, in accordance with certain examples.

[0013] Figure 7 is a block diagram depicting a computing machine and module, in accordance with certain examples.

DETAILED DESCRIPTION OF EXAMPLES

Overview

[0014] The examples described herein provide computer-implemented techniques for activating a transponder device via a physically configurable antenna to enable transmission of data.

[0015] In an example, a transponder device stores data comprising a transponder device identifier, and is configured to communicate via near field communication ("NFC") or radio-frequency identification ("RFID") with a reader computing device. In certain examples, the

transponder device comprises a card, for example, an identification card comprising a user identifier or a payment card comprising account data. In other examples, the transponder device comprises a key fob, a wearable device, or other object. An example transponder device comprises an electronic circuit and an antenna that are configured to communicate data to a reader computing device via NFC or RFID in response to a user tapping the transponder device to the reader computing device. Tapping the transponder device to the reader computing device comprises moving the transponder device and/or the reader computing device such that the transponder device and the reader computing device are within a predefined proximity necessary to communicate data from the transponder device to the reader computing device via NFC or RFID. In an example, in response to tapping the transponder device to the reader computing device, the transponder device establishes an NFC communication channel between the transponder device and the reader computing device and transmits the transponder device identifier to the reader computing device via the established NFC communication channel. In another example, in response to tapping the transponder device to the reader computing device, the transponder device establishes an RFID communication channel between the transponder device and the reader computing device and transmits the transponder device identifier to the reader computing device via the established RFID communication channel.

[0016] In an example, a user obtains a disabled transponder device. In an example, the disabled transponder device is unable to communicate data stored on the transponder device to a reader computing device in response to a tap of the transponder device to the reader computing device because the antenna is disabled. An example disabled transponder is unable to receive radio signals from the reader computing device and/or is unable to transmit the data stored on the transponder device because the antenna is not able to receive and/or transmit radio signals of a specific frequency intelligible to the reader computing device. In an example, the disabled transponder computing device comprises an antenna that is not in a proper geometric configuration to transmit data via an NFC communication channel, an antenna that comprises a short circuit, an antenna comprising one or more regions of the antenna that are physically disconnected from the rest of the antenna, or an antenna that is configured such that it is otherwise unable to transmit data stored on the transponder device to the reader computing device via an NFC communication channel. In an example, the disabled transponder device antenna comprises a removable metal substance in contact with one or more regions of the antenna that are in contact with a surface of the transponder device that causes a short circuit of the antenna until removed by a user. In another example, the disabled transponder device antenna is not in a specified geometric configuration and is connected to a physical mechanism

that a user may activate to cause the antenna to move into the specified geometric configuration. In certain examples, a manufacturing system produces the disabled transponder device in the disabled state. In certain examples, the manufacturing system sends the disabled transponder device to a distribution system for distribution to a user. In an example, the user acquires the disabled transponder device from the distribution system.

[0017] The user physically alters the disabled transponder device antenna to enable transmission of data. In an example, physically altering the transponder device antenna comprises scratching or otherwise removing a metal substance that is in contact with one or more regions of the disabled transponder device antenna that are exposed to a surface of the transponder device. In this example, the user removes one or more short circuits to the antenna by removing the metal substance in contact with the one or more regions of the disabled transponder device antenna, enabling the transponder device for transmission of data. In another example, the disabled transponder device antenna is out of configuration and is physically connected to a mechanism on the transponder device which the user may activate to cause the antenna to be placed in proper geometric configuration for communication of data via an NFC communication channel to a reader computing device. In an example, the mechanism is reversible and the user may deactivate the mechanism subsequent to activating the mechanism to cause the antenna to again be placed out of configuration. In another example, the mechanism is irreversible and the user can only activate the mechanism a single time. In an example, the mechanism comprises one or more of a spring, a push button, a sliding mechanism, a winding mechanism, a dial, a bending mechanism, or other mechanism that is able to physically alter a geometric configuration of the antenna to cause the antenna to enter a specified geometric configuration required for transmission of data to a reader computing device via an NFC communication channel. In another example, the user physically alters a transponder device antenna to disable transmission of data and then later physically alters the transponder device antenna to enable transmission of data.

[0018] In an example, in response to the user physically activating the transponder device antenna by removing a metal substance in contact with one or more regions of the antenna or by activating a physical mechanism to cause the antenna to enter a specified geometric configuration, the transponder device is configured for transmission of data via an NFC communication channel to a reader computing device. In an example, an operator of a reader computing device configures the reader computing device to receive a transmission of data from a transponder device and the user taps the enabled transponder device to the reader computing device. Tapping the transponder device to the reader computing device comprises

moving the transponder device and/or the reader computing device such that the transponder device and the reader computing device are within a predefined proximity necessary to establish an NFC communication channel between the two devices. In an example, in response to tapping the transponder device to the reader computing device, the transponder device transmits the transponder device identifier to the reader computing device via the established NFC communication channel.

[0019] In an example, in response to receiving the transponder device identifier, the reader computing device conducts one or more processes and/or transmits the transponder device identifier to a data processing system via a network to conduct one or more processes. For example, the reader computing device controls access to a restricted physical area and/or access to restricted data and compares the received transponder device identifier to a list of known transponder device identifiers and corresponding access privileges and/or data to which a respective user associated with each corresponding transponder device identifier may access. In another example, the reader computing device comprises a data processing terminal, the received transponder device identifier comprises a user account number, and the reader computing device transmits a processing request to a data processing system. An example data processing system comprises one or more of an issuer system, an acquirer system, or other system that conducts one or more processes based on the transponder device identifier. For example, the transponder device identifier may be a user payment account number, a library account number, a data account number, a transit account number, an access account number, a stored value account number, a bank account number, a credit account number, a store account number, a loan account number, or other appropriate account number of the user. In yet another example, the reader computing device controls power to a device and the user powers the device by providing the proper transponder device identifier by tapping the transponder device to the reader computing device upon successful verification of the transponder device identifier by the reader computing device. In yet another example, the reader computing device controls access to operations of a device and the user is granted access to request specific operations of the device by providing the proper transponder device identifier by tapping the transponder device to the reader computing device upon successful verification of the transponder device identifier by the reader computing device.

[0020] The systems and methods described herein provide a disabled transponder device that may be enabled for data transmission via physical interaction of a user with an antenna of the transponder device. As such the systems and methods described herein may prevent unwanted data transmission or data theft from the transponder device since the

transponder device remains in a disabled state until a user physically interacts with the antenna to either reversibly or irreversibly configure the antenna for data transmission. The systems and methods described herein provide a disabled transponder device comprising a metal substance across at least one region of the antenna of the disabled transponder device such that a user may remove the metal substance to irreversibly enable the transponder device. As the absence of the removed metal substance is visible to users, the systems and methods described herein enable users to know whether transponder devices have been enabled for transmission of data. The systems and methods described herein provide a disabled transponder device comprising a reversible mechanical mechanism connected to an antenna such that a user may activate the mechanical mechanism to move the antenna into a required geometric configuration to enable the transponder device and reverse the mechanical mechanism to move the antenna into an unaligned state to disable the transponder device. As such, the reversible mechanism increases security of data by enabling users to control when a transponder device is enabled for transmission of data.

Example System Architecture

[0021] Turning now to the drawings, in which like numerals indicate like (but not necessarily identical) elements throughout the figures, examples are described in detail.

[0022] Figure 1 is a block diagram depicting a system 100 to activate a transponder device via a physically configurable antenna to enable transmission of data, in accordance with certain examples. As depicted in Figure 1, the system 100 includes transponder device 110 and network computing devices 130, 140, 150, and 160 that are configured to communicate with one another via one or more networks 120. In some examples, a user associated with a device must install an application and/or make a feature selection to obtain the benefits of the techniques described herein.

[0023] In examples, the network 120 can include a local area network ("LAN"), a wide area network ("WAN"), an intranet, an Internet, storage area network ("SAN"), personal area network ("PAN"), a metropolitan area network ("MAN"), a wireless local area network ("WLAN"), a virtual private network ("VPN"), a cellular or other mobile communication network, Bluetooth, Bluetooth low energy ("BLE"), near field communication ("NFC"), ultrasound communication, or any combination thereof or any other appropriate architecture or system that facilitates the communication of signals, data, and/or messages. Throughout the discussion of examples, it should be understood that the terms "data" and "information" are used interchangeably herein to refer to text, images, audio, video, or any other form of information that can exist in a computer-based environment.

[0024] Each network computing device 130, 140, 150, and 160 includes a device having a communication module capable of transmitting and receiving data over the network 120. For example, each network computing device 110, 130, and 140 can include a server, desktop computer, laptop computer, tablet computer, a television with one or more processors embedded therein and / or coupled thereto, smart phone, handheld computer, personal digital assistant ("PDA"), or any other wired or wireless, processor-driven device. In the example depicted in Figure 1, the network computing devices 130, 140, 150, and 160 are operated by reader computing device 130 operators, data processing system 140 operators, manufacturer system 150 operators, and distribution system 160 operators, respectively.

[0025] An example transponder device 110 comprises a physical interface component 111, an antenna 117, and a electronic circuit 119. In certain examples, the transponder device 110 further comprises a data storage unit 113 and/or an NFC controller 115. In other examples, the transponder device 110 further comprises a data storage unit 113 andor an RFID controller 115. In an example, a transponder device 110 stores data comprising a transponder device 110 identifier and is configured to communicate via an NFC communication channel with a reader computing device 130 in response to a user 101 tapping the transponder device 110 to the reader computing device 130. In certain examples, the transponder device 110 comprises a card, for example, an identification card or payment card and the transponder device 110 identifier comprises a user identifier or account data. In other examples, the transponder device 110 comprises a key fob, a wearable device, or other object.

[0026] In an example, the physical interface component 111 enables the user 101 to interact with the transponder device 110 to configure an antenna 117 to receive radio signals of a specified frequency from a reader computing device 130 to enable transmission of data from the transponder device 110 to the reader computing device 130 via an NFC or RFID communication channel. In an example, the physical interface component 111 comprises a removable metal substance that is in contact with one or more regions of the transponder device 110 antenna 117 on a surface of the transponder device 110. An example removable metal substance comprises a metal film or other substance comprising metal that causes one or more short circuits along the one or more regions of the transponder device 110 antenna 117 with which the metal substance is in contact. In an example, the user 101 interacts with the physical interface component 111 comprising the metal substance by scratching the metal substance, peeling off the metal substance, or otherwise removing the metal substance to remove the one or more short circuits to enable the antenna 117 to receive radio signals of the specified

frequency from the reader computing device 130 during a tap of the transponder device 110 to the reader computing device 130.

[0027] In another example, the physical interface component 111 comprises a physical mechanism in contact with the transponder device 110 antenna 117. An example physical mechanism comprises one or more of a spring, a push button, a sliding mechanism, a winding mechanism, a dial, a bending mechanism, or other mechanism that is able to physically alter a geometric configuration of the antenna to cause the antenna to enter a specified geometric configuration required for transmission of data to a reader computing device 130 via an NFC or RFID communication channel. In certain examples, the physical mechanism is reversible and the user 101 can activate and then subsequently deactivate the mechanism, returning the antenna 117 to a state in which it is not in the specified geometric configuration. In certain other examples, the physical mechanism is irreversible and once the user 101 activates the mechanism, the antenna 117 remains in the specified geometric configuration and the user 101 is unable to deactivate the mechanism to cause the antenna 117 to return to the state in which it is not in the specified geometric configuration. In an example, the user 101 interacts with the physical interface component 111 by applying a force (pressing) against a region of transponder device 110 to cause the antenna 117 to cause the antenna to enter the specified geometric configuration from a state in which it is not in the specified geometric configuration. In this example, the user 101 releases the force against the region of the transponder device 110 to cause the antenna 117 to revert to its previous position that is not in the specified geometric configuration. In another example, the user 101 flips a switch, presses a button, winds a dial, bends a region of the transponder device 110, removes a portion of the transponder device 110, connects a separated region of the transponder device 110 to the rest of the transponder device 110, or otherwise activates the physical mechanism to cause the antenna 117 to enter the specified geometric configuration. In certain examples, wherein the physical mechanism is reversible, the user 101 interacts with the physical interface component 111 to cause the antenna 117 to transition from the specified geometric configuration to a configuration that is not the specified geometric configuration.

