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# UTILITY PATENT APPLICATION TRANSMITTAL

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

| | |
|---|---|
| Attorney Docket No. | 060783/P018US/10200570 |
| First Inventor | Randall J. Karr |
| Title | SPECTRUM ALLOCATION SYSTEM AND, etc. |
| Express Mail Label No. | EL372555379US |

## APPLICATION ELEMENTS

*See MPEP chapter 600 concerning utility patent application contents.*

1. [ ] Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original, and a duplicate for fee processing)*
2. [X] Applicant claims small entity status. See 37 CFR 1.27.
3. [X] Specification [Total Pages 22]

*(preferred arrangement set forth below)*
- Descriptive title of the invention
- Cross Reference to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to sequence listing, a table, or a computer program listing appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings *(if filed)*
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

4. [X] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 2]
5. Oath or Declaration [Total Pages ]
   a. [ ] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] Application Data Sheet. See 37 CFR 1.76

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Washington, DC 20231

7. [ ] CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] paper
   c. [ ] Statements verifying identity of above copies

## ACCOMPANYING APPLICATIONS PARTS

9. [ ] Assignment Papers (cover sheet & document(s))
10. [ ] 37 CFR 3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
11. [ ] English Translation Document *(if applicable)*
12. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
13. [ ] Preliminary Amendment
14. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. [X] Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: _____

*Prior application information:* Examiner _____ *Group / Art Unit:* _____

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| Signature | | Date | March 11, 2002 |

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| NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i) | First Named Inventor | Randall J. Karr |
|---|---|---|
| | Title | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATACOMMUNICATIONS |
| | Attorney Docket No. | 060783/P018US/10200570 |

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

March 11, 2002
Date

Signature

Jerry L. Mahurin 34,661
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Docket No.: 060783-P018US-10200570

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR U.S. LETTERS PATENT

Title:

Spectrum Allocation System and Method for Multi-Band Wireless RF Data Communications

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# SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS

## TECHNICAL FIELD

**[0001]** The present invention generally relates to wireless RF data communications, and specifically to spectrum allocation systems and methods for multi-band wireless RF data communications.

## BACKGROUND OF THE INVENTION

**[0002]** Currently, there are several so-called "last mile" and "last foot" data transmission systems which are designed to deliver high speed and/or high data capacity from the internet backbone to an end user or to provide high speed data communications in a campus-like setting. Several such systems use RF transmissions to replace copper wire or fiber optic cables. Some of these fixed wireless data communications systems are called point-to-point or point-to-multipoint systems and operate in various licensed and unlicensed RF bands. Point-to-point systems, typically have a pair of transceivers communicating only with each other, for example from one building to another. Point to multi-point systems communicate between a hub station, or the like and a number of subscriber stations, or the like. For example, such a point to multi-point system may broadcast from a central tall building to a number of shorter buildings.

**[0003]** Typically either of these systems utilize one frequency band of operation, generally, transmitting and receiving on separate frequencies within the same basic band employing frequency division duplexing (FDD). Such prior art data communication systems operate entirely within one regulated band. These prior art systems employ a subchannel scheme for upstream and downstream in which the frequencies of such subchannels are relatively closely spaced. That adjacency requires extensive use of filters resulting in increased size and cost for data communication systems, particularly for subscriber stations. The band utilized for communication in such prior art systems may be a licensed band or it may be an unlicensed band. Generally, as employed herein, unless otherwise noted, a band is a generally contiguous portion of the electromagnetic spectrum which is regulated by a



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governmental entity, such as the Federal Communications Commission (FCC) for the United States, generally under a single designation such as those described below.

**[0004]** Another technique which is used to enable communications within a band of operation is time division duplexing (TDD), whereby a base station or hub transmits part of the time on a frequency, and then a subscriber transmits part of the time on the same frequency, thereby sharing the same frequency. Such a system may employ the entire bandwidth available facilitating broadband communications rather than splitting the available bandwidth between upstream and downstream signals as is required in FDD. A disadvantage in a TDD system is that a large amount of coordination is required, resulting in inefficiencies. The bits-per-megahertz efficiency of the data communicated in a TDD system is greatly degraded because time sharing takes a lot of coordination and/or processing power. Further, units in a TDD system are typically not able to operate autonomously, they must be directed from a central unit such as a hub station in order to provide the aforementioned coordination.

**[0005]** In FDD, a base station may simultaneously transmit and receive, and a subscriber station may simultaneously transmit and receive. This provides a benefit in efficiency with this type of system in that the system does not require a lot of processing power or coordination to determine when to transmit and when to receive as with TDD. This inherent efficiency in an FDD system makes good use of spectrum in wireless data communications when larger amounts of spectrum are available. However, the upstream and downstream communications frequencies are typically in the same regulated band. FDD typically needs a reasonable amount, about one percent of bandwidth, of transmission to reception spacing between upstream and downstream frequencies.

**[0006]** In the prior art, the radio of a hub-station or subscriber station may include a duplexer, which employs filters to filter the upstream out of the downstream, and vice versa. In prior art data communications transceivers, a transmitted signal, and even transmit induced noise can enter the transceiver's receiver, because the receiver is intended to receive a very weak signal. So in the prior art very sophisticated filter systems are required to keep the transmit signal or interference caused by the transmit signal out of the receiver.

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**[0007]** The Multichannel Multipoint Distribution Service (MMDS) is an FCC regulated communications band that operates in the microwave portion of the radio spectrum, between 2.1 and 2.7 GHz. MMDS. Also known as wireless cable, this band was initially intended for use as a substitute for conventional coaxial cable television. However, the MMDS band has come under wide use for data communication services due to deregulation that allows cable TV companies to provide Internet services. Narrowband channels within MMDS can be used by subscribers to transmit signals to the network. Such narrowband channels were originally intended for use in an educational setting (so-called wireless classrooms). Thusly, the Instructional Television Fixed Service (ITFS) band interleaves with the MMDS band. In ITFS, the FCC allows use of either polarity for transmissions by a license-holder, while in MMDS use of the same spectrum, the FCC requires licensing of the polarity as well as the frequency used for transmission.

**[0008]** Other FCC licensed and regulated bands include the following. Wireless Communications Services (WCS) occupy two fifteen MHz wide bands at 2.3 GHz. WCS is intended for wireless data services. Digital Electronic Message Services (DEMS) at the 24.25 to 24.45 and 25.05 to 25.25 GHz bands offer high data capacity over short distances, particularly useful for providing broadband data services to businesses in dense, urban areas or in a campus environment. Local Multipoint Distribution Services (LMDS) employ the 27.5 to 29.5 GHz and 31.0 to 31.3 GHz bands. Wireless Local Loop and fixed wireless data connection systems such as point-to-point or point-to-consecutive point systems operate in these bands. So called Fixed Wireless Local Loop Services occupy the 38.6 GHz to 40 GHz band.

**[0009]** Problematically, there are only a limited number of licensed bands in any geographic area. Also, in these licensed spectrum bands, limited spectrum problems arise where the licensee may not have as much bandwidth in a particular market as needed to provide broadband services desired by the licensee's customers. Also, problems arise where a licensee has spectrum, but this spectrum is not ideal in terms of a transmit/receive frequency pair. For example, certain amount of spectrum, as a percentage of bandwidth, between the upstream and the downstream (i.e. transmit and receive frequencies) is required to allow state of the art filters to properly operate. Many spectrum licensees do not have

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sufficient spectrum bandwidth available to provide this separation between employed frequencies.

**[0010]** In 1997 the FCC created a wireless arena called Unlicensed National Information Infrastructure (UNII). System operators are free to operate wireless equipment in three sub-bands (5.15 to 5.25 GHz, 5.25 to 5.35 GHz and 5.725 to 5.825 GHz) without acquiring a licensed frequency spectrum. The FCC specifies the conditions for operating wireless equipment in the UNII frequency band. However, operators are not protected from possible interference from other UNII operators transmitting in the vicinity or even other systems or devices which utilize the same frequencies.

