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Docket Number:	967P

PROVISIONAL APPLICATION FOR PATENT COVER SHEET (Large Entity)

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

JC678 U.S. PTO 60/196979 04/13/00

INVENTOR(S)/APPLICANT(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Stephen	**Shellhammer**	**Lake Grove, New York**
Jacob	**Sharony**	**Port Washington, New York**
Tony	**Biuso**	**Setauket, New York**
Sean	**Connolly**	**StonyBrook, New York**

☒ *Additional inventors are being named on page 2 attached hereto*

TITLE OF THE INVENTION (280 characters max)

COEXISTENCE TECHNIQUES IN WIRELESS NETWORKS

CORRESPONDENCE ADDRESS

Direct all correspondence to:

☐ Customer Number → *Place Customer Number Bar Code Label here*

OR

☒ Firm or Individual Name	**SYMBOL TECHNOLOGIES, INC.,**				
Address	**One Symbol Plaza**				
Address	**MS A-6**				
City	**Holtsville**	State	**NY**	ZIP	**11742**
Country	**USA**	Telephone	**631-738-5586**	Fax	**631-738-4110**

ENCLOSED APPLICATION PARTS (*check all that apply*)

☒ Specification	*Number of Pages*	17	
☒ Drawing(s)	*Number of Sheets*	4	☐ Other (specify)

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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government

☒ No.

☐ Yes, the name of the U S. Government agency and the Government contract number are.

Respectfully submitted,

SIGNATURE [signature]

DATE 4/13/00

TYPED or PRINTED NAME **Mark Koffsky**

REGISTRATION NO. *(if appropriate)* **41,906**

TELEPHONE **631-738-5586**

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INVENTOR(S)/APPLICANT(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (city and either State or Foreign Country)
William	**Sackett**	**Rocky Point, New York**
Joe	**Cabana**	**Centereach, New York**
Patrick	**Tilley**	**Coram, New York**
Bob	**Beach**	**Los Altos, California**

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COEXISTENCE TECHNIQUES IN WIRELESS NETWORKS

BACKGROUND OF INVENTION

This invention relates to wireless data communications networks, and in particular to arrangements for ensuring coexistence between wireless networks that share the same frequency band with different operating protocols.

Wireless devices communicate with one another using agreed-upon protocols that are transmitted in predefined frequency bands. Often, devices using one or more wireless protocols may operate by transmission within the same frequency band. It is therefore necessary to develop coordination techniques in order for devices using one or more wireless protocols to efficiently operate in the same band of frequencies at the same time.

For example, the assignee of the present invention supplies wireless data communications systems known as the Spectrum 24® System that follows the communications protocol of IEEE 802.11 Standard (802.11), which is hereby incorporated by reference. In the system as implemented, mobile units (MUs) are in data communication with a central computer through access points (APs). The APs communicate with the computer over an Ethernet wired network. Each of the MUs associates itself with one of the APs. As defined in 802.11, this communications protocol uses the 2.4 GHz ISM frequency band.

As currently designed, 802.11 devices may use several predefined methods for transmission within the 2.4 GHz band to perform as a wireless local area network. One method is to use a frequency hopping spread spectrum (FHSS) mechanism wherein data is transmitted for a certain period of time in a particular channel and, following a pseudorandom sequence, continues transmission at a different channel for the same predetermined length of time. As currently designed, 802.11 devices operate at a frequency hopping rate of 10 hops/second. Another method is to use a direct sequence spread spectrum (DSSS) mechanism wherein the data is transmitted in a predetermined frequency channel and is multiplied by a pseudorandom chipping sequence during transmission.

As all 802.11 devices use the same ISM frequency band, interference among these devices is minimized by use of a Carrier Sense Multiple Access / Collision Avoidance (CSMA/CA) protocol. Under CSMA/CA, an 8021.11 device listens for another's devices transmission prior to initiating its own transmission. If no other transmission is detected, the device transmits its information and waits for an acknowledgement from the receiving device. If no acknowledgement of receipt is received after a pre-determined time interval, the device will retransmit after waiting for a randomly chosen interval of time. Thus, if two or more devices began transmitting coincidentally at the same time and the resulting interference blocks all of the transmissions, each device will wait a random amount of time to attempt a retransmission. This allows the devices to transmit at different times.

Another example of a wireless specification that also uses the 2.4 GHz frequency band is Bluetooth™, which is designed for communication among devices within a short range using a lower amount of power. As currently designed, Bluetooth operates using a frequency hopping spread spectrum mechanism at a rate of 1600 hops/second. Bluetooth uses a master/slave system of communication. One example of a Bluetooth network may be a mobile device attached to the user's belt that communicates with a cordless ring scanner. In this case, the mobile device would operate as the master and the cordless ring scanner would operate as the slave. In this system for data transmission, the master and slave only communicate at predefined intervals. At the first interval, the master may communicate to a first slave device, which may only respond during the second interval. At the third interval, a master may communicate to a second slave device, which may only respond during a fourth interval. By using this system, it is ensured that only one device within a particular Bluetooth piconet is transmitting at any particular time. Thus, interference is minimized.

Additionally, it is desirable for one Bluetooth piconet to operate in close proximity with another, separate Bluetooth piconet. Because there are 79 different frequency channels used by Bluetooth, different Bluetooth networks are unlikely to be operating on the same frequency at the same time. Interference between the separate Bluetooth piconets is thus minimized. This allows, for example, multiple individuals working in close proximity with one to each have his or her own mobile unit along with a cordless ring scanner.

Along with the need to operate multiple networks of the same protocol in close proximity, there is also a recognized need in the art to coordinate the transmissions of devices operating under different protocols that use the same frequency band. For example, it may be desirable to use a cordless ring scanner that communicates with belt mounted terminal using the Bluetooth protocol while the same terminal communicates with an access point using the 802.11 protocol. For example, once the user scans a bar code using the cordless ring scanner, the bar code information may be sent to the belt-mounted terminal. That bar code information then may

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