[0028] In certain examples, the transponder device comprises a data storage unit 113 comprising a local or remote data storage structure accessible to the transponder device 110 suitable for storing information. In an example, the data storage unit 115 stores encrypted information. In an example, the data storage unit 113 stores a transponder device 110 identifier. For example, the transponder device 110 identifier comprises a sequence or series of alphanumeric and/or symbolic characters. In an example, the transponder device 110 identifier

corresponds to a user 101 account associated with a data processor system 140. In an example, the data storage unit 113 stores a transponder device 110 identifier.

[0029] In certain examples, the transponder device 110 comprises a near-field communication ("NFC") or radio-frequency identification ("RFID") controller 115 that is capable of sending and receiving data, performing authentication and ciphering functions, and directing how the transponder device 110 will listen for transmissions from a reader computing device 130 or configuring the transponder device into various power-save modes according to NFC-specified or RFID-specified procedures. In another example, the transponder device 110 comprises a Bluetooth controller, Bluetooth low energy ("BLE") controller, or a Wi-Fi controller capable of performing similar functions. An example NFC controller 115 communicates with the data storage unit 113 and is capable of sending and receiving data over a wireless, NFC communication channel. In another example, an RFID controller performs similar functions as the NFC controller 115 using RFID protocols. In an example, the NFC controller 115 activates the antenna 117 to create a wireless communication channel between the transponder device 110 and the reader computing device 130. For example, the transponder device 110 communicates with the reader computing device 130 via the antenna 117. In an example, when the transponder device 110 has been activated, the NFC controller 115 polls through the antenna 117 a radio signal, or listens for radio signals from the reader computing device 130.

[0030] In an example, the antenna 117 is a means of communication between the transponder device 110 and a reader computing device 130. In an example, an NFC controller 115 outputs through the antenna 117 a radio signal, or listens for radio signals from the reader computing device 130 through the antenna 117. In another example, an RFID controller outputs through the antenna 117 a radio signal, or listens for radio signals from the reader computing device 130 through the antenna 117. In another example, a Bluetooth controller, a BLE controller, or a Wi-Fi controller is used instead of an NFC controller 115 to output a radio signal through the antenna 117 or to listen for radio signals from the reader computing device 130 through the antenna 117. In an example, the antenna 117 comprises multiple concentric circles, multiple concentric ovals, or multiple concentric polyhedrons. For example, an antenna 117 comprises six concentric rectangles. In an example, the antenna 117 is embedded within transponder device 110. In another example, one or more regions of the antenna 117 is exposed on a surface of the transponder device 110 and a remainder of the antenna 117 is embedded within the transponder device 110. In an example, the antenna 117 is connected to an electronic circuit 119. In an example, the antenna 117 receives a radio signal of a specific

frequency from a reader computing device 130 when the transponder device 110 is tapped to the reader computing device 130 and the antenna 117 must be in a specific geometric configuration to receive the radio waves of the specific frequency. In an example, the size of the antenna 117 is proportional to the specific frequency of the radio waves that the antenna 117 is able to receive. An antenna 117 that is not configured in the specific geometric configuration or has been moved out of the specific geometric configuration is not able to receive the radio waves of the specific frequency emitted by the reader computing device 130. In an example, the antenna 117 is not placed in the specific geometric configuration until the user 101 interacts with the transponder device 110 via the physical interface component 111 of the transponder device 110, which is coupled to the antenna 117. In an example, the antenna 117 transitions from being in the specific geometric configuration to not being in the specific geometric configuration in response to the user 101 interacting with the transponder device 110 via the physical interface component 111.

[0031] In an example, the electronic circuit 119 is connected to the antenna 117. The electronic circuit 119 receives the radio signal of the predetermined frequency emitted by the reader computing device 130 via the antenna 117 when the transponder device 110 is tapped to the reader computing device 130. In an example, the electronic circuit 119 comprises a microchip. The electronic circuit 119 is activated by the signal received from the reader via the antenna 117. Changing the load in the electronic circuit 119 generates a change in the current in the electronic circuit 119. The change in the current propagates a change in the voltage on the reader computing device 130. The rate of change of current in the electric circuit 119 transmits the data stored in the memory of the electric circuit back to the reader computing device 130. In some examples, some or all of the functions of the data storage unit 113 are implemented by means of the electronic circuit 119 instead.

[0032] An example reader computing device 130 comprises a user interface 131, a data storage unit 133, an NFC controller 135, an antenna 137, and an application 139. In an example, the reader computing device 130 comprises a data processing device, for example, a point of sale terminal that receives a transponder device 110 identifier and transmits a processing authorization request comprising the transponder device 110 identifier to a data processing system 140 via a network 120. In an example, the reader computing device 130 comprises a computing device that determines whether to open a door, gate, or other access to a restricted area according to the received transponder device 110 identifier. In other examples, the reader computing device 130 comprises any other computing device that receives, via an NFC communication channel or an RFID communication channel, a received transponder

device 110 identifier and conducts a process, or receives the transponder device 110 identifier via the NFC communication channel or via the RFID communication channel and transmits the received transponder device 110 identifier to a data processing system 140 or other system via a network 120 to conduct a process. An example reader computing device 130 emits a radio signal comprising a predetermined frequency via the antenna 137 that activates electronic circuit 119 of transponder device 110 when the transponder device 110 is tapped to the reader computing device 130. In an example, the reader computing device 130 receives a modified radio signal emitted by the transponder device 110 and then determines a difference between the radio signal and the modified radio signal to determine a transponder device 110 identifier.

[0033] In an example, the user interface 131 enables a reader computing device 130 operator to interact with the reader computing device 130. For example, the user interface 131 may be a touch screen, a voice-based interface, or any other interface that allows the reader computing device 130 operator to provide input and receive output from an application 139 on the reader computing device 130. In an example, the reader computing device 130 operator interacts via the user interface 131 with the application 139 to configure the reader computing device 130 to emit radio signals of a specified frequency so that tapping the transponder device 110 to the reader computing device 130 results in reception of the transponder device 110 identifier by the reader computing device 130 via an NFC communication channel.

[0034] In an example, the data storage unit 133 comprises a local or remote data storage structure accessible to the reader computing device 130 suitable for storing information. In an example, the data storage unit 135 stores encrypted information, such as HTML5 local storage. In an example, the reader computing device 130 stores a list of known transponder device 110 identifiers and data associated with each known transponder device 110 in the data storage unit 133.

[0035] In an example, the NFC controller 135 is capable of sending and receiving data, performing authentication and ciphering functions, and directing how the reader computing device 130 will listen for transmissions from the transponder device 110 or configuring the reader computing device 130 into various power-save modes according to NFC-specified procedures. In another example, an RFID controller of the reader computing device 130 is capable of sending and receiving data, performing authentication and ciphering functions, and directing how the reader computing device 130 will listen for transmissions from the transponder device 110 or configuring the reader computing device 130 into various power-save modes according to RFID-specified procedures. In another example, the reader computing device 130 comprises a Bluetooth controller, Bluetooth low energy ("BLE") controller, or a

Wi-Fi controller capable of performing similar functions. An example NFC controller 135 communicates with the application 139 and is capable of sending and receiving data over a wireless, NFC communication channel. In another example, the RFID controller of the reader computing device 130 communicates with the application 139 and is capable of sending and receiving data over a wireless, RFID communication channel. In another example, a Bluetooth controller, BLE controller, or Wi-Fi controller performs similar functions as the NFC controller 135 using Bluetooth, BLE, or Wi-Fi protocols. In an example, the NFC controller 135 or RFID controller of the reader computing device 130 activates the antenna 137 to create a wireless communication channel between the reader computing device 130 and the transponder device 110. For example, the reader computing device 130 communicates with the transponder device 110 via the antenna 137. In an example, when the reader computing device 130 has been activated, the NFC controller 135 or RFID controller of the reader computing device 130 polls through the antenna 137 a radio signal, or listens for radio signals from the transponder device 110.

[0036] In an example, the antenna 137 is a means of communication between the reader computing device 130 and the transponder device 110. In an example, the NFC controller 135 outputs through the antenna 137 a radio signal, or listens for radio signals from the transponder device 110. In another example, an RFID controller of the reader computing device 130 outputs through the antenna 137 a radio signal, or listens for radio signals from the transponder device 110. In another example a Bluetooth controller, a BLE controller or a Wi-Fi controller is used.

[0037] In an example, the application 139 is a program, function, routine, applet, or similar entity that exists on and performs its operations on the receiver computing device 130. In certain examples, the receiver computing device 130 operator must install the application 139 and/or make a feature selection on the receiver computing device 130 to obtain the benefits of the techniques described herein. In an example, the receiver computing device 130 operator may access the application 139 on the receiver computing device 130 via the user interface 131. In an example, the application 139 may be associated with a data processing system 140. In an example, the application 139 comprises a service application, a point of sale device application, an application that controls access to restricted physical areas and/or restricted data, or other application 139 that receives a transponder device 110 identifier and conducts a process, provides a service, or provides an output based on the transponder device 110 identifier or requests another device or system to conduct a process provide a service, or provide an output.

[0038] In an example, reader computing device 130 communicates with the data processing system 140 to process a service request. In certain examples, the service request comprises a transaction authorization request. An example data processing system 140, or service processing system, comprises a data storage unit 145 and a processing component 147.

[0039] In an example, the data storage unit 145 comprises a local or remote data storage structure accessible to the data processing system 140 suitable for storing information. In an example, the data storage unit 145 stores encrypted information, such as HTML5 local storage. In an example, the data storage unit 145 comprises a records database comprising transponder device 110 identifiers and associated user 101 account data corresponding to each of the respective transponder device 110 identifiers.

[0040] In an example, the processing component 147 receives service request details from a reader computing device 130. In another example, the processing component 147 receives service request details from the reader computing device 130 and information associated with a user 101 account received from the transponder device 110 via an NFC communication channel. In an example, the processing component 149 transmits a service authorization request to an issuer system through an acquirer system or other appropriate financial institution associated with the user 101 account information. In an example, the data processing system 140 comprises an issuer system or an acquirer system and the processing component 149 receives the service authorization request from the reader computing device 130 or from another data processing system 140. An example service authorization request may comprise account information associated with the reader computing device 130, user 101 account information, and an amount associated with the service authorization request. In an example, after the issuer system processes the service authorization request, the processing component 147 receives an approval or denial of the service authorization request from the issuer system over the network 120. In an example, the processing component 147 transmits a receipt to the reader computing device 130 comprising a summary of the service request. In other examples, the processing component 147 processes a service request and transmits, via the network 120, the receipt to the receiver computing device 130 comprising a summary of the service request.

[0041] An example manufacturer system 150 comprises a data storage unit 155 and a manufacturing component 157. In an example, the manufacturer system 150 manufactures transponder devices 110. In an example, the manufacturer system 150 manufactures one or more disabled transponder computing devices as described herein. In an example, the manufacturer system 150 receives, via the network 120, an order to produce one or more

disabled transponder devices 110 each comprising a stored respective transponder device 110 identifier. In an example, the manufacturer system 150 receives the order from the data processing system 140. In certain examples, the data processing system 140 comprises the manufacturer system 150. In an example, the manufacturer system 150 produces one or more disabled transponder devices for an employer, for a merchant system, or for another appropriate system. In an example, the manufacturer system 150 manufactures a disabled transponder device 110 comprising the transponder device 110 identifier stored on the transponder device 110. In another example, the manufacturer system 150 manufactures a disabled transponder device 110 that does not comprise the transponder device 110 identifier stored on the transponder device 110 and a distribution system 160, merchant system, or other system configures the disabled transponder device 110 with a transponder device 110 identifier. In an example, the manufacturer system 150 generates transponder device 110 identifiers in sequential order, via a random number generator, or otherwise generates transponder device identifiers 110 to store on transponder devices 110. In an example, the manufacturer system 150 ships or otherwise sends manufactured disabled transponder devices 110 to a distribution system 160 for distribution to one or more users 101.

[0042] In an example, the data storage unit 155 comprises a local or remote data storage structure accessible to the manufacturer system 150 suitable for storing information. In an example, the data storage unit 155 stores encrypted information, such as HTML5 local storage. In an example, the data storage unit 155 stores transponder device 110 identifiers.