**[0011]** A problem that many wireless data communication system operators face is a need to provide the highest possible data rates to subscriber units. One prior art method of providing greater through-put in licensed bands is to have a very large channel bandwidth providing data to the subscriber. To increase through-put to a particular subscriber unit, the bandwidth must necessarily increase or the modulation scheme that is used has to become more complicated. Problematically, bandwidth is limited in both the licensed and unlicensed bands and using a higher modulation scheme causes an increase in the necessary signal to noise ratio or carrier to interference ratio (C/I). For example, increasing from a quadrature phase shift keying (QPSK) modulation to a 16 quadrature-amplitude modulation (16QAM), which doubles the throughput, requires a 6 dB increase in C/I. Problematically, such increases in C/I may not be practical, particularly in the unlicensed bands where a significant amount of interference may be present.

## BRIEF SUMMARY OF THE INVENTION

**[0012]** The present invention is directed to systems and methods for providing wireless data transmission spectrum allocation by utilizing separate bands for upstream and downstream wireless data communication. In a preferred embodiment the present invention takes the form of a dual band spectrum allocation system and method for wireless data communications using unlicensed UNII bands for license-free data transmissions from a



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subscriber to a hub, and using relatively interference-free licensed bands for data transmissions from a hub to subscribers, thereby allowing use of greater bandwidth.

**[0013]** The present invention enables the use of wireless spectrum for digital data communication, such as Internet access or other connections such as Ethernet, between points such as campus building's or the like. The present invention is intended to enable use of spectrum that is not otherwise useable for high data rate communication and enables use of limited spectrum where there is not enough bandwidth available to a licensee to transmit the amount of data that is required by the licensee or its customers. As pointed out above, continuous spectrum, which provides sufficient bandwidth for a proper data rate to be passed by a wireless data communications system, is somewhat rare or at least difficult and costly to acquire. The present invention provides a solution for licensees with spectrum congestion and spectrum limitation problems.

**[0014]** The present invention allows an operator to use any band to which the operator has access. If the operator has licenses in more than one band the present invention allows the operator to make efficient use of these licenses. Similarly, if an operator has a license in only one band, the operator can enhance use of the available spectrum in the licensed band by employing unlicensed bands, such as the UNII bands for one direction of communication in accordance with the present invention. For example, a licensee may employ its relatively interference-free licensed spectrum bandwidth for high speed, relatively broadband, transmissions from a hub station to subscriber stations while employing an unlicensed band such as the 5.8 GHz band of the UNII bands for communications from subscribers to the hub. This UNII upper band is 100 megahertz wide and is sparsely used. In most markets there are relatively few or no transmissions in this band.

**[0015]** Generally, Internet or other network traffic is asymmetric, that is to say, there is more traffic coming from the network to subscribers than from subscribers to the network. Therefore, in the present system and method the less noisy licensed band frequency is preferably used to transmit data downstream from the hub to the subscriber while the noisier unlicensed band frequency is preferably used to transmit upstream data from a subscriber to the hub. However, one embodiment of the present system and method, by

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employing the relatively underused unlicensed band at 5.8 GHz, is adaptable to allow relatively high capacity data transmissions from a subscriber to the hub, as necessary.

**[0016]** By utilizing separate bands, particularly bands separated by an octave or more, the present invention increases the efficiency and capacity of a wireless data communication system by allowing use of the full bandwidth available, in each band, to an operator. As used herein, a frequency octave is a doubling of frequencies. In other words, an octave is an interval between two frequencies having a ratio of two-to-one. For example, a downstream transmission made on a one GHz frequency would be separated by one octave from an upstream transmission made on a two GHz frequency. Prior art wireless RF data communication systems do not use over one octave of separation between transmit and receive frequencies. Generally, this would require the use of spectrum from separate bands. Typically, in the prior art, FDD frequency separation is less than one percent of frequency. For example prior art FDD transmission frequencies at around one GHz would traditionally be separated by less than ten MHz

**[0017]** The present invention allows spectrum, which does not have sufficient bandwidth to provide one percent frequency separation between upstream and downstream frequencies, as typically required to use FDD, to be used for broadband data transmission. The present system and method preferably qualifies a geographical area which may not have been optimal based on its available line of sight and licensee's spectrum bandwidth for relatively broadband data communications.

**[0018]** The present inventive point to multi-point radio transmission system is intended to transmit data from one point to multiple points via wireless digital radio, preferably from a base or hub station to a number of subscriber stations, with efficient use of spectrum and at as low a cost as possible. This efficiency is particularly enhanced in a point to multipoint system due to sharing of the cost for hub equipment and site or building top, as well as sharing hub operating expenses such as electricity, among multiple subscribers.

**[0019]** Whereas the present invention uses separate bands of operation to carry out upstream and downstream data transmission, the present invention necessarily addresses some distinctive technical problems. A hub and subscriber stations embodying the present



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invention each preferably employs a multi-band antenna, preferably capable of employing multiple polarities in all bands. Preferably, this antenna is a dual band antenna capable of employ two orthogonal polarities such as horizontal and vertical polarities in both bands. This dual band antenna preferably employs relatively the same gain and footprint for the antenna beams of both bands. Preferably, the forward gain, beam width and the reverse side lobe isolation for the antenna beams are similar so that the footprint for the upstream beam is similar to the footprint for the downstream beam, even though the bands of operation are separated by an octave.

**[0020]** An embodiment of the present invention also preferably employs a dual band duplexer. Such a duplexer may be made up of, by way of example, discrete circuit components, an integrated circuit or a rectangular waveguide assembly. A waveguide based dual band duplexer preferably employs two different size waveguide components, on the order of a factor of two. Preferably, the duplexer provides low insertion loss while low in cost and having a small package size.

**[0021]** Embodiments of the present invention preferably use very diverse portions of spectrum for upstream and downstream data communication, this addresses some of the spectrum limitations and the congestion problems detailed above. Further, the present invention enables the efficient use of the spectrum because it prevents interference between transmit and receive signals without requiring exotic filters. The present dual band approach overcomes the forestated problem of a transmitted signal, or noise induced thereby, entering a transceiver's receiver, because as bands are further separated in the electromagnetic (EM) spectrum, the transmitter and receiver of a transceiver do not interfere with one another. In accordance with the present invention, transmit and receive signals occupy different parts or bands of the EM spectrum, preferably separated by at least an octave of frequency. So preferably need for filtering is greatly reduced. As a result of filtering being reduced, the present invention enables the size of a data communications device to be reduced and the cost of the device to be reduced.

**[0022]** When employing two separate bands, filtering requirements for one band may be greater than the filtering requirements for the other band. This may be due to one frequency of operation being widely used, for similar and/or different purposes, or an



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adjacent frequency band that has tight regulatory specifications. For example, some bands, such as WCS, have an adjacent band, such as Digital Audio Radio Satellite (DARS), that have more stringent rules, in this example due to WCS being a terrestrial band and DARS being a satellite band. By using a relatively noisier band, such as the UNII band, for upstream transmissions, a preferred embodiment of the present invention enables an operator to use the more expensive and complicated filter in the base station, and the less expensive, smaller filters in subscriber stations. This is economically advantageous in a point to multi-point system since only one large, expensive filter is needed at the base station.

**[0023]** The present invention has great advantages related to frequency coordination and licensing. Typically in a point to multi-point system, a service provider is required to coordinate a base station so it does not interfere with or is received by subscribers in adjacent markets. Additionally, in prior art licensed spectrum data communication systems each of the subscriber stations must be included in an interference study. Typically, the maximum ground elevation of the highest subscriber in a given sector is used in conjunction with power addition of all of the subscribers in the system, transmitting at the same time, to analyze interference to any adjacent market. In accordance with a preferred embodiment of the present system, subscribers transmit on an unlicensed band and thus can transmit without benefit of a license. So, a service provider employing the present system and method does not need to make a frequency coordination study for all of the subscriber area. Preferably, use of a licensed band by a hub station for downstream transmissions affords a degree of protection from interference by other systems. Therefore, a provider employing the present system and method should only be required to perform frequency coordination for the base station. A related advantage is that as subscribers are added, a provider should not need to refine its frequency plan.

**[0024]** The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the



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art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims. The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present invention.

## BRIEF DESCRIPTION OF THE DRAWING

**[0025]** For a more complete understanding of the present invention, reference is now made to the following descriptions taken in conjunction with the accompanying drawing, in which:

**[0026]** FIGURE 1 is a diagrammatic illustration of a wireless data communication system employing the present spectrum allocation system and method for multi-band wireless RF data communications;

**[0027]** FIGURE 2 is a diagrammatic illustration of an embodiment of a subscriber station employing dual band wireless data communication in accordance with the present invention; and

**[0028]** FIGURE 3 is a diagrammatic illustration of an embodiment of a hub station employing dual band wireless data communication in accordance with the present invention.

