

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF GEORGIA**

**SWIRLATE IP LLC,**

Plaintiff,

v.

**COOPERATIVE CHOICE LLC,**

Defendant.

C.A. No. 1:21-cv-04450-SCJ

**JURY TRIAL DEMANDED**

**PATENT CASE**

**FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Swirlate IP LLC files this First Amended Complaint for Patent Infringement against Cooperative Choice LLC pursuant to Rule 15(a)(1)(A), Fed.R.Civ.P., and would respectfully show the Court as follows:

**I. THE PARTIES**

1. Plaintiff Swirlate IP LLC (“Swirlate” or “Plaintiff”) is a Texas limited liability company having an address at 6009 W Parker Rd, Ste 149 – 1090, Plano, TX 75093-8121.

2. On information and belief, Defendant Cooperative Choice LLC (“Defendant”) is a limited liability company organized and existing under the laws of Georgia, with its principal place of business at 55 Satellite Blvd NW, Suwanee, GA 30024, and a registered agent Ernest Jakins at 850 Commerce Road, Jefferson, GA 30549.

**II. JURISDICTION AND VENUE**

3. This action arises under the patent laws of the United States, Title 35 of the United States Code. This Court has subject matter jurisdiction of such action under 28 U.S.C. §§ 1331 and 1338(a).

4. On information and belief, Defendant is subject to this Court’s specific and general personal jurisdiction, pursuant to due process and the Georgia Long-Arm Statute, due at least to

its business in this forum, including at least a portion of the infringements alleged herein. Furthermore, Defendant is subject to this Court's specific and general personal jurisdiction because Defendant is a Georgia limited liability company.

5. Without limitation, on information and belief, Defendant has derived revenues from its infringing acts occurring within Georgia. Further, on information and belief, Defendant is subject to the Court's general jurisdiction, including from regularly doing or soliciting business, engaging in other persistent courses of conduct, and deriving substantial revenue from goods and services provided to persons or entities in Georgia. Further, on information and belief, Defendant is subject to the Court's personal jurisdiction at least due to its sale of products and/or services within Georgia. Defendant has committed such purposeful acts and/or transactions in Georgia such that it reasonably should know and expect that it could be haled into this Court as a consequence of such activity.

6. Venue is proper in this district under 28 U.S.C. § 1400(b). On information and belief, Defendant is organized in Georgia. On information and belief, from and within this District Defendant has committed at least a portion of the infringements at issue in this case.

7. For these reasons, personal jurisdiction exists and venue is proper in this Court under 28 U.S.C. § 1400(b).

**III. COUNT I**  
**(PATENT INFRINGEMENT OF UNITED STATES PATENT NO. 7,154,961)**

8. Plaintiff incorporates the above paragraphs herein by reference.

9. On December 26, 2006, United States Patent No. 7,154,961 ("the '961 Patent") was duly and legally issued by the United States Patent and Trademark Office. The '961 Patent is titled "Constellation Rearrangement for ARQ Transmit Diversity Schemes." A true and correct copy of the '961 Patent is attached hereto as Exhibit A and incorporated herein by reference.

10. Swirlate is the assignee of all right, title and interest in the '961 patent, including all rights to enforce and prosecute actions for infringement and to collect damages for all relevant times against infringers of the '961 Patent. Accordingly, Swirlate possesses the exclusive right and standing to prosecute the present action for infringement of the '961 Patent by Defendant.

11. The invention in the '961 Patent relates to the field of Automatic Repeat reQuest ("ARQ") transmission techniques in wireless communication systems. (Ex. A at col. 1:6-8). In particular, it relates to a method for transmitting data using transmit diversity schemes in which data packets are transmitted using a first and second transmission based on a repeat request and the bit-to-symbol mapping is performed differently for different transmitted diversity branches. (*Id.* at col. 1:8-12). The inventors recognized a problem in prior art of the use of ARQ transmission techniques in wireless communication systems with unreliable and time-varying channel conditions and the invention results in an improved performance avoiding transmission errors. (*Id.* at col. 1:12-15).