[0043] In an example, the manufacturing component 157 controls a process to manufacture disabled transponder devices 110 as described herein. In an example, the manufacturing component 157 receives an order to produce a disabled transponder device 110. In an example, the manufacturing component 157 produces a transponder device 110 comprising an antenna 117 that is exposed to a surface of the transponder device 110 at one or more regions and applies a physical interface component 111 comprising a metal substance to the one or more regions of the antenna 117 to disable the transponder computing device 110 by creating a short circuit across the one or more regions of the antenna 117. In another example, the manufacturing component 157 produces a disabled transponder device 110 comprising an antenna 117 that is not in a specified geometric configuration required for transmission of data to a reader computing device 130 via an NFC communication channel and integrates a physical interface component 111 into the transponder device 110 that enables a user 101 activate the physical interface component 111 to cause the antenna 117 to enter the specified geometric configuration. In this other example, physical interface component 111

comprises a physical mechanism. In certain examples, the manufacturing component 157 integrates a reversible physical interface component 111 into or onto the transponder device 110 that enables the user 101 disable the transponder device 110 by causing the antenna 117 to transition from the specified geometric configuration to a configuration that is not the specified geometric configuration. In other examples, the manufacturing component 157 integrates an irreversible physical interface component 111 into or onto the transponder device 110 that does not allow the user 101 to disable the transponder device 110 after enabling the transponder device via the same physical interface component 111.

[0044] An example distribution system 160 receives one or more disabled transponder devices 110 produced by the manufacturer system 150 and distributes the one or more disabled transponder devices 110 to one or more users 101. In an example, the distribution system comprises an employer, a merchant, or other system that distributes transponder devices 110 to users 110. In an example, the distribution system 160 is associated with the data processing system 140 and/or reader computing device 130. For example, the distribution system 160 comprises an employer system that distributes transponder devices 110 for use by employees at a reader computing device 130 of the employer. In another example, the distribution system 160 comprises a merchant system. For example, a merchant system provides transponder devise 110 comprising transponder device 110 identifiers associated with stored value accounts to users 101 in exchange for payment.

[0045] In examples, the network computing devices and any other computing machines associated with the technology presented herein may be any type of computing machine such as, but not limited to, those discussed in more detail with respect to Figure 7. Furthermore, any functions, applications, or components associated with any of these computing machines, such as those described herein or any others (for example, scripts, web content, software, firmware, hardware, or modules) associated with the technology presented herein may by any of the components discussed in more detail with respect to Figure 8. The computing machines discussed herein may communicate with one another, as well as with other computing machines or communication systems over one or more networks, such as network 120. The network 120 may include any type of data or communications network, including any of the network technology discussed with respect to Figure 7.

Example Processes

[0046] The example methods illustrated in Figures 2 and 6 are described hereinafter with respect to the components of the example operating environment 100. The example methods of Figures 2 and 5-6 may also be performed with other systems and in other

environments. The operations described with respect to any of the Figures 2 and 5-6 can be implemented as executable code stored on a computer or machine readable non-transitory tangible storage medium (e.g., floppy disk, hard disk, ROM, EEPROM, nonvolatile RAM, CD-ROM, etc.) that are completed based on execution of the code by a processor circuit implemented using one or more integrated circuits; the operations described herein also can be implemented as executable logic that is encoded in one or more non-transitory tangible media for execution (e.g., programmable logic arrays or devices, field programmable gate arrays, programmable array logic, application specific integrated circuits, etc.).

[0047] Figure 2 is a block diagram depicting a method 200 for activating a transponder device via a physically configurable antenna to enable transmission of data, in accordance with certain examples. The method 200 is described with reference to the components illustrated in Figure 1. In an example, a user 101 scratches off or otherwise removes a metal substance from an antenna 117 of the transponder device 110 to enable the transponder device 110 for transmission of data to a reader computing device 130. In another example, a user 101 activates a mechanism connected to the antenna 117 of the transponder device 110 to cause the antenna 117 to enter a specified geometric configuration, enabling the transponder device 110 for transmission of data to a reader computing device 130.

[0048] In block 210, the user 101 obtains a disabled transponder device 110. In an example, a manufacturer system 150 manufactures a transponder device 110 according to the examples described in Figures 5 and 6. In an example, the user 101 obtains the disabled transponder device 110 from a distribution system 160. For example, the user 101 purchases the disabled transponder device 110 from a distribution system comprising a merchant system. In another example, the user 101 is issued the disabled transponder device by a distribution system 160 comprising an employer of the user 101. In another example, the user 101 otherwise obtains the disabled transponder device 110.

[0049] In an example, the disabled transponder device 110 comprises a card, for example, an identification card comprising a user 101 identifier or a payment card comprising a payment account identifier. In another example, the disabled transponder device 110 comprises a key fob, a wearable device, or other object. The disabled transponder device 110 is unable to communicate data stored on the transponder device 110 to a reader computing device 130 because the antenna 117 of the transponder device 110 is not able to receive and/or transmit radio signals of a specific frequency intelligible to the reader computing device 130. In an example, the disabled transponder device 110 comprises an antenna 117 that is not in a proper geometric orientation to transmit the stored data via an NFC communication channel,

an antenna 117 that comprises a metal substance in contact with the antenna 117 causing a short circuit across one or more regions of the antenna 117, an antenna 117 comprising one or more regions of the antenna 117 that are physically disconnected from the antenna 117, or an antenna that is otherwise configured such that it is unable to receive radio signals from the reader computing device 130 and/or transmit the stored data to the reader computing device 130 via an NFC communication channel.

[0050] In an example, the disabled transponder device 110 antenna 117 comprises a removable metal substance in contact with one or more regions of the antenna 117 that causes a short circuit of the antenna until physically removed by a user 101. In an example, the antenna 117 comprising the removable metal substance in contact with one or more regions of the antenna 117 is not in a specified geometric configuration to enable communication with a reader computing device 130 via an NFC communication channel until a user 101 physically removes the removable metal substance. In one example, the metal substance comprises a metal film or metal tape. In another example, the metal substance comprises a plastic film comprising a metal vaporization. In an example, the user 101 removes the metal substance by scratching it off, peeling it off, or otherwise removes the metal substance from contact with the one or more regions of the antenna 117. In an example, the metal substance comprises tin or any other metal that is able to conduct electricity and/or cause a short circuit when in contact with the antenna 117.

[0051] In another example, the disabled transponder device 110 antenna 117 is out of the specified geometric configuration to enable communication with the reader computing device 130 and is physically connected to a mechanism on the transponder device 110 that the user may activate to cause the antenna 117 to be placed in the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel. In an example, the mechanism comprises one or more of a spring, a push button, a sliding mechanism, a winding mechanism, a dial, a bending mechanism, or other mechanism that, when activated by the user 101, is able to physically alter a geometric configuration of the antenna 117 to cause the antenna 117 to enter the specified geometric configuration required for communication with the reader computing device 130.

[0052] In block 220, the user 101 physically alters the transponder device 110 antenna 117 to enable transmission of data. For example, the user 101 scratches off, peels off, or otherwise removes a metal substance that is in contact with one or more regions of the antenna 117 to remove a short circuit across the antenna 117 so that the antenna 117 is able to communicate with the reader computing device 130 when tapped to the reader computing

device 130. In another example, a particular region of the antenna 117 is bent and the user 101 presses against a particular region of the transponder device 117 in contact with the particular region of the antenna 117 to cause the particular region of the antenna 117 to move into a position such that the antenna 117 is in the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel. In another example, the user 101 presses a button, slides a switch, or winds a dial that causes the antenna 117 to move into the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel. In yet another example, a region of the antenna 117 is separated from the rest of the antenna 117 and the user 101 connects the separated region of the antenna 117 to the rest of the antenna 117. For example, the transponder device 110 comprises a separable region of the transponder device 110 comprising a region of the antenna 117 and the user 101 joins the separable region of the transponder device 110, which causes the complete antenna 117 to be in the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel. In yet another example, the transponder device 110 comprising the antenna 117 is folded and the user 101 unfolds the transponder device 110, causing the antenna 117 to move into the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel. In another example, the user 101 otherwise interacts with the transponder device 110 to physically move the antenna 117 into a position such that the antenna 117 is in the specified geometric configuration for communication with the reader computing device 130 via an NFC communication channel.

[0053] Figure 3 is an example illustration of a transponder device comprising an antenna that is activatable via a removable metal film, in accordance with certain examples. Figure 3 illustrates a transponder device 300a, a transponder device front view 300b, a physically altered transponder device 300c, and a physically altered transponder device front view 300d. For example, Figure 3 illustrates two cross sectional views of the transponder device 110 described in Figure 1, transponder device 300a at a time before a user scratches or otherwise removes metal film 330a and physically altered transponder device 300c at a time after the user scratches or otherwise removes metal film 330a. Figure 3 also illustrates two corresponding front views of the transponder device 110 are also shown, transponder device front view 300b at the time before a user scratches or otherwise removes metal film 330b and physically altered transponder device front view 300d at the time after the user scratches or otherwise removes metal film 330b. Transponder device 300a comprises antenna 320a that is in contact with microchip 310a and metal film 330a that is in contact with two regions of the

antenna 320a. In an example, the user scratches or otherwise removes metal film 330a, resulting in physically altered transponder device 330c comprising scratched metal film 330c. In an example, scratched metal film 330c is not in contact with antenna 320c or is no longer causing a short circuit on antenna 320c and antenna 320c is able to receive signals of a specified frequency from a reader computing device 130 as described in Figures 1-2. As illustrated in transponder device front view 300b and physically altered transponder device front view 300d, the user scratches the metal film 330b and the scratched film 330c visibly indicates that the transponder device has been activated and possibly used. In an example, after the user scratches or otherwise removes the metal film 330a/330b, the antenna 320b/320d is exposed to an environment around the transponder device 330b/330d. In certain examples, the user removes enough of the metal film 330a/330b such that one concentric circuit of the antenna 320a/320b is no longer in contact with the metal film 330a/330b and the transponder device 300b/300d is enabled to communicate with a reader computing device. In another example, the user removes enough of the metal film 330a/330b such that all concentric circuits of the antenna 320a/320b are no longer in contact with the metal film 330a/330b and the transponder device 300b/300d is enabled to communicate with a reader computing device.

[0054] Figure 4 is an example illustration of a transponder device comprising an antenna that is activatable via a reversible mechanism, in accordance with certain examples. Figure 4 illustrates a transponder device 400a and a transponder device front view 400b. For example, Figure 4 illustrates a cross sectional view of the transponder device 110 described in Figure 1 and a frontal view of the transponder device 110 described in Figure 1. In an example transponder device front view 400b, the reversible mechanism 430b and microchip 410b are visible to the user 101 but the antenna 420a is not visible to the user 101. In an example, transponder device 400a comprises antenna 420a that is in contact with microchip 410a and reversible mechanism 430a that is connected to the antenna 420a. In an example, the antenna 420 is not in a specified geometric configuration to enable communication between the transponder device 400a and a reader computing device and the user activates, initiates, or otherwise engages the reversible mechanism 430a, which causes the antenna 420 to enter the specified geometric configuration.

[0055] In an example, before the user activates the reversible mechanism 430a, the antenna 420a is not able to receive signals of the specified frequency from a reader computing device 130 as described in Figures 1-2. In this example, after the user activates the reversible mechanism 430a, the antenna 420a enters the specified geometric configuration and is able to receive signals of the specified frequency from a reader computing device 130 as described in

Figures 1-2. In an example, the reversible mechanism 430a comprises one or more of a spring, a push button, a sliding mechanism, a winding mechanism, a dial, a bending mechanism, or other mechanism. In an example, the reversible mechanism 430a, when activated by the user 101, physically alters a geometric configuration of the antenna to cause the antenna to enter a specified geometric configuration required for transmission of data to the reader computing device 130 via an NFC communication channel or other appropriate mechanism able to cause the antenna 420a to enter the specified geometric configuration to enable communication between the transponder device 400a and the reader computing device 130. In another example, the reversible mechanism 430a, when activated by the user 101, physically connects a disconnected region of the antenna 420a from the rest of the antenna 420a to cause the antenna to enter the specified geometric configuration required for transmission of data to the reader computing device 130. In yet another example, the reversible mechanism 430a, when activated by the user 101, physically removes a metal substance from the antenna 420a to remove one or more short circuits from the antenna 420 to enable transmission of data to a reader computing device via the NFC communication channel.