## DETAILED DESCRIPTION

**[0029]** The present systems and methods for multi-band wireless RF data communications enables communication of upstream data on one band of operation while downstream data is communicated on a different band of operation. These bands are preferably separated by more than one percent bandwidth and in a preferred embodiment are separated by at least one octave of bandwidth. Specifically one preferred embodiment of the



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present invention utilizes one regulated band for downstream communications such as from a hub station to subscriber stations and an entirely different regulated band for communication in the other direction, these bands preferably employ a magnitude of separation, thereby minimizing filtering problems and as a result minimizing size and cost of communication stations. The two bands may both be licensed bands or both may be unlicensed bands. However, in one preferred embodiment, one band is a licensed band while another is an unlicensed band.

**[0030]** FIGURE 1 is a diagrammatic illustration of a point to multi-point data communications system 100 employing an embodiment of the present spectrum allocation system and method for multi-band wireless RF data communications. FIGURE 1 shows base station 10 in wireless data communication with multiple subscriber systems S1 to Sn. In accordance with the present system and method any number of subscribers S1 to Sn may be present. The present system and method employ downstream (i.e. from the hub to subscribers) wireless data transmissions 102 and 104 in at least one band of operation, preferably a relatively interference-free licensed band such as MMDS, ITFC or WCS while transmissions 101 and 103 in the upstream direction (i.e. from subscriber to the hub) take place in at least one license-free band, such as the UNII bands. The bands of operation for the present invention are preferably separated by more than the normal degree of separation between upstream and downstream frequencies as employed in prior art FDD. Preferably, the frequencies of operation for upstream transmissions 101 and 103 and the frequencies of operation for downstream transmissions 102 and 104 are in separate bands of operation, preferably regulated bands. Compensation for interference 107 with reception of upstream communications is preferably carried out by a single filter at hub station 10, while interference 108 and 109 with reception of the relatively high data-volume downstream transmissions is relatively minor due to the preferable employment of a relatively interference-free licensed band. This allows the aforementioned use of a single expensive and/or complicated filter at the base station, and the use of less expensive, smaller filters in subscriber stations.

**[0031]** The present systems and methods preferably employ dual band antennas, and dual band duplexers in both types of stations, hub station 10 and subscriber stations S1 to Sn. Referring to FIGURE 2, an embodiment of subscriber unit 200 uses multi-band antenna



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201, preferably capable of employing multiple polarities in all bands. Preferably, antenna 201 is a dual band antenna also capable of employing two orthogonal polarities such as horizontal and vertical polarities. Dual band antenna 201, as discussed previously, preferably normalizes the gain of the two bands. Dual band antenna 201 preferably matches the antenna patterns preferably by matching the pattern beam width, side lobes and front to back footprint as much as possible, so the footprint of operation matches in the upstream and the downstream direction as much as possible, even though the bands of operation are preferably separated by an octave. Alternatively, separate antenna beams for upstream and downstream data communications may be employed to avoid multipath effects or the like and/or to facilitate non-line-of-sight communications. Regardless, the present invention preferably utilizes an antenna that fits packaging requirements for subscriber stations (i.e. compact size for use in a subscribers available space) while operating in both bands.

**[0032]** Preferably subscriber station 200 employs a multi-band duplexer 202. Duplexer 202 preferably accommodates upstream and downstream communications on at least two greatly different bands of operation. A preferred embodiment duplexer 202 operates in two separate bands of operation, as opposed to transmitting and receiving on frequencies within the same band of operation, as with prior art duplexers. Duplexer 202 may be made up of discrete circuit components, may be embodied in an integrated circuit, may comprise a rectangular waveguide assembly or may be made up of other combinations of components and elements capable of carrying out duplexing in accordance with the present invention. A waveguide based dual band duplexer employs two different size waveguide components. For a preferred duplexer using frequencies in bands separated by an octave, the waveguide size difference is on the order of a factor of two. Preferably, the duplexer provides low insertion loss while being low in cost and having a small package size. Less expensive duplexers 202, which may have integrated filters with fewer poles, may be employed in subscriber stations 200, when compared to a hub station, thereby lowering the cost of subscriber stations 200, making the overall system less expensive.

**[0033]** Subscriber station 200 preferably employs intermediate frequency (IF) converters 203 (preferably employing heterodyne techniques), digital to analog (D/A) processing circuits 204 and analog to digital (A/D) processing circuits 205. Preferably, incoming signals are converted from an analog RF signal to a digital signal for use by



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customer premises equipment (CPE) 206, which may include further networking equipment serving multiple users . Preferably, received signals are broken into their MAC layer and PHY layer components for use by conventional networking protocols such as Ethernet to communicate with CPE 206. For transmitting, signals originate from CPE 206 as a digital Ethernet signal or the like and are converted to an RF signal for transmission. The signal is imposed on a carrier signal, preferably produced by a voltage controlled oscillator, or the like (not shown). Preferably the output signal is passed through a power amplifier set (not shown), which directly drives antenna output.

**[0034]** Filtering to allow dual band operation is largely handled within duplexer 202. However, additional filters 207 associated with the aforementioned IF circuitry, specifically digital filtering, known as finite impulse response (FIR) filtering, and also discrete filtering such as surface acoustical wave (SAW) filtering, may be carried out by RF filters 207 before and/or after D/A and A/D conversion. Whereas, in accordance with the present invention, a band with less interference and thus less filtering requirements is used to transmit from the hub to subscriber station 200, the subscriber station preferably need not make extensive use of filtering or may only employ less costly filters for reception.

**[0035]** Turning to FIGURE 3, although the architecture of base station 300 is somewhat similar to that of subscriber station 200, technical challenges specific to a base station 300 arise. Preferably, hub 300 employs a multi-lobe antenna assembly with each lobe comprising a dual band antenna 301. Similar to subscriber station, 200, the pattern of dual band antenna 301, the side lobes, gain and front to back ratio of antenna beams for the two different bands employed by the hub for transmitting and receiving are preferably matched as close as possible to the same gain and pattern of the complimentary subscriber station antenna beam patterns. In short, the footprint of a reception antenna beam pattern preferably approximates the footprint for a transmission antenna beam pattern for both hub antenna 301 and subscriber station antenna 201, such that the beam patters for both stations are substantially co-spatial. Alternatively, separate antenna beams for communications from and to hub 300 may be employed to facilitate non-line-of-sight communication and/ or to avoid multipath effects, or the like.



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**[0036]** Hub duplexer 302 of preferred embodiment hub 300 is also a multi-band duplexer enabling use of at least two different transmit and receive bands. However, base station 300 may utilize a more elaborate duplexer 302, e.g. having a greater number of poles, while maintaining low insertion loss. A preferred embodiment of duplexer 302 operates in separate bands of operation, as opposed to prior art duplexers which transmit and receive on frequencies within a single band of operation. Embodiments of duplexer 302 may be made up of discrete circuit components, may comprise an integrated circuit or may employ a rectangular waveguide assembly which may be made up of two or more different size waveguide components. Preferably, duplexer 302 provides low insertion loss, is low in cost and is compactly packaged. Additionally, more elaborate filtering is preferably used in conjunction with base station dual band duplexer 302.

**[0037]** Similar to subscriber station 200, an embodiment of hub 300 employs IF circuitry 303 using heterodyne techniques, A/D converters 305, and D/A converters 304 to enable communication via network 306. Network 306 may be the Internet backbone, an intranet, an Ethernet network for a campus or the like, a cable network, public switched telephone network (PSTN), a nationwide service network, or other public or private network. Preferably, incoming signals are converted from an analog RF signal to a digital signal employing A/D converter 305 for use by Network 306. Preferably, signals received by base station 300 are broken into their MAC layer and PHY layer components for use by conventional networking protocols such as Ethernet to communicate with Network 306. For transmitting, signals originating from Network 306 as digital signals are converted to RF signals for transmission by D/A converter circuitry 304 and IF/RF circuitry 303.