12. In telecommunications, in order to improve the reliability of data transmissions, the prior art had several transmit diversity techniques in which redundant versions of identical data are transmitted in at least two diversity branches by default without explicitly requesting further diversity branches. (*Id.* at col. 1:19-24). Such transmit diversity techniques included (i) site diversity (transmitted signal originates from different sites), (ii) antenna diversity (transmitted signal originates from different antennas), (iii) polarization diversity (transmitted signal is mapped onto different polarization), (iv) frequency diversity (transmitted signal is mapped on different carrier frequencies or frequency hopping sequences), (v) time diversity (transmitted signal is mapped on different interleaving sequences), and (vi) multicode diversity (transmitted signal is mapped on different codes). (*Id.* at col. 1:24-42). The diversity branches would then be combined

in order to improve the reliability of the received data. These diversity combining techniques included (a) selection combining (selecting the diversity branch with the highest Signal-to-Noise Ratio (“SNR”) for decoding and ignoring the remaining ones), (b) equal gain combining (combining received diversity branches with ignoring the differences in received SNR), and (c) maximum ratio combining (combining received diversity branches taking the received SNR of each diversity branch into account).

13. The prior art also had techniques for error detection/correction with respect to the transmission of data. For example, the prior art would use ARQ schemes together with Forward Error Correction (FEC),<sup>1</sup> which is called hybrid ARQ (“HARQ”). If an error is detected within a packet by the Cyclic Redundancy Check (“CRC”), the receiver requests that the transmitter send additional information (*e.g.*, retransmission) to improve the probability to correctly decode the erroneous packet. (*Id.* at col. 1: 59-63).

14. The ‘961 discussed a particular prior art reference that had the shortcomings of the prior art. WO-02/067491 A1 disclosed a method for HARQ transmission that averages the bit reliability over successively requested retransmissions by means of signal constellation rearrangement. (*Id.* at col. 1: 64-67). The reference showed that when more than 2 bits of data were mapped onto one modulation symbol, the bits have different reliability depending on the chosen mapping. (*Id.* at col. 2: 1-5). For most FEC schemes, this leads to a degraded decoder performance compared to an input of more equally distributed bit reliabilities. (*Id.* at col. 2:5-7). As a result, in conventional communications systems the modulation dependent variations in bit

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<sup>1</sup> FEC is a technique used for controlling errors in data transmission over unreliable or noisy communication channels. The general idea of FED is that a sender encodes the message in a redundant way, most often using an error correction code. The redundancy allows the receiver to detect a limited number of errors that may occur anywhere in the message, and to potentially correct these errors without re-transmission.

reliabilities are not considered and, therefore, usually the variations remain after combining the diversity branches at the receiver. (*Id.* at col. 2:8-11).

15. The inventors therefore developed a method that improved performance with regard to transmission errors. (*Id.* at col. 2:15-18). The idea of the invention is to improve performance at the receiver by applying different signal constellation mappings to the available distinguishable transmit diversity branches and ARQ retransmissions. (*Id.* at col. 2:20-23). The invention is applicable to modulation formats in which more than 2 bits are mapped onto one modulation symbol, since this implies a variation in reliabilities for the bits mapped onto the signal constellation. (*Id.* at col. 2:23-29).

16. **Direct Infringement.** Upon information and belief, Defendant has been directly infringing at least claim 1 of the '961 patent in Georgia , and elsewhere in the United States, by performing actions comprising at least performing the claimed ARQ re-transmission method by performing the steps of the claimed invention using the EMC Security's Connect+ Home Security System ("Accused Instrumentality") (*e.g.*, <https://www.emcsecurity.com/security-systems/>; <https://www.emcsecurity.com/product/connect-fundamentals-system/>; <https://www.emcsecurity.com/wp-content/uploads/2019/03/Connect-Install-and-User-Manual.pdf>).






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- Add a keypad.
- Add additional sensors and options.

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Description	Reviews (3)
<ul style="list-style-type: none"> <li>• Set-up in just minutes with video and written instruction. <a href="#">View Connect+ Resources page.</a></li> <li>• Wifi connection with optional cellular.</li> <li>• 24/7 professional monitoring and police dispatch from \$16.9 with no contract.</li> <li>• Requires the mobile app for system control - \$5/mo.</li> <li>• Connect other smart-devices (locks, lights, thermostats, and Alexa).</li> <li>• Risk Free Purchase. 30 Day No Questions Asked <a href="#">Return Policy.</a></li> </ul>	

[\(https://www.emcsecurity.com/product/connect-fundamentals-system/\)](https://www.emcsecurity.com/product/connect-fundamentals-system/).