[0056] In an example, the user 101 interacts with the reversible mechanism 430a to cause the antenna 420a to transition from the specified geometric configuration to a configuration that is not the specified geometric configuration and the transponder device 400a is no longer able to communicate with the reader computing device 130. In this example, the configuration that is not the specified geometric configuration comprises an initial geometric configuration of the antenna 420a. In another example, the configuration that is not the specified geometric configuration comprises a configuration that does not correspond to the initial geometric configuration of the antenna 420a. In an example, the reversible mechanism 430a comprises a region of the transponder device 400a that the user 101 may press or otherwise apply force to bend the antenna 420a into the specified geometric configuration. In this example, when the user 101 ceases to press or otherwise ceases to apply the force, the antenna 420a returns to a geometric configuration that is not the specified geometric configuration.

[0057] In an example, the user 101 engages the reversible mechanism 430a when the user desires to transmit data from the transponder device 400a to the reader computing device and may disengage the reversible mechanism 430a when the user 101 does not desire to transmit data from the transponder device 400a to the reader computing device 130. In an example, disengaging the reversible mechanism causes the antenna 420a to revert to a configuration that is not the specified geometric configuration able to communicate with the

reader computing device. In another example, disengaging the reversible mechanism 430a physically disconnects a region of the antenna 420a from the rest of the antenna 420a. In yet another example, disengaging the reversible mechanism 430a causes a metal substance to come in contact with the antenna 420a to cause one or more short circuits over the antenna 420a to disable communication with the reader computing device 130.

[0058] Returning to Figure 2, in block 230, the user 101 taps the transponder device 110 to a reader computing device 130. In an example, the reader computing device 130, in response to an input from an operator of the reader computing device 130, broadcasts a radio signal of a specified frequency. In an example, the electronic circuit 119 of the transponder device 110 is connected to the antenna 117 of the transponder device 110. The electronic circuit 119 receives the radio signal of the predetermined frequency emitted by the reader computing device 130 via the antenna 117 when the transponder device 110 is tapped to the reader computing device 130. For example, the reader computing device 130 generates a radio frequency (RF) or other field polling for the presence of a user device 110, and the user taps the user device 110 by placing the device 110 within the field of the reader computing device 130. In some examples, a reader computing device 130 operator activates the RF field or other field to poll for the presence of a user device 110 using an application 139 on the reader computing device 130. For example, tapping the transponder device 110 to the reader computing device comprises a user 101 moving the transponder device 110 and/or the reader computing device 130 so that a distance between the transponder device 110 and the reader computing device 130 is less than a predefined distance to enable communication between the reader computing device 130 and the transponder device 110.

[0059] In block 240, the transponder device 110 transmits data to the reader computing device 130. The electronic circuit 119 is activated by the radio signal received from the reader via the antenna 117. Changing the load in the electronic circuit 119 generates a change in the current in the electronic circuit 119. The change in the current propagates a change in the voltage on the reader computing device 130. The rate of change of current in the electric circuit 119 transmits the data stored in the memory of the electric circuit 119 or data storage unit 113 back to the reader computing device 130. In an example, the data comprises financial account data of the user 101 or a stored value account identifier. In another example, the data comprises a user 101 identifier.

[0060] In an example, the reader computing device 130 processes the data or sends the received data to the data processor system 140 to process the data. For example, the reader computing device 130 controls access to a restricted physical area or restricted data and

receives a user 101 identifier from the transponder device 110 via the NFC communication channel. In this example, if the user 101 identifier corresponds to a known user 101 identifier, the reader computing device 130 grants access to the restricted physical area or the restricted data. In another example, the reader computing device 130 controls power to another computing device and, in response to the user 101 identifier corresponding to a known user 101 identifier, the reader computing device 130 provides power to the other computing device.

[0061] In other examples, the reader computing device 130 transmits the received data to a data processor system 140 or otherwise communicates with the data processor system 140 to process a service request based on the received data. For example, the reader computing device 130 receives an access code from the transponder device 110 via the NFC communication channel and transmits the access code via the network 120 to a data processor system 140, which receives the access code, verifies the access code, and transmits data back to the reader computing device 130 via the network 120. For example, the reader computing device 130 receives financial account information from the transponder device 110 via the NFC communication channel. In an example, the reader computing device 130 transmits the financial account information to a data processor system 140 comprising an acquirer system in a payment authorization request. In an example embodiment, the reader computing device 130 submits the request to an acquirer system via a network 120. In an example embodiment, the payment request message comprises the received financial account information. In an example, the acquirer system receives the payment authorization request. The acquirer system transmits the payment authorization request to an issuer system, which approves or denies the payment authorization request received from the acquirer system. In an example, the reader computing device 130 receives a communication via the network 120 from the issuer system or acquirer system notifying the reader computing device 130 that the payment authorization request was approved or was denied. In an example, the reader computing device 130 prints a receipt or otherwise transmits a receipt to the user 101 comprising a summary of the transaction.

[0062] In block 250, the user 101 determines whether the physical alteration of the transponder device 110 antenna 117 is reversible. For example, the transponder device 110 antenna 117 is irreversibly activatable or reversibly activatable. For example, a transponder device 110 activatable via removal of a metal substance by the user 101 is irreversibly activatable because there is no way to reverse the removal of the metal substance. For example, the user 101 scratches off metal film to activate the antenna 117 and is not able to replace the metal film that was scratched off or otherwise removed. Another transponder device 110 may

be activatable via a reversible mechanism and the user 101 may activate the antenna 117 by engaging the reversible mechanism for a desired length of time and then deactivate the antenna 117 by disengaging the reversible mechanism.

[0063] If the physical alteration of the transponder device 110 antenna 117 is reversible, the method 200 proceeds to block 260. For example, the user 101 engaged the reversible mechanism on the transponder device 110, tapped the transponder device 110 to the reader computing device 130 to establish an NFC communication channel to transmit data from the transponder device 110 to the reader computing device 130, and desires to deactivate the transponder device 110.

[0064] In block 260, the user 101 reverses the physical alteration of the transponder device 110 antenna 117 to disable the transponder device 110. For example, the user 101 pushes, switches, slides, winds, bends, pulls, or otherwise interacts with the physical interface component 111 to deactivate the antenna 117 of the transponder device 110. For example, the user 101 interacts with the physical interface component 111 comprising a sliding mechanism by sliding the sliding mechanism, causing the antenna 117 to transition from the specified geometric configuration or communication with the reader computing device 130 to a configuration that is not the specified geometric configuration for communication with the reader computing device 130. In an example, the user 101 decides, at a subsequent time to disengaging the mechanism to deactivate the transponder device 110 antenna 117, to engage the mechanism to activate the transponder device 110 antenna 117, causing the antenna 117 to enter the specified geometric configuration to communicate with the reader computing device 110. Thus, the user 101 may control when the transponder device 110 is able to transmit data by manipulating a geometric configuration of the antenna 117 via the physical interface component 111 of the transponder device 110.

[0065] Returning to block 250, if the physical alteration of the transponder device 110 antenna 117 is not reversible, the method 200 proceeds to block 270. For example, a transponder device 110 activatable via removal of a metal substance by the user 101 is irreversibly activatable because there is no way to reverse the removal of the metal substance. For example, the user 101 scratches off metal film to activate the antenna 117 and is not able to replace the metal film that was scratched off or otherwise removed. In an example, the user 101 that scratched off the metal substance or one or more other users 101 perceive that the metal film was removed and knows that the transponder device 110 was possibly used at a previous time.

[0066] In block 270, the transponder device 110 remains enabled to transmit data. For example, the antenna 117 was activated via removal of the metal substance from the antenna 117 and remains activated. The user 101 may tap the transponder device 110 multiple times to one or more reader computing devices 130 to establish an NFC communication channel to transmit the data to the one or more reader computing devices 130. In another example the user 101 may dispose of the transponder device 110 after a single transmission of the data to the reader computing device 130. In an example, one or more other users 101 perceive that the metal film was removed and knows that the transponder device 110 was possibly used at a previous time.

[0067] Figure 5 is a block diagram depicting a method 500 for manufacturing a transponder device 110 comprising an antenna 117 that is irreversibly activatable via physical alteration, in accordance with certain examples. The method 500 is described with reference to the components illustrated in Figure 1. In an example, a manufacturer system 150 produces a transponder device 110 that is activatable by a user 101 removing a metal substance that is in contact with and causing a short circuit across the antenna 117. In an example, the manufacturer system 150 receives a request to produce the transponder device 110 from a merchant system, from an employer system, from a distribution system 160, or from another appropriate system. In this example, the request may comprise data to store on the transponder device 110. In certain examples, the manufacturer system 150 produces a transponder device 110 that is activatable for use with a reader computing device 130 comprising a reader computing device 130 of a point of sale terminal, a reader computing device 130 controlling a gate, a reader computing device 130 controlling power to another computing device, or other appropriate reader computing device 130.

[0068] In block 510, a manufacturer system 150 produces a transponder device 110 comprising an antenna 117 that is at least partially exposed to an environment that is external to the transponder device 110. In an example, the transponder device 110 comprises a surface exposed to an environment external to the transponder device 110 and an antenna 117 that is upon the surface at one or more regions of the antenna 117, the antenna 117 being otherwise embedded within the transponder device 110. In another example, the transponder device comprises a plastic card with an antenna 117 that is external to the plastic card at one or more regions of the antenna 117, the antenna 117 being otherwise embedded within the plastic card. In an example, the transponder device 110 further comprises an electronic circuit 119 that is in contact with the antenna and that is configurable to store data. In an example, the manufacturer system 150 produces the transponder device 110 comprising an antenna 117 of a specified size

and geometric configuration able to receive radio signals of a specified frequency broadcast by a reader computing device 130 and establish an NFC or RFID communication channel with the reader computing device 130. In an example, the antenna 117 comprises two or more concentric shapes, for example, two or more concentric rectangles, two or more concentric ovals, two or more concentric circles, or two or more concentric polyhedrons.

[0069] In block 520, the manufacturer system 150 applies a physically removable metal substance to the exposed portions of the antenna 117 to disable the antenna 117. In an example, the physically removable metal substance comprises a metal film that causes a short circuit across the one or more regions of the antenna 117 that are external to the transponder device 110 via contact with the one or more regions. An example physically removable metal substance comprises a substance that is conductive to electricity. In an example, the physically removable metal substance comprises a metal film or a plastic film comprising a metal vaporization. In an example, the manufacturer system applies the physically removable metal substance such that removal of the substance by a user 101 does not damage the one or more regions of the antenna 117. In an example, the metal substance is physically removable from the one or more regions of the antenna 117 via scratching by one or more users 101. For example, scratching comprises scratching via a fingernail of the user 101 or via an object held by the user 101. In another example, the metal substance is physically removable from the one or more regions of the antenna 117 via peeling, pulling, sliding, or other physical action by one or more users 101. In an example, removal of the metal substance from the one or more regions of the antenna 117 removes the short circuit across the one or more regions of the antenna 117, enabling the antenna 117 to receive radio signals of the specified frequency from the reader computing device 130 when the transponder device 110 is placed within a specified proximity of the reader computing device 130.

[0070] In block 530, the manufacturer system 150 stores data on the transponder device 110. In certain examples, the manufacturer system 150 stores or loads the data on the transponder device 110 at a time before applying the physically removable metal substance to the antenna 117. In an example, the manufacturer system 150 receives a request to produce the transponder device 110 comprising the data from an employer, merchant system, or other appropriate system. In other examples, the manufacturer system 150 stores or loads the data on the transponder device 110 at a time after applying the physically removable metal substance to the antenna 117 and before sending the transponder device 110 to a distribution system. In an example, the manufacturer system 150 does not store or load data on the transponder device 110.

[0071] In block 540, the manufacturer system 150 sends the disabled transponder device 110 to a distribution system 160 for distribution to a user 101. In an example, the distribution system 160 is associated with an entity from which the manufacturer system received a request to produce the transponder device 110. In another example, the distribution system 160 comprises an entity that sells transponder devices 110 comprising stored data. For example, the distribution system 160 comprises a merchant system and the transponder device 110 comprises a stored value card for sale by the merchant system. In another example, the distribution system 160 is a component of an employer system and the distribution system 160 distributes the transponder device 110 to an employee for use by the employee at a location of the employer system.