**[0038]** Filtering at the base station to allow dual band operation is also largely handled within duplexer 302. Additional filters 307 associated with the aforementioned IF circuitry, which may include digital FIR filtering and discrete SAW filtering may be carried out before and/or after D/A and A/D conversion. At base station 300, the present invention utilizes a reduced number of, or preferably a single, more complicated and expensive filter, which may have more poles or more selectivity and which may or may not be incorporated into duplexer 302. Because one base station is supporting multiple subscriber stations overall cost of the system is reduced, since a single more expensive filter is used at base station 300 while lower cost filters are used at multiple subscriber stations 200.



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**[0039]** As will be appreciated by those skilled in the art functionality of various components in both subscriber station 200 and/or hub station 300 of the present system may be integrated into fewer, or even singular components. Conversely, components may be separated. For example, filters, described above as incorporated in duplexers 202 and 302, may be separate components deployed separately from or in conjunction with duplexers 202 and 302.

**[0040]** Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present invention. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.

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CLAIMS

What is claimed is:

1. A spectrum allocation method for wireless data communication comprising the steps of:

transmitting data from a first station using a first frequency within a first band of operation;

receiving data at said first station using a second frequency within a second band of operation;

transmitting data from at least one other station to said first station using said second frequency within said second band of operation; and

receiving data at said at least one other station using said first frequency within said first band of operation.

2. The method of claim 1 wherein said first frequency and said second frequency are separated by at least one octave.

3. The method of claim 1 wherein one of said stations is a hub station transmitting to at least one subscriber station.

4. The method of claim 1 wherein one of said stations is a hub station transmitting to a plurality of subscriber stations.

5. The method of claim 1 wherein said first frequency and said second frequency are separated by a bandwidth of at least one percent of the lower of said frequencies.

6. The method of claim 1 wherein said frequencies are in separate regulated bands.



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7. The method of claim 1 wherein at least one of said frequencies is in a licensed band.

8. The method of claim 1 wherein at least one of said frequencies is in an unlicensed band.

9. The method of claim 1 wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

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10. A system for spectrum allocation in wireless data communication comprising:

a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation; and

at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation.

11. The system of claim 10 wherein each of said stations further comprise duplexers separating transmitted signals and received signals.

12. The system of claim 10 wherein said first frequency is separated from said second frequency by a bandwidth of at least one percent of the lower of one of said frequencies.

13. The system of claim 10 wherein said first frequency and said second frequency are separated by at least one octave.

14. The system of claim 10 wherein said frequencies are in separate regulated bands.

15. The system of claim 10 wherein at least one of said frequencies is in a licensed band.

16. The system of claim 10 wherein at least one of said frequencies is in an unlicensed band.



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17. The system of claim 10 wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

18. The system of claim 10 wherein each of said stations further comprise at least one dual band antenna.

19. The system of claim 10 wherein said first station is a hub station and said at least one other data communications station is at least one subscriber station.

20. The system of claim 19 wherein said first frequency is in a licensed band and said second frequency is an unlicensed band.

21. The system of claim 19 wherein said hub station transmits to a plurality of said subscriber stations.

22. The system of claim 19 wherein said hub station comprises at least one dual band antenna transmitting on said first frequency using a first antenna beam and receiving on said second frequency using a second antenna beam.

23. The system of claim 22 wherein said subscriber stations comprise at least one dual band antenna receiving on said first frequency using a first antenna beam and transmitting on said second frequency using a second antenna beam.

24. The system of claim 23 wherein said hub station first antenna beam and said subscriber station first antenna beam have co-spatial footprints and said hub station second antenna beam and said subscriber station second antenna beam have co-spatial footprints.

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25. A data communications station using spectrum allocation for wireless data communications, said station comprising:

means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals; and

means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation.

26. The station of claim 25 further comprising means for filtering said data signals.

27. The station of claim 25 wherein said frequencies are separated by a bandwidth of at least one percent of the lower of said frequencies used to transmit and receive data signals.

28. The station of claim 25 wherein said disparate frequencies are separated by at least one octave.

29. The station of claim 25 wherein said station is a hub station which communicates with a plurality of subscriber stations.

30. The station of claim 29 wherein said hub station comprises a plurality of said antenna beam means for communicating with said plurality of subscriber stations.

31. The station of claim 25 wherein said station is a subscriber station.

32. The station of claim 25 wherein said disparate frequencies are in separate disparate regulated bands.

33. The station of claim 25 wherein at least one of said disparate frequencies is in a licensed band.

34. The station of claim 33 wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station.

35. The station of claim 25 wherein at least one of said disparate frequencies is in an unlicensed band.

36. The station of claim 35 wherein said at least one unlicensed band frequency is used for upstream data communications from at least one subscriber station to a hub station.

37. The station of claim 25 wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band.

38. The station of claim 37 wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station and wherein said at least one unlicensed band frequency is used for upstream data communications from at least one subscriber station to a hub station.

39. The station of claim 38 further comprising means for filtering said data signals, wherein filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications at said at least one subscriber station.

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# ABSTRACT

A dual band spectrum allocation system and method for wireless data communications uses discrete bands for upstream and downstream data communications. A preferred embodiment uses unlicensed UNII bands for license-free data transmissions from a subscriber to a hub, and uses relatively interference free licensed bands for data transmissions from a hub to subscribers, thereby allowing use of greater bandwidth, simplifying system licensing and reducing filtering requirements for subscribers.

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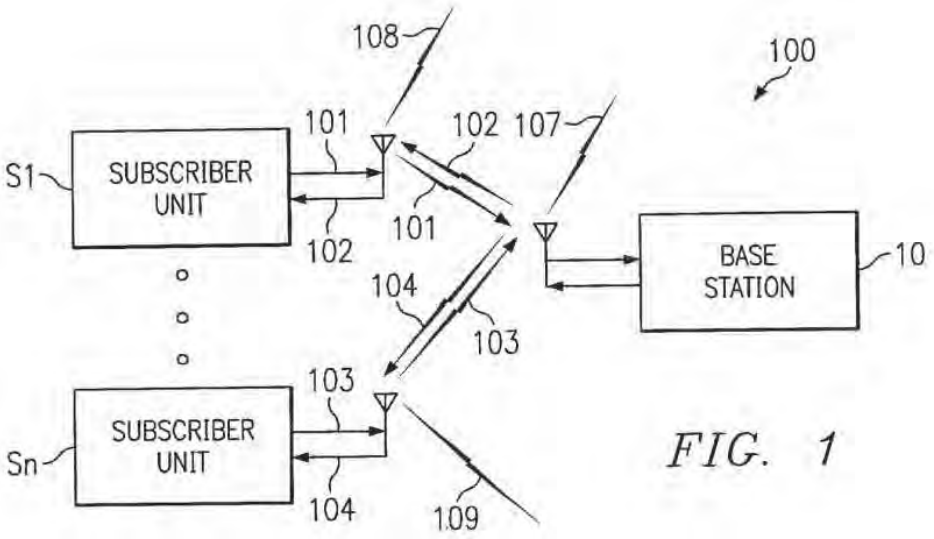



FIG. 1

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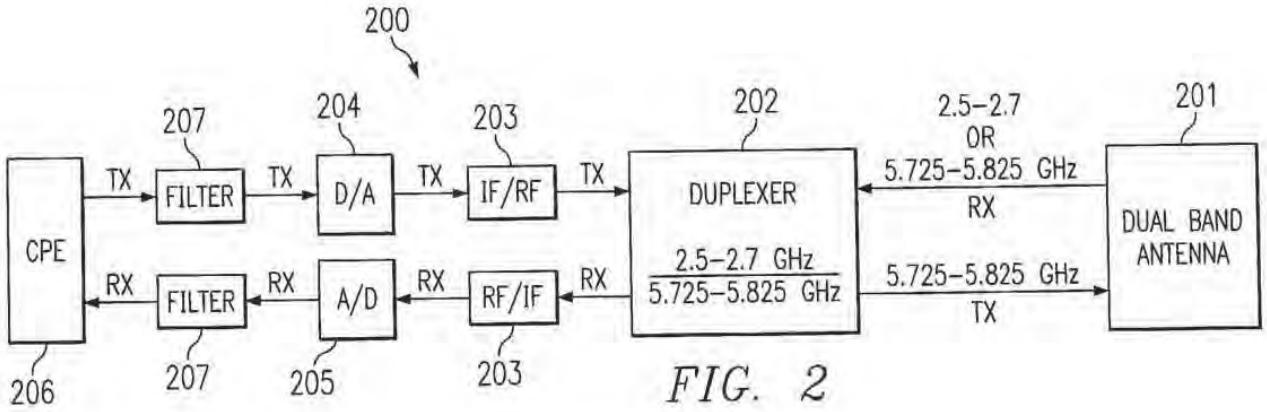