Connect+™ Security and Automation Platform  
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**Meet Connect+**

Connect+ is a professional wireless security panel designed to deliver home security and automation services. A secured and supervised Ethernet connection comes standard. Optional Cellular and Wi-Fi cards provide primary or backup communication channels. Its long-range encrypted wireless receiver easily provides whole home coverage. Wireless arming stations and mobile devices uncouple Connect+ from the entry wall and allow it to be installed at a location convenient for Internet and power connections.



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<https://www.emcsecurity.com/wp-content/uploads/2019/03/Connect-Install-and-User-Manual.pdf>).

**Expansion Cards for Internet Connectivity**

- Wi-Fi™ Card
- LTE Cellular Card (Verizon)

(*Id.*).

### Cellular Connections

1. Ensure the Cellular card is properly installed, and the Power LED on the card is pulsing.

2. Inspect the LED on the expansion card.

- A solid LED indicates the panel is connected to the network.
- A flashing LED indicates the panel has found a tower, and is attempting to connect to the network. Wait until the LED is solid.

If the LED has been double flashing for more than ten minutes, try power cycling the panel.

(*Id.*).

### Communication Paths

LTE Category M1

Wi-Fi

Ethernet

(*Id.*).

17. The Accused Instrumentality practices an ARQ retransmission method (*e.g.*, HARQ method) in a wireless communication system (*e.g.*, LTE network) in which data packets are transmitted from a transmitter (*e.g.*, the Accused Instrumentality) to a receiver (*e.g.*, LTE base station) using a first transmission (*e.g.*, HARQ transmission) and at least a second transmission (*e.g.*, HARQ retransmission) based on a repeat request (*e.g.*, HARQ retransmission request in the form of NAK). For example, at least in its internal testing and usage, the Accused Instrumentality uses an HARQ method in an LTE network in which data is transmitted from the Accused



Instrumentality to an LTE base station using at least an HARQ transmission and an HARQ retransmission based on a repeat request, such as an HARQ retransmission request in the form of a negative acknowledgement (“NAK”). (E.g., <https://www.emcsecurity.com/security-systems/>; <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

18. Upon information and belief, the Accused Instrumentality practices modulating data packets at the transmitter (e.g., the Accused Instrumentality) using a first modulation scheme (e.g., one of QPSK, 16QAM and 64 QAM) to obtain first data symbols (e.g., output of modulation block performing said first modulation scheme). (E.g., [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

19. Upon information and belief, the Accused Instrumentality practices performing the first transmission (e.g., HARQ transmission) by transmitting the first data symbols (e.g., output of modulation block performing said first modulation scheme) over a first diversity branch to the receiver (e.g., mapping from assigned resource blocks to the first available number of antenna ports). For example, at least in its internal testing and usage, the Accused Instrumentality discloses a first diversity branch wherein the output of modulation block, i.e., first data symbols is transmitted over a first diversity branch which is indicated in case of Multi-antenna processing wherein mapping from assigned resource blocks to the first available number of antenna ports. (E.g., <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

20. Upon information and belief, the Accused Instrumentality practices modulating said data packets at the transmitter (*e.g.*, the Accused Instrumentality) using a second modulation scheme (*e.g.*, one of QPSK, 16QAM and 64 QAM—which is distinct from the first modulation scheme) to obtain second data symbols (*e.g.*, output of modulation block using a second modulation scheme). For example, at least in its internal testing and usage, the Accused Instrumentality on repeat request, *i.e.*, receiving the retransmission request in the form of NAK, enables a second mapping of said higher order modulation scheme (*i.e.*, an Adaptive Retransmission having a different Modulation Coding Scheme (MCS) than the one used for HARQ transmission, *i.e.*, first higher order modulation scheme). (*E.g.*, <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>; [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

21. Upon information and belief, the Accused Instrumentality practices performing the second transmission (*e.g.*, HARQ retransmission) by transmitting the second data symbols (*e.g.*, output of modulation block using a second modulation scheme) over a second diversity branch (*e.g.*, mapping from assigned resource blocks to the later available number of antenna ports) to the receiver (*e.g.*, LTE base station). For example, at least in its internal testing and usage, the Accused Instrumentality discloses a second diversity branch wherein the output of modulation block, *i.e.*, second data symbols is transmitted over a second or later diversity branch which is indicated in case of Multi-antenna processing wherein mapping from assigned resource blocks to the later

available number of antenna ports. (E.g., <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;