[0072] Figure 6 is a block diagram depicting a method 600 for manufacturing a transponder device 110 comprising an antenna 117 that is reversibly activatable via physical alteration, in accordance with certain examples. The method 600 is described with reference to the components illustrated in Figure 1. In an example, a manufacturer system 150 produces a transponder device 110 that is activatable by a user 101 engaging a physical interface component 111 that is in contact with the antenna 117 that is able to change a geometric configuration of the transponder device 110 antenna 117. In an example, the manufacturer system 150 receives a request to produce the transponder device 110 from a merchant system, from an employer system, from a distribution system 160, or from another appropriate system. In this example, the request may comprise data to store on the transponder device 110. In certain examples, the manufacturer system 150 produces a transponder device 110 that is activatable for use with a reader computing device 130 comprising a reader computing device 130 of a point of sale terminal, a reader computing device 130 controlling a gate, a reader computing device 130 controlling power to another computing device, or other appropriate reader computing device 130.

[0073] In block 610, the manufacturer system 150 produces a transponder device 110 comprising an antenna 117 that is not in a specified geometric configuration and a reversible mechanism for activating and deactivating the antenna 117. An example physical mechanism comprises one or more of a spring, a push button, a sliding mechanism, a winding mechanism, a dial, a bending mechanism, or other mechanism that is able to physically alter a geometric configuration of the antenna to cause the antenna to enter a specified geometric configuration required for transmission of data to a reader computing device 130 via NFC or RFID communication. For example, engaging the mechanism causes the antenna 117 to bend, combine two or more sub-components of the antenna 117 into a complete antenna 117, or

otherwise change a geometric configuration of the antenna 117 so that the antenna 117 is in the specified geometric configuration.

[0074] In block 620, the manufacturer system 150 configures the mechanism such that the transponder device 110 antenna 117 is disabled. In certain examples, the physical mechanism is reversible and the user 101 can activate and then subsequently disengage the mechanism, returning the antenna 117 to a state in which it is not in the specified geometric configuration. For example, disengaging the mechanism causes the antenna 117 to bend, separate the complete antenna 117 into two or more sub-components of the antenna 117, or otherwise change a geometric configuration of the antenna 117 so that the antenna 117 is not in the specified geometric configuration. In certain other examples, the physical mechanism is irreversible and once the user 101 activates the mechanism, the antenna 117 remains in the specified geometric configuration and the user 101 is unable to deactivate the mechanism to cause the antenna 117 to return to the state in which it is not in the specified geometric configuration.

[0075] In block 630, the manufacturer system 150 stores data on the transponder device 110. In certain examples, the manufacturer system 150 stores or loads the data on the transponder device 110 at a time before applying the physically removable metal substance to the antenna 117. In an example, the manufacturer system 150 receives a request to produce the transponder device 110 comprising the data from an employer, merchant system, or other appropriate system. In other examples, the manufacturer system 150 stores or loads the data on the transponder device 110 at a time after manufacturer system 150 produces the transponder device 110 and before sending the transponder device 110 to a distribution system. In an example, the manufacturer system 150 does not store or load data on the transponder device 110.

[0076] In block 640, the manufacturer system 150 sends the disabled transponder device 110 to a distribution system 160 for distribution to the user 101. In an example, the distribution system 160 is associated with an entity from which the manufacturer system received a request to produce the transponder device 110. In another example, the distribution system 160 comprises an entity that sells transponder devices 110 comprising stored data. For example, the distribution system 160 comprises a merchant system and the transponder device 110 comprises a stored value card for sale by the merchant system. In another example, the distribution system 160 is a component of an employer system and the distribution system 160 distributes the transponder device 110 to an employee for use by the employee at a location of the employer system.

Other Examples

[0077] Figure 7 depicts a computing machine 2000 and a module 2050 in accordance with certain examples. The computing machine 2000 may correspond to any of the various computers, servers, mobile devices, embedded systems, or computing systems presented herein. The module 2050 may comprise one or more hardware or software elements configured to facilitate the computing machine 2000 in performing the various methods and processing functions presented herein. The computing machine 2000 may include various internal or attached components such as a processor 2010, system bus 2020, system memory 2030, storage media 2040, input/output interface 2060, and a network interface 2070 for communicating with a network 2080.

[0078] The computing machine 2000 may be implemented as a conventional computer system, an embedded controller, a laptop, a server, a mobile device, a smartphone, a set-top box, a kiosk, a router or other network node, a vehicular information system, one more processors associated with a television, a customized machine, any other hardware platform, or any combination or multiplicity thereof. The computing machine 2000 may be a distributed system configured to function using multiple computing machines interconnected via a data network or bus system.

[0079] The processor 2010 may be configured to execute code or instructions to perform the operations and functionality described herein, manage request flow and address mappings, and to perform calculations and generate commands. The processor 2010 may be configured to monitor and control the operation of the components in the computing machine 2000. The processor 2010 may be a general purpose processor, a processor core, a multiprocessor, a reconfigurable processor, a microcontroller, a digital signal processor ("DSP"), an application specific integrated circuit ("ASIC"), a graphics processing unit ("GPU"), a field programmable gate array ("FPGA"), a programmable logic device ("PLD"), a controller, a state machine, gated logic, discrete hardware components, any other processing unit, or any combination or multiplicity thereof. The processor 2010 may be a single processing unit, multiple processing units, a single processing core, multiple processing cores, special purpose processing cores, co-processors, or any combination thereof. According to certain embodiments, the processor 2010 along with other components of the computing machine 2000 may be a virtualized computing machine executing within one or more other computing machines.

[0080] The system memory 2030 may include non-volatile memories such as read-only memory ("ROM"), programmable read-only memory ("PROM"), erasable programmable

read-only memory ("EPROM"), flash memory, or any other device capable of storing program instructions or data with or without applied power. The system memory 2030 may also include volatile memories such as random access memory ("RAM"), static random access memory ("SRAM"), dynamic random access memory ("DRAM"), and synchronous dynamic random access memory ("SDRAM"). Other types of RAM also may be used to implement the system memory 2030. The system memory 2030 may be implemented using a single memory module or multiple memory modules. While the system memory 2030 is depicted as being part of the computing machine 2000, one skilled in the art will recognize that the system memory 2030 may be separate from the computing machine 2000 without departing from the scope of the subject technology. It should also be appreciated that the system memory 2030 may include, or operate in conjunction with, a non-volatile storage device such as the storage media 2040.

[0081] The storage media 2040 may include a hard disk, a floppy disk, a compact disc read only memory ("CD-ROM"), a digital versatile disc ("DVD"), a Blu-ray disc, a magnetic tape, a flash memory, other non-volatile memory device, a solid state drive ("SSD"), any magnetic storage device, any optical storage device, any electrical storage device, any semiconductor storage device, any physical-based storage device, any other data storage device, or any combination or multiplicity thereof. The storage media 2040 may store one or more operating systems, application programs and program modules such as module 2050, data, or any other information. The storage media 2040 may be part of, or connected to, the computing machine 2000. The storage media 2040 may also be part of one or more other computing machines that are in communication with the computing machine 2000 such as servers, database servers, cloud storage, network attached storage, and so forth.

[0082] The module 2050 may comprise one or more hardware or software elements configured to facilitate the computing machine 2000 with performing the various methods and processing functions presented herein. The module 2050 may include one or more sequences of instructions stored as software or firmware in association with the system memory 2030, the storage media 2040, or both. The storage media 2040 may therefore represent examples of machine or computer readable media on which instructions or code may be stored for execution by the processor 2010. Machine or computer readable media may generally refer to any medium or media used to provide instructions to the processor 2010. Such machine or computer readable media associated with the module 2050 may comprise a computer software product. It should be appreciated that a computer software product comprising the module 2050 may also be associated with one or more processes or methods for delivering the module 2050 to the computing machine 2000 via the network 2080, any signal-bearing medium, or any

other communication or delivery technology. The module 2050 may also comprise hardware circuits or information for configuring hardware circuits such as microcode or configuration information for an FPGA or other PLD.

[0083] The input/output ("I/O") interface 2060 may be configured to couple to one or more external devices, to receive data from the one or more external devices, and to send data to the one or more external devices. Such external devices along with the various internal devices may also be known as peripheral devices. The I/O interface 2060 may include both electrical and physical connections for operably coupling the various peripheral devices to the computing machine 2000 or the processor 2010. The I/O interface 2060 may be configured to communicate data, addresses, and control signals between the peripheral devices, the computing machine 2000, or the processor 2010. The I/O interface 2060 may be configured to implement any standard interface, such as small computer system interface ("SCSI"), serial-attached SCSI ("SAS"), fiber channel, peripheral component interconnect ("PCI"), PCI express (PCIe), serial bus, parallel bus, advanced technology attached ("ATA"), serial ATA ("SATA"), universal serial bus ("USB"), Thunderbolt, FireWire, various video buses, and the like. The I/O interface 2060 may be configured to implement only one interface or bus technology. Alternatively, the I/O interface 2060 may be configured to implement multiple interfaces or bus technologies. The I/O interface 2060 may be configured as part of, all of, or to operate in conjunction with, the system bus 2020. The I/O interface 2060 may include one or more buffers for buffering transmissions between one or more external devices, internal devices, the computing machine 2000, or the processor 2010.

[0084] The I/O interface 2060 may couple the computing machine 2000 to various input devices including mice, touch-screens, scanners, electronic digitizers, sensors, receivers, touchpads, trackballs, cameras, microphones, keyboards, any other pointing devices, or any combinations thereof. The I/O interface 2060 may couple the computing machine 2000 to various output devices including video displays, speakers, printers, projectors, tactile feedback devices, automation control, robotic components, actuators, motors, fans, solenoids, valves, pumps, transmitters, signal emitters, lights, and so forth.

[0085] The computing machine 2000 may operate in a networked environment using logical connections through the network interface 2070 to one or more other systems or computing machines across the network 2080. The network 2080 may include wide area networks (WAN), local area networks (LAN), intranets, the Internet, wireless access networks, wired networks, mobile networks, telephone networks, optical networks, or combinations thereof. The network 2080 may be packet switched, circuit switched, of any topology, and

may use any communication protocol. Communication links within the network 2080 may involve various digital or an analog communication media such as fiber optic cables, free-space optics, waveguides, electrical conductors, wireless links, antennas, radio-frequency communications, and so forth.

[0086] The processor 2010 may be connected to the other elements of the computing machine 2000 or the various peripherals discussed herein through the system bus 2020. It should be appreciated that the system bus 2020 may be within the processor 2010, outside the processor 2010, or both. According to certain examples, any of the processor 2010, the other elements of the computing machine 2000, or the various peripherals discussed herein may be integrated into a single device such as a system on chip ("SOC"), system on package ("SOP"), or ASIC device.

[0087] In situations in which the systems discussed here collect personal information about users, or may make use of personal information, the users may be provided with an opportunity or option to control whether programs or features collect user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), or to control whether and/or how to receive content from the content server that may be more relevant to the user. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over how information is collected about the user and used by a content server.

[0088] Embodiments may comprise a computer program that embodies the functions described and illustrated herein, wherein the computer program is implemented in a computer system that comprises instructions stored in a machine-readable medium and a processor that executes the instructions. However, it should be apparent that there could be many different ways of implementing embodiments in computer programming, and the embodiments should not be construed as limited to any one set of computer program instructions. Further, a skilled programmer would be able to write such a computer program to implement an embodiment of the disclosed embodiments based on the appended flow charts and associated description in the application text. Therefore, disclosure of a particular set of program code instructions is not considered necessary for an adequate understanding of how to make and use embodiments. Further, those skilled in the art will appreciate that one or more aspects of

embodiments described herein may be performed by hardware, software, or a combination thereof, as may be embodied in one or more computing systems. Moreover, any reference to an act being performed by a computer should not be construed as being performed by a single computer as more than one computer may perform the act.