FIG. 2

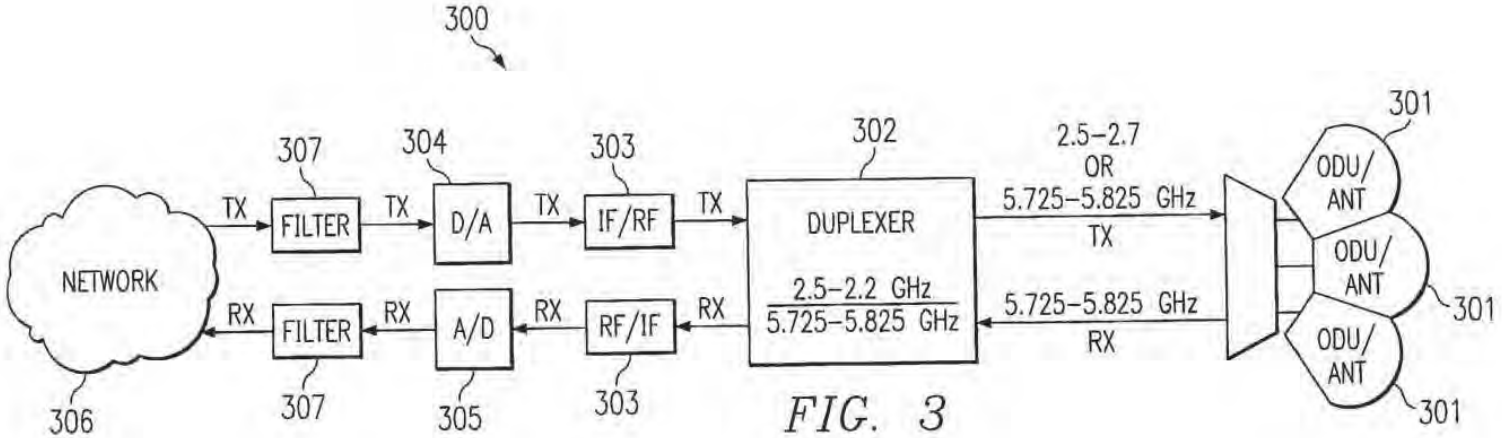



FIG. 3

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PTO/SB/05 (03-01)
Approved for use through 10/31/2002. OMB 0651-0032
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# UTILITY PATENT APPLICATION TRANSMITTAL

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

| | |
|---|---|
| *Attorney Docket No.* | 060783/P018US/10200570 |
| *First Inventor* | Randall J. Karr |
| *Title* | SPECTRUM ALLOCATION SYSTEM AND, etc. |
| *Express Mail Label No.* | EL372555379US |

## APPLICATION ELEMENTS

*See MPEP chapter 600 concerning utility patent application contents.*

1. [ ] Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original, and a duplicate for fee processing)*
2. [X] Applicant claims small entity status. See 37 CFR 1.27.
3. [X] Specification [*Total Pages* 22]
   *(preferred arrangement set forth below)*
   - Descriptive title of the invention
   - Cross Reference to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to sequence listing, a table, or a computer program listing appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
4. [X] Drawing(s) *(35 U.S.C. 113)* [*Total Sheets* 2]
5. Oath or Declaration [*Total Pages*]
   a. [ ] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] Application Data Sheet. See 37 CFR 1.76
7. [ ] CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] paper
   c. [ ] Statements verifying identity of above copies

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10/095307
03/11/02

## ACCOMPANYING APPLICATIONS PARTS

9. [ ] Assignment Papers (cover sheet & document(s))
10. [ ] 37 CFR 3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
11. [ ] English Translation Document *(if applicable)*
12. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
13. [ ] Preliminary Amendment
14. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. [X] Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: _____

*Prior application information: Examiner* _____ *Group / Art Unit:* _____

**For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.**

## 19. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* [ ] or [X] *Correspondence address below*

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| *Name* | FULBRIGHT & JAWORSKI L.L.P.<br>Jerry L. Mahurin | | | | |
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| | | | |
|---|---|---|---|
| *Name (Print/Type)* | Jerry L. Mahurin | *Registration No. (Attorney/Agent)* | 34,661 |
| *Signature* | | *Date* | March 11, 2002 |

**Transmittal-New Utility Patent Application**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EL372555379US, in an envelope addressed to: Box Patent Application, Commissioner for Patents, Washington, DC 20231, on the date shown below.

Dated: March 11, 2002 Signature: _____ (Jerry L. Mahurin)

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10095307 031102

PTO/SB/35 (11-00)
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| **NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)** | First Named Inventor | Randall J. Karr |
|---|---|---|
| | Title | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATACOMMUNICATIONS |
| | Attorney Docket No. | 060783/P018US/10200570 |

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

March 11, 2002
Date

Signature

Jerry L. Mahurin 34,661
Typed or printed name

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing.**

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently submits an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

**Nonpublication Request**
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EL372555379US, in an envelope addressed to: Box Patent Application, Commissioner for Patents, Washington, DC 20231, on the date shown below.

Dated: March 11, 2002 Signature: (Jerry L. Mahurin)

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## PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 10/695307

### CLAIMS AS FILED - PART I

| | (Column 1) | (Column 2) |
|---|---|---|
| TOTAL CLAIMS 36 | | |
| FOR | NUMBER FILED | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS | 36 minus 20= | * 6 |
| INDEPENDENT CLAIMS | 3 minus 3 = | * |
| MULTIPLE DEPENDENT CLAIM PRESENT | | ☐ |

* If the difference in column 1 is less than zero, enter "0" in column 2

| SMALL ENTITY TYPE ☐ | | OR | OTHER THAN SMALL ENTITY | |
|---|---|---|---|---|
| RATE | FEE | | RATE | FEE |
| BASIC FEE | 370.00 | OR | BASIC FEE | 740.00 |
| X$ 9= | | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL | | OR | TOTAL | |

### CLAIMS AS AMENDED - PART II

| AMENDMENT A | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA |
|---|---|---|---|---|
| Total | * | Minus | ** | = |
| Independent | * | Minus | *** | = |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM | | | | ☐ |

| SMALL ENTITY | | OR | OTHER THAN SMALL ENTITY | |
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| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
| X$ 9= | | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

| AMENDMENT B | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA |
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| Total | * | Minus | ** | = |
| Independent | * | Minus | *** | = |
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| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
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| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

| AMENDMENT C | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA |
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| Independent | * | Minus | *** | = |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM | | | | ☐ |

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| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
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| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

# CLAIMS ONLY

SERIAL NO. 10095307

FILING DATE

APPLICANT(S)

CLAIMS

| | AS FILED | | AFTER 1st AMENDMENT | | AFTER 2nd AMENDMENT | |
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| TOTAL DEP. | 36 | | | | | |
| TOTAL CLAIMS | 39 | | | | | |

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| TOTAL DEP. | | | | | | |
| TOTAL CLAIMS | | | | | | |

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| APPLICATION NUMBER | FILING/RECEIPT DATE | FIRST NAMED APPLICANT | ATTORNEY DOCKET NUMBER |
|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Karr | 060783/P018US/10200570 |

**CONFIRMATION NO. 3972**

**FORMALITIES LETTER**

*OC000000007821459*

FULBRIGHT & JAWORSKI L.L.P.
Jerry L. Mahurin
2200 Ross Avenue, Suite 2800
Dallas, TX 75201

Date Mailed: 04/08/2002

## NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

**FILED UNDER 37 CFR 1.53(b)**

***Filing Date Granted***

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  *Applicant must submit* **$ 370** *to complete the basic filing fee for a small entity.*
- Total additional claim fee(s) for this application is **$144**.
  - **$144** for **16** total claims over 20.
- The oath or declaration is missing.
  *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(l) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.
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OIPE JC184 JUN 12 2002 PATENT & TRADEMARK OFFICE

# TRANSMITTAL FORM

*(to be used for all correspondence after initial filing)*

| | |
|---|---|
| Application Number | 10/095,307 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Group Art Unit | N/A |
| Examiner Name | Not Yet Assigned |
| Total Number of Pages in This Submission: 10 | Attorney Docket Number: 060783/P018US/10200570 |

## ENCLOSURES (*check all that apply*)

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [x] Response to Missing Parts/ Incomplete Application
  - [x] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Assignment Papers *(for an Application)*
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [x] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
- [ ] After Allowance Communication to Group
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to Group *(Appeal Notice, Brief, Reply Brief)*
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) *(please identify below)*

Statement Under 37 CFR 3.73(b) Declaration

Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | |
|---|---|
| Firm or Individual Name | FULBRIGHT & JAWORSKI L.L.P.<br>Jerry L. Mahurin |
| Signature | |
| Date | June 5, 2002 |

**Transmittal**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail, in an envelope addressed to: U.S. Patent and Trademark Office, Office of Public Records, Crystal Gateway 4, Room 335, Washington, DC 20231, on the date shown below.