[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

22. Upon information and belief, at least in its internal testing and usage, the Accused Instrumentality utilizes a base station which practices demodulating the received first (e.g., output of modulation block performing said first modulation scheme) and second data symbols (e.g., output of modulation block using a second modulation scheme) at the receiver (e.g., LTE Base Station) using the first and second modulation schemes (e.g., the mappings corresponding to transmission and retransmission Modulation Coding Scheme) respectively. For example, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which practices demodulation of first (e.g., output of modulation block performing said first modulation scheme) and second data symbols (e.g., output of modulation block using a second modulation scheme) at the LTE Base Station using the first and second modulation scheme, i.e., Modulation Coding Scheme which are distinct for transmission and Adaptive Re-transmission (i.e., an Adaptive Re-transmission having a different Modulation Coding Scheme (MCS) than the one used for transmission, i.e., first higher order modulation scheme). (E.g., <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>; [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

23. Upon information and belief, the Accused Instrumentality at least in its internal testing and usage, utilizes a base station which practices diversity combining (*e.g.*, Hybrid ARQ soft-combining) the demodulated data received over the first (*e.g.*, mapping from assigned resource blocks to the first available number of antenna ports) and second diversity branches (*e.g.*, mapping from assigned resource blocks to the later available number of antenna ports). For example, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which performs a diversity combining, *i.e.*, Hybrid ARQ soft-combining of data from multiple received antenna ports. (*E.g.*, [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>).

24. Upon information and belief, the Accused Instrumentality utilizes the modulation schemes wherein 16 QAM and a number of  $\log_2(M)$  modulation schemes are used. For example, the Accused Instrumentality performs a data modulation such as QPSK, 16 QAM and 64 QAM wherein the M-ary Quadrature Amplitude Modulation is basically a  $\log_2(M)$  modulation schemes, for example, 16QAM stands for  $\log_2(16)$  modulation schemes and 64 QAM stands for  $\log_2(64)$  modulation schemes. (*E.g.*, <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.gaussianwaves.com/2012/10/constructing-a-rectangular-constellation-for-16-qam/>; <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>; [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

**IV. COUNT II**  
**(PATENT INFRINGEMENT OF UNITED STATES PATENT NO. 7,567,622)**

25. Plaintiff incorporates the above paragraphs herein by reference.

26. On July 28, 2009, United States Patent No. 7,567,622 (“the ‘622 Patent”) was duly and legally issued by the United States Patent and Trademark Office. The ‘622 Patent is titled “Constellation Rearrangement for ARQ Transmit Diversity Schemes.” The ‘622 patent issued from an application that is a continuation of the application leading to the ‘961 patent. A true and correct copy of the ‘622 Patent is attached hereto as Exhibit B and incorporated herein by reference.

27. Swirlate is the assignee of all right, title and interest in the ‘622 patent, including all rights to enforce and prosecute actions for infringement and to collect damages for all relevant times against infringers of the ‘622 Patent. Accordingly, Swirlate possesses the exclusive right and standing to prosecute the present action for infringement of the ‘622 Patent by Defendant.


28. The ‘622 patent shares the same specification as the ‘961 patent and therefore the background information regarding the ‘961 patent in paragraphs 11 through 15 are incorporated by reference.

29. During the prosecution history, applicant explained the benefits of the claimed invention. The claim “defines an ARQ retransmission method in which more than two data bits are mapped onto one data symbol in each of the initial transmission and a retransmission. The symbols of the initial transmission and the retransmission represent the same bit information, but are different symbols due to different bit mappings. Since different bits of a modulation symbol have different communications reliabilities, the claimed subject matter supports averaging the communication reliabilities for each bit mapped onto a transmission symbol and a retransmission symbol so as to improve the likelihood of receiving the bit.” (Ex. C at 16).