[0089] The examples described herein can be used with computer hardware and software that perform the methods and processing functions described herein. The systems, methods, and procedures described herein can be embodied in a programmable computer, computer-executable software, or digital circuitry. The software can be stored on computer-readable media. For example, computer-readable media can include a floppy disk, RAM, ROM, hard disk, removable media, flash memory, memory stick, optical media, magneto-optical media, CD-ROM, etc. Digital circuitry can include integrated circuits, gate arrays, building block logic, field programmable gate arrays (FPGA), etc.

[0090] The example systems, methods, and acts described in the embodiments presented previously are illustrative, and, in alternative examples, certain acts can be performed in a different order, in parallel with one another, omitted entirely, and/or combined between different examples, and/or certain additional acts can be performed, without departing from the scope and spirit of various embodiments. Accordingly, such alternative examples are included in the scope of the following claims, which are to be accorded the broadest interpretation so as to encompass such alternate examples.

[0091] Although specific examples have been described above in detail, the description is merely for purposes of illustration. It should be appreciated, therefore, that many aspects described above are not intended as required or essential elements unless explicitly stated otherwise. Modifications of, and equivalent components or acts corresponding to, the disclosed aspects of the examples, in addition to those described above, can be made by a person of ordinary skill in the art, having the benefit of the present disclosure, without departing from the spirit and scope of embodiments defined in the following claims, the scope of which is to be accorded the broadest interpretation so as to encompass such modifications and equivalent structures.

CLAIMS

What is claimed is:

1. A transponder device comprising:

an electronic circuit storing data;

an antenna in contact with the electronic circuit, the antenna being configured to receive radio signals of a specified frequency; and

an interface component in contact with the antenna to activate the antenna to receive the radio signals of the specified frequency.

2. The transponder device of claim 1, wherein interaction with the interface component activates the antenna to receive the radio signals of the specified frequency.

3. The transponder device of claim 2, wherein the interface component comprises a conductive substance in contact with one or more regions of the antenna, the conductive substance causing a short circuit along each of the one or more regions of the antenna to prevent the antenna from receiving the radio signals of the specified frequency, and

wherein the interaction with the interface component comprises removing at least a portion of the conductive substance in contact with the one or more regions of the antenna.

4. The transponder device of claim 3, wherein the conductive substance comprises a metal substance.

5. The transponder device of claim 3, wherein the conductive substance comprises a conductive film.

6. The transponder device of claim 3, wherein removing the conductive substance comprises scratching the conductive substance.

7. The transponder device of claim 3, wherein the antenna comprises two or more concentric shapes, and wherein the antenna is configured to receive the radio signals of the specified frequency when the conductive substance is removed from at least one of the two or more concentric shapes.

8. The transponder device of claim 7, wherein the two or more concentric shapes comprise two or more concentric circles, two or more concentric ovals, or two or more concentric polyhedrons.

9. The transponder device of claim 3, the electronic circuit receiving the radio signals of the specified frequency emitted by a reader computing device, establishing a communication channel with the reader computing device via the antenna, and transmitting the stored data to the reader computing device via the communication channel.

10. The transponder device of claim 9, wherein the communication channel comprises a near-field communication ("NFC") channel or a radio frequency identification ("RFID") communication channel.

11. The transponder device of claim 9, wherein placing the transponder device within a specified proximity to a reader computing device activates the electronic circuit via reception of the radio signals of the specified frequency.

12. The transponder device of claim 1, wherein the interface component comprises one or more of a spring, a sliding mechanism, a winding mechanism, or a folding mechanism.

13. The transponder device of claim 2, wherein interacting with the interface component comprising applying force to a region of a surface of the transponder device.

14. The transponder device of claim 2, wherein interacting with the interface component causes the antenna to enter a specified geometric configuration to receive the radio signals of the specified frequency.

15. The transponder device of claim 2, wherein receiving the radio signals of the specified frequency by an activated antenna activates the electronic circuit and enables transmission of the stored data to the reader computing device via the communication channel.

16. The transponder device of claim 1, wherein a size of the antenna is proportional to the specified frequency of the radio signals.

17. The transponder device of claim 1, wherein the electronic circuit comprises a microchip.

18. A method to manufacture transponder devices, comprising:

providing a transponder device comprising an electronic circuit and an antenna in contact with the electronic circuit, wherein the electronic circuit is configurable to store data, the antenna being configured to receive radio signals of a specified frequency; and

providing an interface component in contact with the antenna to activate the antenna to receive the radio signals of the specified frequency.

19. The method of claim 18, wherein interaction with the interface component activates the antenna to receive the radio signals of the specified frequency.

20. The method of claim 19,

wherein one or more regions of the antenna are exposed to an environment external to the transponder device,

wherein providing the interface component in contact with the antenna comprises applying a conductive substance to the one or more regions of the antenna exposed to the environment external to the transponder device to cause a short circuit across the one or more regions of the antenna, and

wherein activating the antenna via the interaction with the interface component comprises removing at least a portion of the conductive substance from the one or more regions of the antenna to remove the short circuit across the one or more regions of the antenna.

21. The method of claim 20, the electronic circuit receiving via the activated antenna the radio signals of the specified frequency emitted by a reader computing device, establishing a communication channel with the reader computing device via the activated antenna, and transmitting the stored data to the reader computing device via the communication channel.

22. The method of claim 21, wherein the communication channel comprises a near-field communication ("NFC") channel or radio frequency identification ("RFID") communication channel.

23. The method of claim 20, wherein the conductive substance comprises a metal substance.

24. The method of claim 20, wherein the conductive substance comprises a conductive film.

25. The method of claim 20, wherein removing the conductive substance comprises scratching the conductive substance.

26. The method of claim 20, wherein the antenna comprises two or more concentric shapes, wherein the antenna is able to receive the radio signals of the specified frequency when the conductive substance is removed from at least one of the two or more concentric shapes.

27. The method of claim 26 wherein the two or more concentric shapes comprise two or more concentric circles, two or more concentric ovals, or two or more concentric polyhedrons.

28. The method of claim 19, wherein the interface component in contact with the antenna secures the antenna in a first geometric configuration, preventing the antenna from receiving the radio signals of the specified frequency while in the first geometric configuration, and

wherein interacting with the interface component to activate the antenna comprises changing a geometric configuration of the antenna from the first geometric configuration to a second geometric configuration using the interface component, the second geometric configuration enabling the antenna to receive the radio signals of the specified frequency.

29. The method of claim 18, wherein the interface component comprises one or more of a spring, a sliding mechanism, a winding mechanism, or a folding mechanism.

30. The transponder device of claim 28, wherein the interface component comprises a region of a surface of the transponder device and wherein applying force to the physical interface component moves the antenna from the first geometric configuration to the second geometric configuration.

31. The method of claim 18, wherein a size of the antenna is proportional to the specified frequency of the radio signals.

32. The method of claim 18, wherein the electronic circuit comprises a microchip.

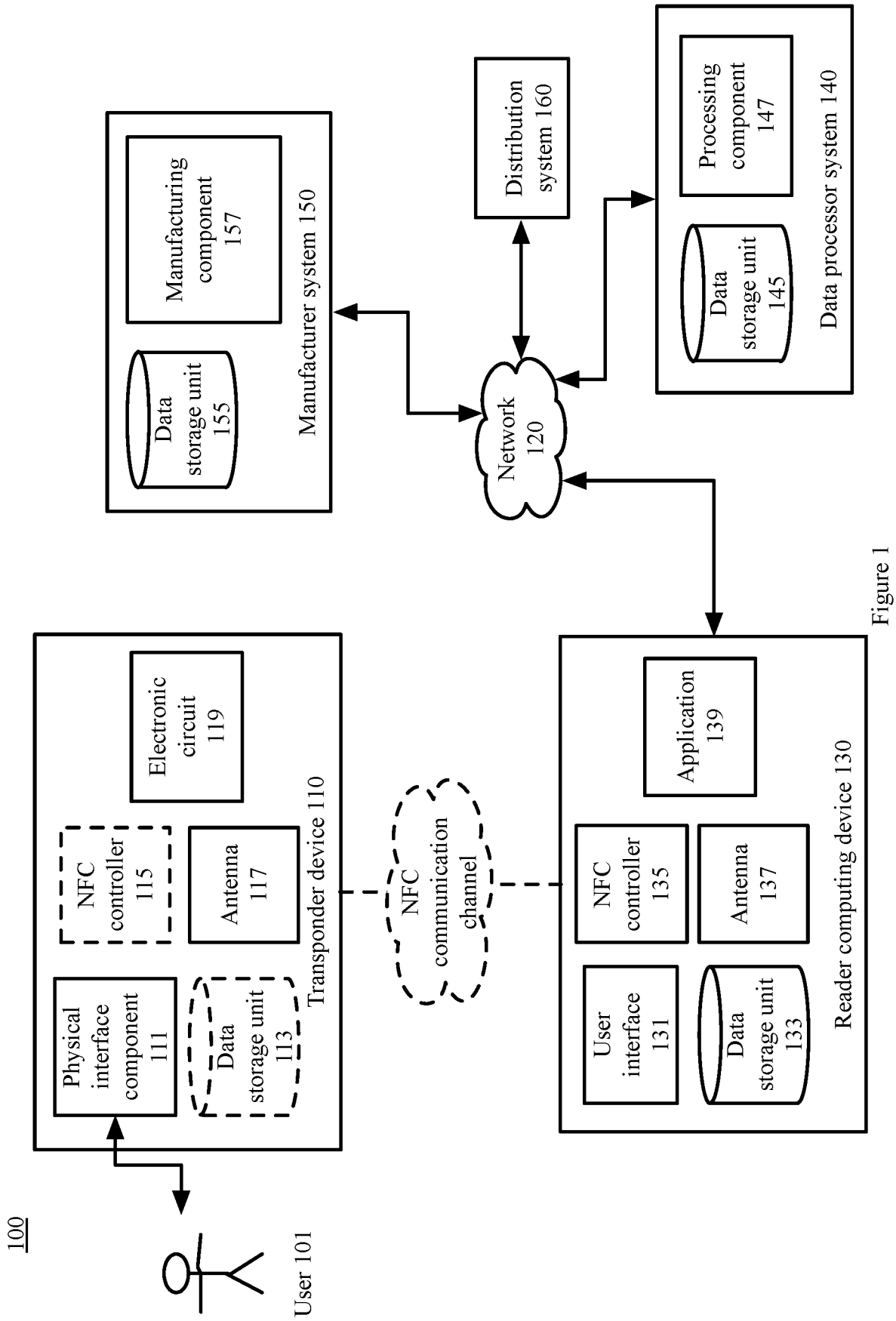

100
User 101
Transponder device 110
Physical interface component 111
Data storage unit 113
NFC controller 115
Antenna 117
Electronic circuit 119
NFC communication channel
Reader computing device 130
User interface 131
Data storage unit 133
NFC controller 135
Antenna 137
Application 139
Network 120
Manufacturer system 150
Data storage unit 155
Manufacturing component 157
Distribution system 160
Data processor system 140
Data storage unit 145
Processing component 147