Dated: June 5, 2002 Signature: _____ (Jerry L. Mahurin)

25156547.1

JUN 12 2002
PATENT & TRADEMARK OFFICE
JC184

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# FEE TRANSMITTAL for FY 2002

*Patent fees are subject to annual revision.*

[x] Applicant claims small entity status. See 37 CFR 1.27

**TOTAL AMOUNT OF PAYMENT** ($) 606.00

| Complete if Known | |
|---|---|
| Application Number | 10/095,307 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Examiner Name | Not Yet Assigned |
| Group Art Unit | N/A |
| Attorney Docket No. | 060783/P018US/10200570 |

## METHOD OF PAYMENT *(check all that apply)*

[x] Check [ ] Credit Card [ ] Money Order [ ] Other [ ] None

[ ] Deposit Account

Deposit Account Number: 06-2380

Deposit Account Name: Fulbright & Jaworski L.L.P.

**The Commissioner is hereby authorized to:** *(check all that apply)*

[ ] Charge fee(s) indicated below [x] Credit any overpayments

[ ] Charge any additional fee(s) during the pendency of this application

[ ] Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

## FEE CALCULATION

### 1. BASIC FILING FEE

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description | Fee Paid |
|---|---|---|---|---|---|
| 101 | 740 | 201 | 370 | Utility filing fee | 370.00 |
| 106 | 330 | 206 | 165 | Design filing fee | |
| 107 | 510 | 207 | 255 | Plant filing fee | |
| 108 | 740 | 208 | 370 | Reissue filing fee | |
| 114 | 160 | 214 | 80 | Provisional filing fee | |

SUBTOTAL (1) ($) 370.00

### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

| | | | Extra Claims | | Fee from below | | Fee Paid |
|---|---|---|---|---|---|---|---|
| Total Claims | 39 | -** = | 19 | x | 9 | = | 171.00 |
| Independent Claims | 3 | -** = | 0 | x | 42 | = | 0.00 |
| Multiple Dependent | | | | | | = | |

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description |
|---|---|---|---|---|
| 103 | 18 | 203 | 9 | Claims in excess of 20 |
| 102 | 84 | 202 | 42 | Independent claims in excess of 3 |
| 104 | 280 | 204 | 140 | Multiple dependent claim, if not paid |
| 109 | 84 | 209 | 42 | ** Reissue independent claims over original patent |
| 110 | 18 | 210 | 9 | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2) ($) 171.00

***or number previously paid, if greater; For Reissues, see above*

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description | Fee Paid |
|---|---|---|---|---|---|
| 105 | 130 | 205 | 65 | Surcharge – late filing fee or oath | 65.00 |
| 127 | 50 | 227 | 25 | Surcharge – late provisional filing fee or cover sheet. | |
| 139 | 130 | 139 | 130 | Non-English specification | |
| 147 | 2,520 | 147 | 2,520 | For filing a request for *ex parte* reexamination | |
| 112 | 920* | 112 | 920* | Requesting publication of SIR prior to Examiner action | |
| 113 | 1,840* | 113 | 1,840* | Requesting publication of SIR after Examiner action | |
| 115 | 110 | 215 | 55 | Extension for reply within first month | |
| 116 | 400 | 216 | 200 | Extension for reply within second month | |
| 117 | 920 | 217 | 460 | Extension for reply within third month | |
| 118 | 1,440 | 218 | 720 | Extension for reply within fourth month | |
| 128 | 1,960 | 228 | 980 | Extension for reply within fifth month | |
| 119 | 320 | 219 | 160 | Notice of Appeal | |
| 120 | 320 | 220 | 160 | Filing a brief in support of an appeal | |
| 121 | 280 | 221 | 140 | Request for oral hearing | |
| 138 | 1,510 | 138 | 1,510 | Petition to institute a public use proceeding | |
| 140 | 110 | 240 | 55 | Petition to revive – unavoidable | |
| 141 | 1,280 | 241 | 640 | Petition to revive - unintentional | |
| 142 | 1,280 | 242 | 640 | Utility issue fee (or reissue) | |
| 143 | 460 | 243 | 230 | Design issue fee | |
| 144 | 620 | 244 | 310 | Plant issue fee | |
| 122 | 130 | 122 | 130 | Petitions to the Commissioner | |
| 123 | 50 | 123 | 50 | Processing fee under 37 CFR 1.17(q) | |
| 126 | 180 | 126 | 180 | Submission of Information Disclosure Stmt | |
| 581 | 40 | 581 | 40 | Recording each patent assignment per property (times number of properties) | |
| 146 | 740 | 246 | 370 | Filing a submission after final rejection (37 CFR 1.129(a)) | |
| 149 | 740 | 249 | 370 | For each additional invention to be examined (37CFR 1.129(b)) | |
| 179 | 740 | 279 | 370 | Request for Continued Examination (RCE) | |
| 169 | 900 | 169 | 900 | Request for expedited examination of a design application | |
| Other fee (specify) | | | | | |

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 65.00

| SUBMITTED BY | | | | Complete *(if applicable)* | |
|---|---|---|---|---|---|
| Name (Print/Type) | Jerry L. Mahurin | Registration No. (Attorney/Agent) | 34,661 | Telephone | (214) 855-8386 |
| Signature | | | | Date | June 5, 2002 |

**Fee Transmittal**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail, in an envelope addressed to: Commissioner for Patents, Washington, DC 20231, on the date shown below.

Dated: June 5, 2002 Signature: _____ (Jerry Mahurin)

25156459.1

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COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

JUN 12 2002
PATENT & TRADEMARK OFFICE

| APPLICATION NUMBER | FILING/RECEIPT DATE | FIRST NAMED APPLICANT | ATTORNEY DOCKET NUMBER |
|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Katt | 060783/P018US/10200570 |

**CONFIRMATION NO. 3972**

**FORMALITIES LETTER**

*OC000000007821459*

HAYNES AND BOONE, LLP
Jerry L. Mahurin
2200 Ross Avenue, Suite 2800
Dallas, TX 75201

Date Mailed: 04/08/2002

## NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

06/18/2002 BABRAHA1 00000068 10095307

01 FC:201 370.00 OP
02 FC:205 65.00 OP
03 FC:203 171.00 OP

**FILED UNDER 37 CFR 1.53(b)**

***Filing Date Granted***

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An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  *Applicant must submit $* **370** *to complete the basic filing fee for a small entity.*
- Total additional claim fee(s) for this application is ~~$144~~. ١٧١
  - ~~$144~~ ١٧١ for ~~16~~ ١٩ total claims over 20.
- The oath or declaration is missing.
  *A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.*
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(l) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.
- **The balance due by applicant is ~~$ 679~~.** ٥٠٨

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***A copy of this notice MUST be returned with the reply.***

Tedus

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 2 - COPY TO BE RETURNED WITH RESPONSE

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Dated: June 5, 2002 Signature: (Jerry L. Mahurin)

OIPE JC184 JUN 12 2002 PATENT & TRADEMARK OFFICE

Docket No.: 060783/P018US/10200570
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randall J. Karr, et al.

Application No.: 10/095,307 Group Art Unit: N/A

Filed: March 11, 2002 Examiner: Not Yet Assigned

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS

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**RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION**

**Box Missing Parts**
Commissioner for Patents
Washington, DC 20231

Dear Sir:

In response to the Notice to File Missing Parts of Application – Filing Date Granted mailed April 8, 2002, Applicant respectfully submits a Declaration, a Power of Attorney, and Statement Under 37 CFR 3.73(b).