30. An advantage of the claimed subject matter “lies in reducing the overall data traffic, since the claimed retransmission is only needed in situations where any initial transmission cannot be successfully received by a receiver. The claimed subject matter employs retransmission and diversity combining only when the initial transmission is not received properly, whereas [the prior art] communications scheme always transmits identical data over three parallel paths for diversity combining by a receiver and does not retransmit data in accordance with a repeat request by a receiver.” (Ex. C at 17).

31. **Direct Infringement.** Upon information and belief, Defendant has been directly infringing at least claim 1 of the ‘622 patent in Georgia , and elsewhere in the United States, by performing actions comprising at least performing the claimed ARQ re-transmission method by performing the steps of the claimed invention using the MST Fusion Cortex (“Accused Instrumentality”) (e.g., <https://www.emcsecurity.com/security-systems/>; <https://www.emcsecurity.com/product/connect-fundamentals-system/>; <https://www.emcsecurity.com/wp-content/uploads/2019/03/Connect-Install-and-User-Manual.pdf>).






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- Start with the Basics (Base Station, 2 Entry Sensors, 1 Motion Sensor).
- Add a keypad.
- Add additional sensors and options.

[\(https://www.emcsecurity.com/security-systems/\)](https://www.emcsecurity.com/security-systems/).

Description	Reviews (3)
<ul style="list-style-type: none"> <li>• Set-up in just minutes with video and written instruction. <a href="#">View Connect+ Resources page.</a></li> <li>• Wifi connection with optional cellular.</li> <li>• 24/7 professional monitoring and police dispatch from \$16.9 with no contract.</li> <li>• Requires the mobile app for system control - \$5/mo.</li> <li>• Connect other smart-devices (locks, lights, thermostats, and Alexa).</li> <li>• Risk Free Purchase. 30 Day No Questions Asked <a href="#">Return Policy.</a></li> </ul>	

[\(https://www.emcsecurity.com/product/connect-fundamentals-system/\)](https://www.emcsecurity.com/product/connect-fundamentals-system/).

Connect+™ Security and Automation Platform  
RE6100 Series Installation Guide

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Connect+ is a professional wireless security panel designed to deliver home security and automation services. A secured and supervised Ethernet connection comes standard. Optional Cellular and Wi-Fi cards provide primary or backup communication channels. Its long-range encrypted wireless receiver easily provides whole home coverage. Wireless arming stations and mobile devices uncouple Connect+ from the entry wall and allow it to be installed at a location convenient for Internet and power connections.



**Features**

- Cellular, Wi-Fi, or Ethernet communication channels
- Control from a user's mobile device
- Industry-leading wireless range
- Up to 50 users
- Up to 96 zones
- 2-way voice communication with RE6130
- 5 year warranty

<https://www.emcsecurity.com/wp-content/uploads/2019/03/Connect-Install-and-User-Manual.pdf>).

**Expansion Cards for Internet Connectivity**

- Wi-Fi™ Card
- LTE Cellular Card (Verizon)

(*Id.*).



### Cellular Connections

1. Ensure the Cellular card is properly installed, and the Power LED on the card is pulsing.

2. Inspect the LED on the expansion card.

- A solid LED indicates the panel is connected to the network.
- A flashing LED indicates the panel has found a tower, and is attempting to connect to the network. Wait until the LED is solid.

If the LED has been double flashing for more than ten minutes, try power cycling the panel.

(*Id.*).

### Communication Paths

LTE Category M1

Wi-Fi

Ethernet

(*Id.*).

32. The Accused Instrumentality practices an ARQ re-transmission method (*e.g.*, HARQ method) in a wireless communication system (*e.g.*, LTE network) wherein data packets are transmitted from a transmitter (*e.g.*, the Accused Instrumentality) to a receiver (*e.g.*, LTE base station) using a higher order modulation scheme (*e.g.*, one of QPSK, 16QAM and 64 QAM) wherein more than two data bits are mapped onto one data symbol to perform a first transmission and at least a second transmission (*e.g.*, HARQ retransmission) based on a repeat request (*e.g.*, HARQ retransmission request in the form of NAK). For example, the Accused Instrumentality

performs a higher order data modulation such as 16QAM and 64 QAM wherein has more than two data bits are mapped onto one data symbol (*i.e.*, in case of 16QAM it transmits 4 bits per symbol whereas in the case of 64QAM it transmits 6 bits per symbol). (*E.g.*, <https://www.emcsecurity.com/security-systems/>; <https://www.emcsecurity.com/product/connect-fundamentals-system/>; <https://www.emcsecurity.com/wp-content/uploads/2019/03/Connect-Install-and-User-Manual.pdf>; <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>; [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