Figure 1

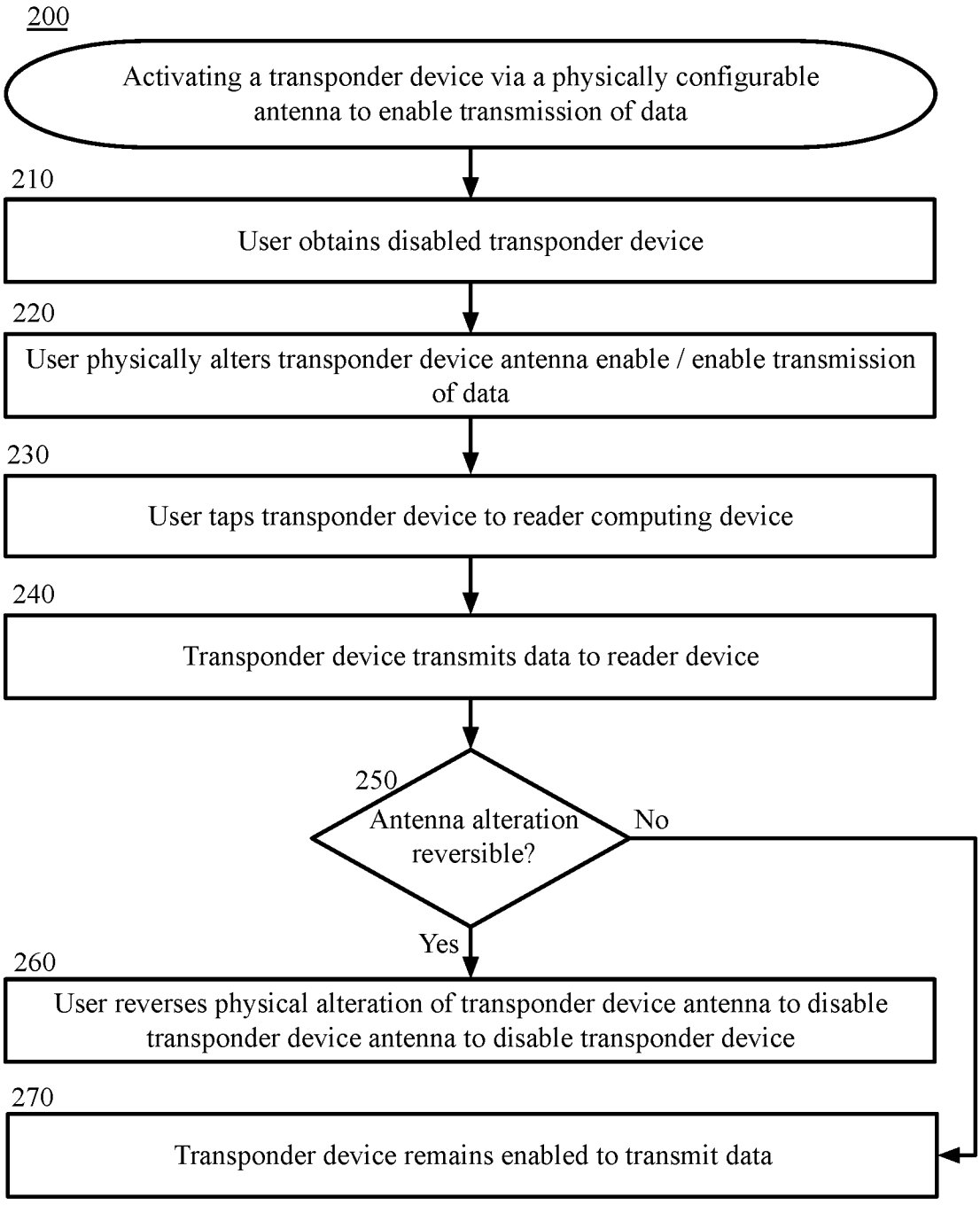

200
Activating a transponder device via a physically configurable antenna to enable transmission of data
210
User obtains disabled transponder device
220
User physically alters transponder device antenna enable / enable transmission of data
230
User taps transponder device to reader computing device
240
Transponder device transmits data to reader device
250
Antenna alteration reversible?
No
Yes
260
User reverses physical alteration of transponder device antenna to disable transponder device antenna to disable transponder device
270
Transponder device remains enabled to transmit data

Figure 2

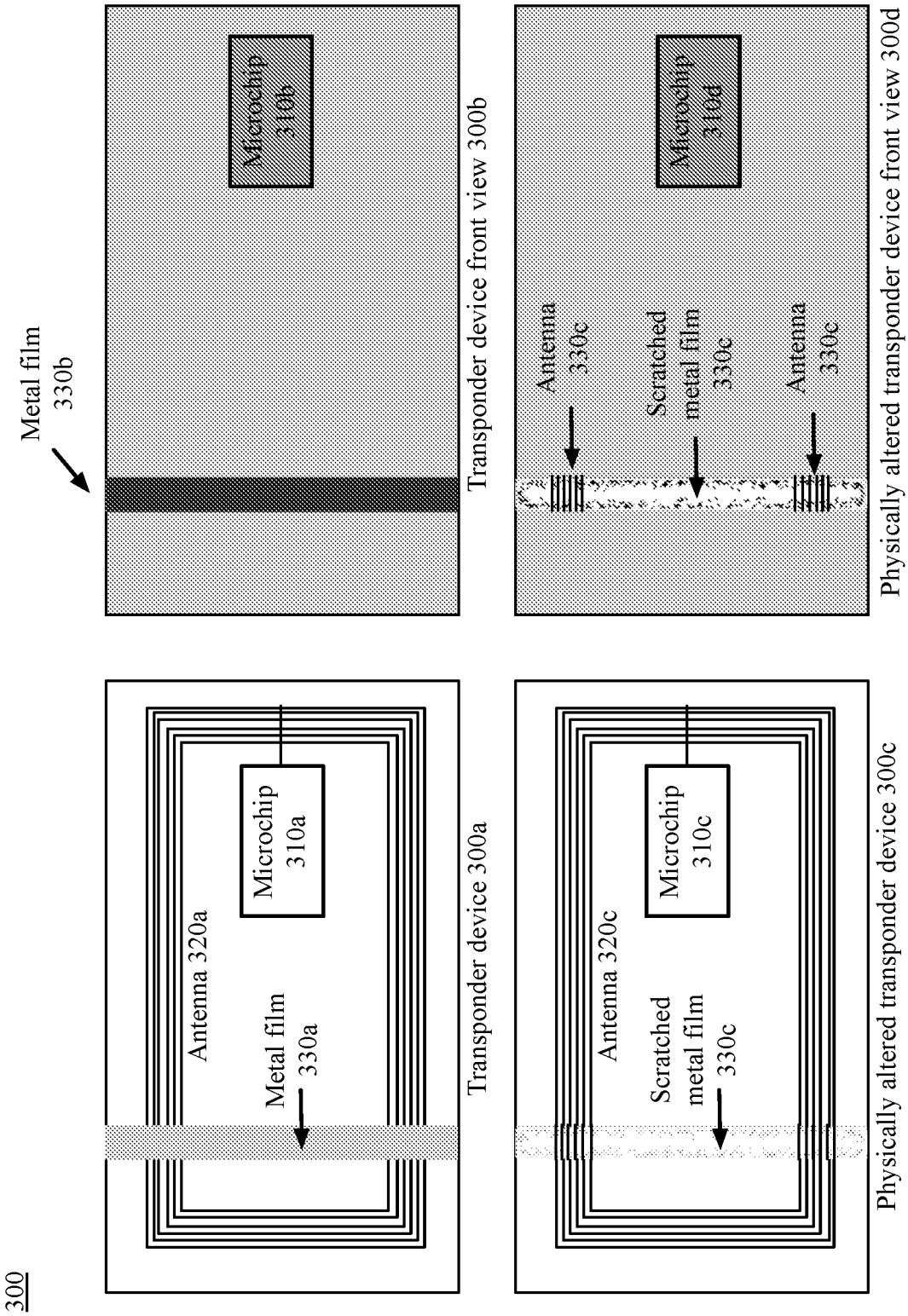

300
Antenna 320a
Metal film 330a
Microchip 310a
Transponder device 300a
Metal film 330b
Microchip 310b
Transponder device front view 300b
Antenna 320c
Scratched metal film 330c
Microchip 310c
Physically altered transponder device 300c
Antenna 330c
Scratched metal film 330c
Antenna 330c
Microchip 310d
Physically altered transponder device front view 300d

Figure 3

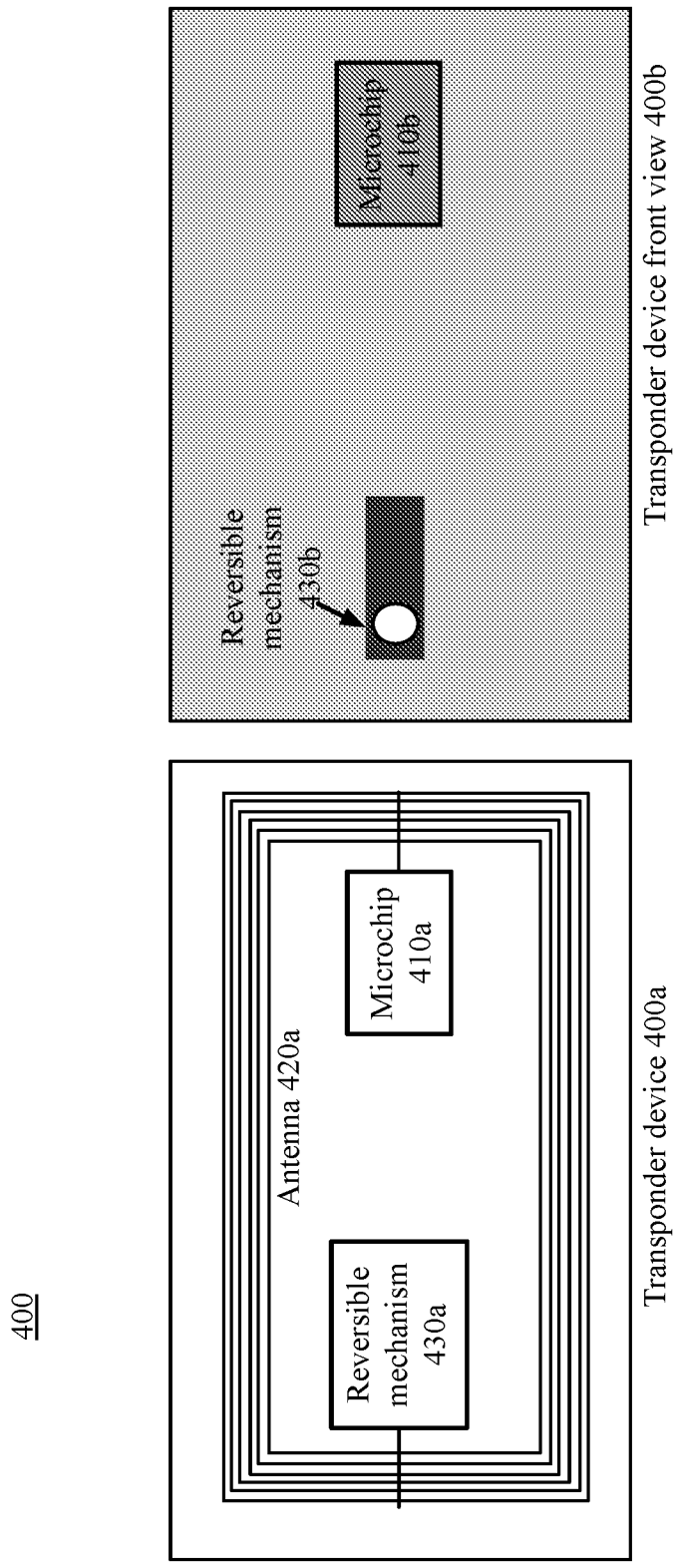

400
Transponder device 400a
Antenna 420a
Reversible mechanism 430a
Microchip 410a
Transponder device front view 400b
Reversible mechanism 430b
Microchip 410b

Figure 4

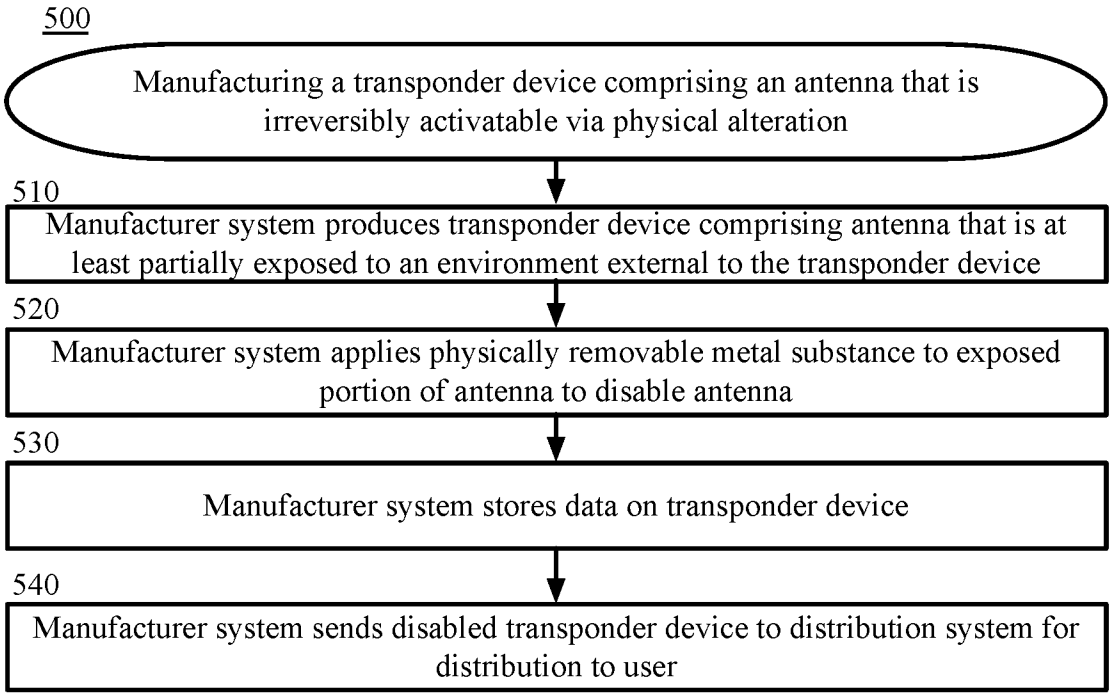

500
Manufacturing a transponder device comprising an antenna that is irreversibly activatable via physical alteration
510
Manufacturer system produces transponder device comprising antenna that is at least partially exposed to an environment external to the transponder device
520
Manufacturer system applies physically removable metal substance to exposed portion of antenna to disable antenna
530
Manufacturer system stores data on transponder device
540
Manufacturer system sends disabled transponder device to distribution system for distribution to user