Please note the changes marked on the Notice.

Our check in the amount of $606.00, which includes $65.00 covering the fee set forth in 37 CFR 1.16(e), is enclosed. The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 06-2380.

Dated: June 5, 2002

Respectfully submitted,

By
Jerry L. Mahurin
Registration No.: 34,661
FULBRIGHT & JAWORSKI L.L.P.
2200 Ross Avenue
Suite 2800
Dallas, Texas 75201
(214) 855-8000
(214) 855-8200 (Fax)
Attorneys for Applicant

25174510.1

OIPE JC184
JUN 1 7 2002
PATENT & TRADEMARK OFFICE

(4)

## Application Data Sheet

### Application Information

| | |
|---|---|
| Application number:: | 10/095,307 |
| Filing Date:: | March 11, 2002 |
| Application Type:: | Regular |
| Subject Matter:: | Utility |
| Suggested Group Art Unit:: | N/A |
| CD-ROM or CD-R?:: | None |
| Sequence submission?:: | None |
| Computer Readable Form (CRF)?:: | No |
| Title:: | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS |
| Attorney Docket Number:: | 060783/P018US/10200570 |
| Request for Early Publication?:: | No |
| Request for Non-Publication?:: | Yes |
| Small Entity?:: | Yes |
| Petition included?:: | No |
| Secrecy Order in Parent Appl.?:: | No |

### Applicant Information

| | |
|---|---|
| Applicant Authority Type:: | Inventor |
| Primary Citizenship Country:: | US |
| Status:: | Full Capacity |
| Given Name:: | Randy J. |
| Family Name:: | Karr |
| City of Residence:: | Maple Valley |
| State or Province of Residence:: | WA |
| Country of Residence:: | US |
| Street of mailing address:: | 21409 SE 215th Street |
| City of mailing address:: | Maple Valley |
| State or Province of mailing address:: | WA |

| | |
|---|---|
| Country of mailing address:: | US |
| Postal or Zip Code of mailing address:: | 98038 |

| | |
|---|---|
| Applicant Authority Type:: | Inventor |
| Primary Citizenship Country:: | Canada |
| Status:: | Full Capacity |
| Given Name:: | Jean-Francois |
| Family Name:: | Grenon |
| City of Residence:: | Seattle |
| State or Province of Residence:: | WA |
| Country of Residence:: | US |
| Street of mailing address:: | 1615 39th Avenue E |
| City of mailing address:: | Seattle |
| State or Province of mailing address:: | WA |
| Country of mailing address:: | US |
| Postal or Zip Code of mailing address:: | 98112 |

| | |
|---|---|
| Applicant Authority Type:: | Inventor |
| Status:: | Full Capacity |
| Given Name:: | Frank D. |
| Family Name:: | Cole |
| City of Residence:: | Bothell |
| State or Province of Residence:: | WA |
| Country of Residence:: | US |
| Street of mailing address:: | 20611 E. Bothell-Everett Hwy<br>Apt. 159 |
| City of mailing address:: | Bothell |
| State or Province of mailing address:: | WA |
| Country of mailing address:: | US |
| Postal or Zip Code of mailing address:: | 98012 |

**Correspondence Information**

| | |
|---|---|
| Correspondence Customer Number:: | 000029053 |
| Phone number:: | (214) 855-8386 |
| Fax number:: | (214) 855-8200 |
| E-Mail address:: | jmahurin@fulbright.com |

**Representative Information**

| | |
|---|---|
| Representative Customer Number:: | 000029053 |

**Assignee Information**

| | |
|---|---|
| Assignee name:: | Vectrad Network Corp. |
| Street of mailing address:: | 21520 30th Drive SE |
| | Building A, Suite 210 |
| City of mailing address:: | Bothell |
| State or Province of mailing address:: | WA |
| Country of mailing address:: | US |
| Postal or Zip Code of mailing address:: | 98021 |

3

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OIPE JUN 12 2002 PATENT & TRADEMARK OFFICE

## DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| Title of Invention | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS |
|---|---|

As the below named inventor(s), I/we declare that:

The declaration is directed to:

☐ The attached application, or

☒ Application No. 10/095,307, filed on 03/11/2002,

☐ as amended on _____ (if applicable).

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

All statements made herein of my/our own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME(S) OF INVENTORS:

Inventor one: Randy J. Karr

Signature: _____ Date: 5-30-02 Citizen of: US

Inventor two: Jean-Francois Grenon

Signature: _____ Date: 5.30.02 Citizen of: Canada

Inventor three: Frank D. Cole

Signature: _____ Date: 5-30-02 Citizen of: US

Inventor four: _____

Signature: _____ Date: _____ Citizen of: _____

☐ Additional inventors are being named on _____ additional form(s) attached hereto.

25159085.1

OIPE JC184
JUN 12 2002
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## STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Randy J. Karr, et al.

Application No./Patent No.: 10/095,307 Filed/Issue Date: March 11, 2002

Entitled: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS

Vectrad Network Corp. (Name of Assignee) , a Corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [x] the assignee of the entire right, title, and interest; or
2. [ ] an assignee of less than the entire right, title and interest.
   The extent (by, percentage) of its ownership interest is _____ %

in the patent application/patent identified above by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
3. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet.

[x] Copies of assignments or other documents in the chain of title are attached.
[**NOTE**: A separate copy (*i.e.*, the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

June 5, 2002
Date

Jerry L. Mahurin
Typed or printed name

Signature

Patent Attorney
Title

25156424.1

## ASSIGNMENT BY INVENTORS

**THIS ASSIGNMENT**, made by Randy J. Karr; Jean-Francois Grenon; and Frank D. Cole (hereinafter referred to as Assignors), residing at 21409 SE 215th Street, Maple Valley, Washington 98038; 1615 39th Avenue E, Seattle, Washington 98112; and 20611 East Bothell-Everett Hwy, Apt. 159, Bothell, Washington 98012, respectively;

**WHEREAS**, Assignors have invented certain new and useful improvements in SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS, set forth in a Patent application for Letters Patent of the United States, already filed on March 11, 2002 as U.S. application No. 10/095,307; and

**WHEREAS**, Vectrad Network Corp., a Corporation organized under and pursuant to the laws of Washington having its principal place of business at 21520 30th Drive SE, Building A, Suite 210, Bothell, Washington 98021 (hereinafter referred to as Assignee), is desirous of acquiring the entire right, title and interest in and to said inventions and said Application for Letters Patent of the United States, and in and to any Letters Patent of the United States to be obtained therefore and thereon.

**NOW, THEREFORE**, in consideration of One Dollar ($1.00) and other good and sufficient consideration, the receipt of which is hereby acknowledged, Assignors have sold, assigned, transferred and set over, and by these presents do sell, assign, transfer and set over, unto Assignee, its successors, legal representatives and assigns, the entire right, title and interest in and to the above-mentioned inventions and application for Letters Patent, and in and to any and all direct and indirect divisions, continuations and continuations-in-part of said application, and any and all Letters Patent in the United States and all foreign countries which may be granted therefore and thereon, and reissues, reexaminations and extensions of said Letters Patent, and all rights under the International Convention for the Protection of Industrial Property, the same to be held and enjoyed by Assignee, for its own use and benefit and the use and benefit of its successors, legal representatives and assigns, to the full end of the term or terms for which Letters Patent may be granted and/or extended, as fully and entirely as the same would have been held and enjoyed by Assignors, had this sale and assignment not been made.

**AND** for the same consideration, Assignors hereby represent and warrant to Assignee, its successors, legal representatives and assigns, that, at the time of execution and delivery of these presents, except for any rights, titles and/or interests that have arisen to Assignee under law or that have already been transferred to Assignee, Assignors are the sole and lawful owners of the entire right, title and interest in and to the said inventions and application for Letters Patent above-mentioned, and that the same are unencumbered and that Assignors have good and full right and lawful authority to sell and convey the same in the manner herein set forth.