33. Upon information and belief, the Accused Instrumentality practices modulating data packets at the transmitter (*e.g.*, the Accused Instrumentality) using a first mapping of said higher order modulation scheme (*e.g.*, one of QPSK, 16QAM and 64 QAM) to obtain first data symbols (*e.g.*, output of modulation block performing said first modulation scheme). For example, the Accused Instrumentality, at least in its internal testing and usage, performs a higher order data modulation such as 16QAM and 64 QAM which have more than two data bits are mapped onto one data symbol (*i.e.*, in case of 16QAM it transmits 4 bits per symbol whereas in the case of 64QAM it transmits 6 bits per symbol) so as to obtain a said first data symbols which is basically the output of the modulation block. (*E.g.*, [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude->

[modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php](http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/);

[https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

34. Upon information and belief, the Accused Instrumentality practices performing the first transmission by transmitting the first data symbols (*e.g.*, output of modulation block performing said first modulation scheme) over a first diversity branch to the receiver (*e.g.*, mapping from assigned resource blocks to the first available number of antenna ports). For example, the Accused Instrumentality discloses a first diversity branch wherein the output of modulation block, *i.e.*, first data symbols is transmitted over a first diversity branch which is indicated in case of Multi-antenna processing wherein mapping from assigned resource blocks to the first available number of antenna ports. (*E.g.*, <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;

[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

35. Upon information and belief, the Accused Instrumentality practices performing receiving at the transmitter (*e.g.*, the Accused Instrumentality) the repeat request (*e.g.*, HARQ retransmission request in the form of NAK) issued by the receiver (*e.g.*, LTE base station) to retransmit the data packets in case the data packets of the first transmission have not been successfully decoded (*e.g.*, Error indication in the data received). (*E.g.*,

<http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;

[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

36. Upon information and belief, the Accused Instrumentality practices modulating, in response to the received repeat request (*e.g.*, HARQ retransmission request in the form of NAK), said data packets at the transmitter using a second mapping of said higher order modulation scheme (*e.g.*, one of QPSK, 16QAM and 64 QAM- which is distinct from the first modulation scheme) to obtain second data symbols (*e.g.*, output of modulation block using a second modulation scheme). For example, the Accused Instrumentality on repeat request *i.e.*, receiving the retransmission request in the form of NAK, enables a second mapping of said higher order modulation scheme (*i.e.*, an Adaptive Re-transmission having a different Modulation Coding Scheme (MCS) than the one used for transmission *i.e.*, first higher order modulation scheme). (*E.g.*, <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>; [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>; [https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

37. Upon information and belief, the Accused Instrumentality practices performing, in response to the received repeat request (*e.g.*, retransmission request in the form of NAK), the second transmission (*e.g.*, retransmission) by transmitting the second data symbols (*e.g.*, output of modulation block using a second modulation scheme) over a second diversity branch to the receiver (*e.g.*, mapping from assigned resource blocks to the later available number of antenna ports). For example, at least in its internal testing and usage, the Accused Instrumentality discloses a second diversity branch wherein the output of modulation block, *i.e.*, second data symbols is transmitted over a second or later diversity branch which is indicated in case of Multi-antenna

processing wherein mapping from assigned resource blocks to the later available number of antenna ports. (E.g., <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;  
[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf)).

38. Upon information and belief, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which practices demodulating the received first (e.g., output of modulation block performing said first modulation scheme) and second data symbols (e.g., output of modulation block using a second modulation scheme) at the receiver (e.g., LTE Base Station) using the first and second mappings (e.g., the mappings corresponding to transmission and retransmission Modulation Coding Scheme). For example, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which practices demodulation of first (e.g., output of modulation block performing said first modulation scheme) and second data symbols (e.g., output of modulation block using a second modulation scheme) at the LTE Base Station using the first and second mappings, i.e., Modulation Coding Scheme which are distinct for transmission and Adaptive Re-transmission (i.e., an Adaptive Re-transmission having a different Modulation Coding Scheme (MCS) than the one used for transmission i.e., first higher order modulation scheme). (E.g., <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;  
[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf);  
<https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>;

[https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

39. Upon information and belief, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which practices diversity combining (*e.g.*, Hybrid ARQ soft-combining) the demodulated data received over the first (*e.g.*, mapping from assigned resource blocks to the first available number of antenna ports) and second diversity branches (*e.g.*, mapping from assigned resource blocks to the later available number of antenna ports). For example, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station which performs a diversity combining *i.e.*, Hybrid ARQ soft-combining of data from multiple received antenna ports. (*E.g.*, [https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf); <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>).