Figure 5

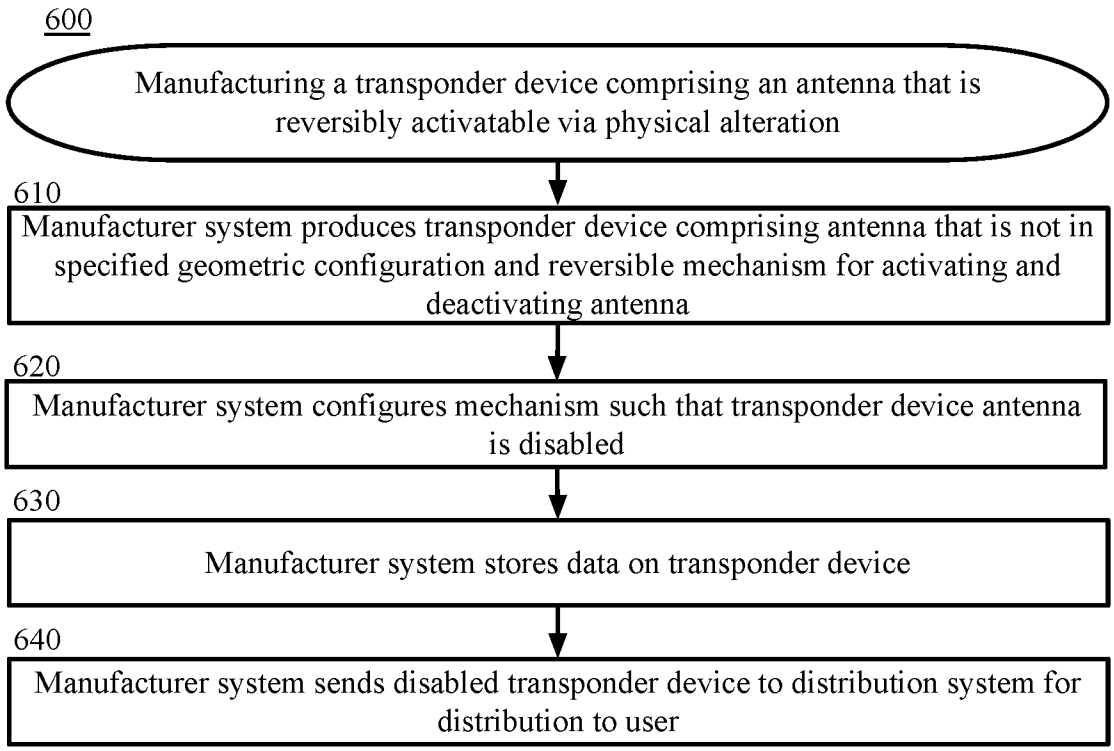

600
Manufacturing a transponder device comprising an antenna that is reversibly activatable via physical alteration
610
Manufacturer system produces transponder device comprising antenna that is not in specified geometric configuration and reversible mechanism for activating and deactivating antenna
620
Manufacturer system configures mechanism such that transponder device antenna is disabled
630
Manufacturer system stores data on transponder device
640
Manufacturer system sends disabled transponder device to distribution system for distribution to user

Figure 6

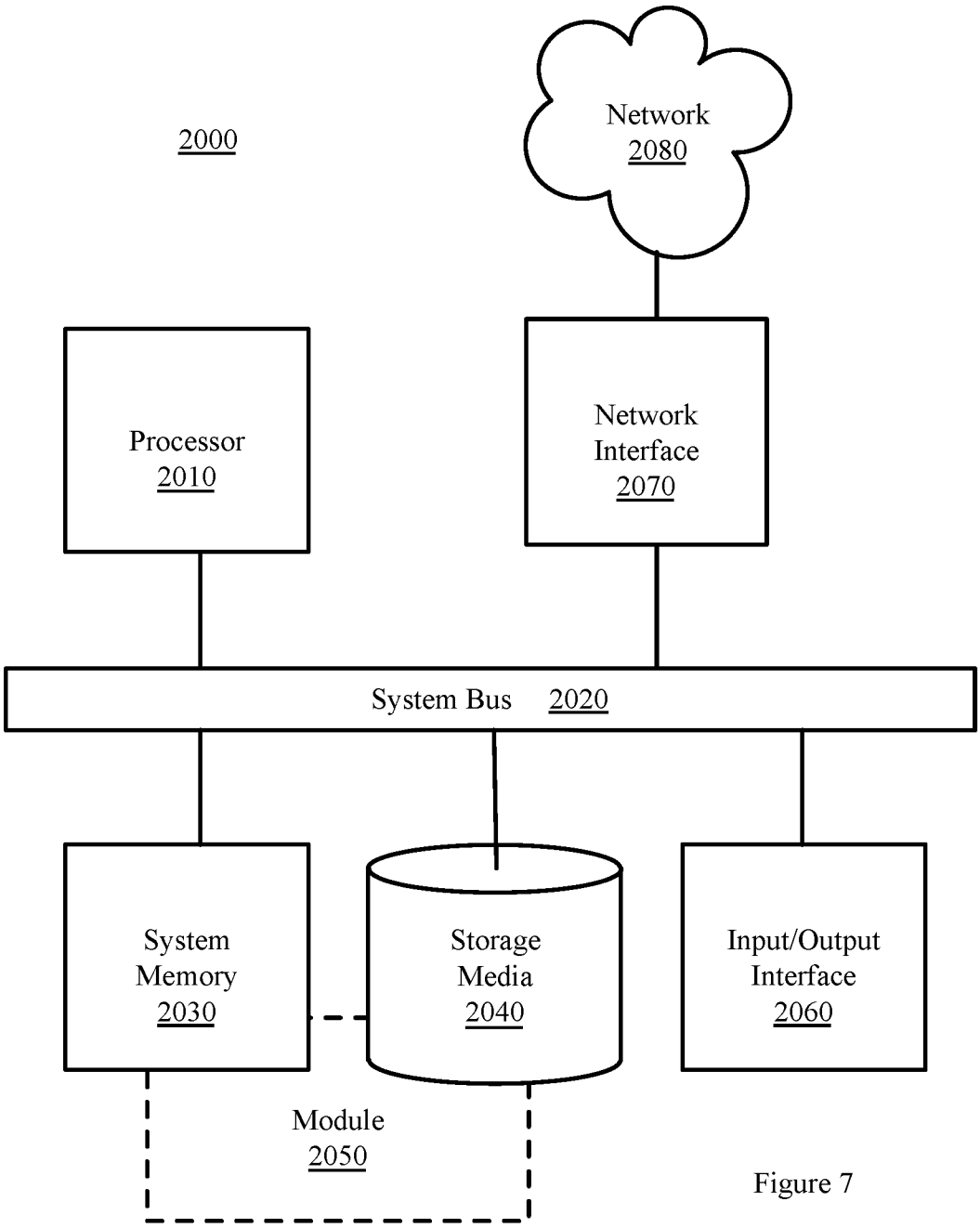

2000
Network
2080
Processor
2010
Network
Interface
2070
System Bus 2020
System
Memory
2030
Storage
Media
2040
Input/Output
Interface
2060
Module
2050

Figure 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/021709

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06K19/077 G06K19/07
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 425 526 B1 (FIDALGO JEAN-CHRISTOPHE [FR] ET AL) 30 July 2002 (2002-07-30) the whole document	1-32
X	US 6 371 378 B1 (BRUNET OLIVIER [FR] ET AL) 16 April 2002 (2002-04-16) column 1, lines 20-51 column 4, lines 34-45; figure 3	1-32
X	US 2002/190364 A1 (DOBASHI HISANOBU [JP] ET AL) 19 December 2002 (2002-12-19) abstract; figure 1	1-32
X	US 6 073 856 A (TAKAHASHI NORIO [JP]) 13 June 2000 (2000-06-13) column 3, line 8 - column 4, line 61; figures 1,2	1-32

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 November 2019	27/11/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Heusler, Nikolaus

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/021709

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 197 42 126 A1 (SIEMENS AG [DE]) 25 March 1999 (1999-03-25) the whole document	1
X	US 2018/060615 A1 (ASHWOOD SMITH PETER [CA]) 1 March 2018 (2018-03-01) page 6, paragraph 33	1
X	DE 10 2005 062827 A1 (BUNDESDRUCKEREI GMBH [DE]) 28 June 2007 (2007-06-28) paragraph [0053]; figure 1	1
X	WO 2019/014695 A1 (AIT AUSTRIAN INSTITUTE OF TECH GMBH [AT]) 24 January 2019 (2019-01-24) page 15, lines 21-36; figure 8	1
X	US 2004/012496 A1 (DE SOUZA KENNETH G [CA] ET AL) 22 January 2004 (2004-01-22) figures 2,4	1
A	DE 195 30 608 A1 (ORGA KARTENSYSTEME GMBH [DE]) 27 February 1997 (1997-02-27) column 1, lines 22-39	1-32

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2019/021709

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6425526 B1	30-07-2002	AT 272238 T	15-08-2004
		AU 5631199 A	26-04-2000
		CN 1384952 A	11-12-2002
		DE 69919008 T2	11-08-2005
		EP 1116179 A1	18-07-2001
		FR 2784210 A1	07-04-2000
		JP 2002526870 A	20-08-2002
		US 6425526 B1	30-07-2002
		WO 0021029 A1	13-04-2000
US 6371378 B1	16-04-2002	AT 217106 T	15-05-2002
		AU 1567399 A	05-07-1999
		BR 9813461 A	10-10-2000
		CA 2312042 A1	24-06-1999
		CN 1281567 A	24-01-2001
		DE 69805204 T2	19-12-2002
		EP 1040448 A1	04-10-2000
		ES 2177107 T3	01-12-2002
		FR 2772494 A1	18-06-1999
		JP 2002509304 A	26-03-2002
		US 6371378 B1	16-04-2002
		WO 9931625 A1	24-06-1999
US 2002190364 A1	19-12-2002	DE 69835563 T2	13-09-2007
		EP 0899683 A2	03-03-1999
		JP 3418322 B2	23-06-2003
		JP H1173483 A	16-03-1999
		US 6465880 B1	15-10-2002
		US 2002190364 A1	19-12-2002
US 6073856 A	13-06-2000	EP 0901101 A2	10-03-1999
		US 6073856 A	13-06-2000
DE 19742126 A1	25-03-1999	DE 19742126 A1	25-03-1999
		WO 9916019 A1	01-04-1999
US 2018060615 A1	01-03-2018	US 2018060615 A1	01-03-2018
		WO 2018040829 A1	08-03-2018
DE 102005062827 A1	28-06-2007	DE 102005062827 A1	28-06-2007
		EP 1969533 A1	17-09-2008
		WO 2007074011 A1	05-07-2007
WO 2019014695 A1	24-01-2019	AT 520415 A1	15-03-2019
		WO 2019014695 A1	24-01-2019
US 2004012496 A1	22-01-2004	NONE	
DE 19530608 A1	27-02-1997	NONE	