40. Upon information and belief, the Accused Instrumentality, at least in its internal testing and usage, utilizes a base station receiver wherein the first and second mapping of said higher order modulation schemes are pre-stored in a memory table (*e.g.*, modulation schemes are decided by MAC Scheduler). For example, the Accused Instrumentality performs a first higher order data modulation such as 16QAM and 64 QAM wherein has more than two data bits are mapped onto one data symbol (*i.e.*, in case of 16QAM it transmits 4 bits per symbol whereas in the case of 64QAM it transmits 6 bits per symbol). The Accused Instrumentality on repeat request, *i.e.*, receiving the retransmission request in the form of NAK, enables a second mapping of said higher order modulation scheme (*i.e.*, an Adaptive Re-transmission having a different Modulation Coding Scheme (MCS) than the one used for transmission, *i.e.*, first higher order modulation scheme). (*E.g.*, <http://www.techplayon.com/hybrid-automatic-repeat-request-harq-in-lte-fdd/>;

[https://www.etsi.org/deliver/etsi\\_ts/136300\\_136399/136302/08.00.00\\_60/ts\\_136302v080000p.pdf](https://www.etsi.org/deliver/etsi_ts/136300_136399/136302/08.00.00_60/ts_136302v080000p.pdf);  
<https://www.electronics-notes.com/articles/radio/modulation/quadrature-amplitude-modulation-types-8qam-16qam-32qam-64qam-128qam-256qam.php>;  
[https://www.etsi.org/deliver/etsi\\_ts/136200\\_136299/136211/08.07.00\\_60/ts\\_136211v080700p.pdf](https://www.etsi.org/deliver/etsi_ts/136200_136299/136211/08.07.00_60/ts_136211v080700p.pdf)).

41. Plaintiff has been damaged as a result of Defendant's infringing conduct. Defendant is thus liable to Plaintiff for damages in an amount that adequately compensates Plaintiff for such Defendant's infringement of the '961 patent and '622 patent, *i.e.*, in an amount that by law cannot be less than would constitute a reasonable royalty for the use of the patented technology, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

42. On information and belief, Defendant has had at least constructive notice of the '961 patent and '622 patent by operation of law and marking requirements have been complied with.

#### **IV. JURY DEMAND**

Plaintiff, under Rule 38 of the Federal Rules of Civil Procedure, requests a trial by jury of any issues so triable by right.

#### **V. PRAYER FOR RELIEF**

WHEREFORE, Plaintiff respectfully requests that the Court find in its favor and against Defendant, and that the Court grant Plaintiff the following relief:

- a. Judgment that one or more claims of United States Patent No. 7,154,861 have been infringed, either literally and/or under the doctrine of equivalents, by Defendant;
- b. Judgment that one or more claims of United States Patent No. 7,567,622 have been infringed, either literally and/or under the doctrine of equivalents, by Defendant;

- c. Judgment that Defendant account for and pay to Plaintiff all damages to and costs incurred by Plaintiff because of Defendant's infringing activities and other conduct complained of herein;
- d. That Plaintiff be granted pre-judgment and post-judgment interest on the damages caused by Defendant's infringing activities and other conduct complained of herein;
- e. That Plaintiff be granted such other and further relief as the Court may deem just and proper under the circumstances.

November 23, 2021

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**CERTIFICATE OF SERVICE**

I hereby certify that on November 23, 2021, I electronically filed the above documents and exhibits with the Clerk of Court using CM/ECF which will send electronic notification of such filings to all registered counsel. I also hereby certify that on November 23, 2021, I served the foregoing on Defendant's counsel via email pursuant to its agreement to accept service on Defendant's behalf.

/s/ Cortney S. Alexander  
Cortney S. Alexander