**AND** for the same consideration, Assignors hereby covenant and agree to and with Assignee, its successors, legal representatives and assigns, that Assignors will sign all papers and documents, take all lawful oaths and do all acts necessary or required to be done for the procurement, maintenance, enforcement and defense of any Letters Patent and applications for Letters Patent for said inventions, without charge to Assignee, its successors, legal representatives and assigns, whenever counsel of Assignee, or counsel of its successors, legal representatives and assigns, shall advise: that any proceeding in connection with said inventions, or said Patent application for Letters Patent, or any proceeding in connection with any Letters Patent or applications for Letters Patent for said inventions in any country, including but not limited to interference proceedings, is lawful and desirable; or, that any division, continuation or continuation-in-part of any application for Letters Patent, or any reissue, reexamination or extension of any Letters Patent, to be obtained thereon, is lawful and desirable.

**AND** Assignors hereby request the Commissioner of Patent and Trademarks to issue said Letters Patent of the United States to Assignee, as Assignee of said inventions and the Letters Patent to be issued thereon, for the sole use and benefit of Assignee, its successors, legal representatives and assigns.

**AND** Assignors hereby grant the following individuals the power to insert on this Assignment any further identification which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office for recordation of this document:

FULBRIGHT & JAWORSKI L.L.P.

| | | | | | |
|---|---|---|---|---|---|
| David H. Tannenbaum | 24,745 | Matthew D. Jones | 44,810 | Michael A. Papalas | 40,381 |
| Jody C. Bishop | 44,034 | Jerry L. Mahurin | 34,661 | William B. Tiffany | 41,347 |
| Michael J. Fogarty, III | 42,541 | Thomas J. Meaney | 41,990 | R. Ross Viguet | 42,203 |

**AND** Assignors acknowledge an obligation of assignment of this invention to Assignee at the time the invention was made.

Randy J. Karr 5-30-02

Date: 6-4-02

United States of America )
State of Washington ) ss.:
County of King )

On this 4th day of June, 2002, before me personally came Randy J. Karr, to me known to be the individual described in and who executed the foregoing instrument, and acknowledged execution of the same.

Lori Lawrenson
Notary Public

LORI L. LAWRENSON NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 4-29-04

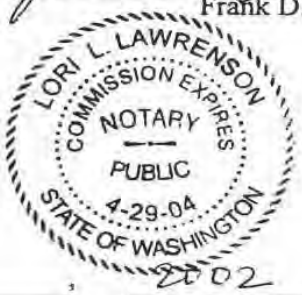
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5-30-02
Frank D. Cole

Date: 6/4/02

United States of America )
State of Washington ) ss.:
County of King )




On this 4th day of June, 2002, before me personally came Frank D. Cole, to me known to be the individual described in and who executed the foregoing instrument, and acknowledged execution of the same.

Lori L. Lawrenson
Notary Public

COPY OF PAPERS ORIGINALLY FILED

25156534.1

Jean-Francois Grenon

Date: 6-4-02

United States of America )
State of Washington ) ss.:
County of King )

On this 4th day of June, 2002, before me personally came Jean-Francois Grenon, to me known to be the individual described in and who executed the foregoing instrument, and acknowledged execution of the same.

Lori L. Lawrenson
Notary Public

LORI L. LAWRENSON NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 4-29-04

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25156534.1

JUN 12 2002
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# POWER OF ATTORNEY OR AUTHORIZATION OF AGENT

| | |
|---|---|
| Application Number | 10/095,307 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Title | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR, |
| Group Art Unit | N/A |
| Examiner Name | Not Yet Assigned |
| Attorney Docket No. | 060783/P018US/10200570 |

I hereby appoint:

☐ Practitioners at Customer Number _____ → [ ]
*Customer Number* *Customer Number Bar Code*

*OR*

☒ Practitioner(s) named below:

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| David H. Tannenbaum | 24,745 | Michael A. Papalas | 40,381 |
| Jody C. Bishop | 44,034 | William B. Tiffany | 41,347 |
| Michael J. Fogarty, III | 42,541 | R. Ross Viguet | 42,203 |
| Matthew D. Jones | 44,810 | | |
| Jerry L. Mahurin | 34,661 | | |
| Thomas J. Meaney | 41,990 | | |

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Please change the correspondence address for the above-identified application to:

☐ The above-mentioned Customer Number.

*OR*

☐ Practitioners at Customer Number _____ → [ ]
*Customer Number* *Customer Number Bar Code*

*OR*

| | | | | | |
|---|---|---|---|---|---|
| ☐ Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | Telephone | | Fax | |

I am the:

☐ Applicant/Inventor.

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
*Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).*

**SIGNATURE of Applicant or Assignee of Record**

| | |
|---|---|
| Name | Vectrad Network Corporation by Randy J. Karr, Vice President for Engineering |
| Signature | Randy J. Karr |
| Date | 5-30-02 |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required. See below*.

☐ *Total of 1 forms are submitted.

(staple traded file in this area)

## 2700 INTERNAL TRANSFER REQUEST FOR S.N. 10/095307

| | |
|---|---|
| DATE: 7-10-02 | FROM: S.T. (print name) |
| FORWARD TO:<br>A. Art Unit: 2661<br>B. Class: 370<br>C Subclass: | REASON(S):<br>A. You had Parent (check box)<br>B. See Title (check box)<br>C. See Abstract (check box)<br>D. See Claim(s): |

FURTHER EXPLANATION IF NEEDED:

MULTIPLEX COMMUNICATIONS (FDD, TDD)

| | |
|---|---|
| DATE: 7/30/02 | FROM: PHUNKULH (print name) |
| FORWARD TO:<br>A. Art Unit: 2631<br>B. Class: 370<br>C Subclass: 136 | REASON(S):<br>A. You had Parent (check box)<br>B. See Title (check box)<br>C. See Abstract (check box)<br>D. See Claim(s): |

FURTHER EXPLANATION IF NEEDED:

SPOILED

| | |
|---|---|
| DATE: | FROM: (print name) |
| FORWARD TO CLASSIFIER<br>[redacted] | REASON(S):<br>A. You had Parent (check box)<br>B. See Title (check box)<br>C. See Abstract (check box)<br>D. See Claim(s): |

FURTHER EXPLANATION IF NEEDED:

### DISPOSITION BY 2700 CLASSIFICATION

| | |
|---|---|
| DATE: | CLASSIFIER: |
| FORWARD TO:<br>A. Art Unit:<br>B. Class:<br>C Subclass: | REASON(S):<br>A. You had Parent (check box)<br>B. See Title (check box)<br>C. See Abstract (check box)<br>D. See Claim(s): |

FURTHER EXPLANATION IF NEEDED:

OIPE
MAY 0 2 2005
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AU 2662

PTO/SB/21 (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# TRANSMITTAL FORM

*(to be used for all correspondence after initial filing)*

| | |
|---|---|
| Application Number | 10/095,307 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Art Unit | 2662 |
| Examiner Name | H. Kizou |
| Total Number of Pages in This Submission: 3 | Attorney Docket Number: 68144/P009US/10501230 |

## ENCLOSURES (*Check all that apply*)

- [ ] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [x] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):

Return Receipt Postcard
Statement Under 37 CFR 3.73(b)

Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm Name | FULBRIGHT & JAWORSKI L.L.P. | | |
| Signature | | | |
| Printed name | Jerry L. Mahurin | | |
| Date | April 26, 2005 | Reg. No. | 34,661 |

**Transmittal**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail, in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below.

Dated: April 26, 2005 Signature: _____ (June Nguyen)

25528149.1

OIPE 3C118 MAY 0 2 2005 PATENT & TRADEMARK OFFICE

PTO/SB/81 (11-04)
Approved for use through 11/30/2005. OMB 0651-0035
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# POWER OF ATTORNEY and CORRESPONDENCE ADDRESS INDICATION FORM

| | |
|---|---|
| Application Number | 10/095,307 - Conf. #3972 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Title | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELES S, etc. |
| Art Unit | 2662 |
| Examiner Name | Kizou, Hassan |
| Attorney Docket No. | 68144/P009US/10501230 |

I hereby revoke all previous powers of attorney given in the above-identified application.

I hereby appoint:

[x] Practitioners associated with the Customer Number: 000029053

*OR*

[ ] Practitioner(s) named below:

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| | | | |

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Please recognize or change the correspondence address for the above-identified application to:

[x] The address associated with the above-mentioned Customer Number:

*OR*

[ ] The address associated with Customer Number:

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[ ] Firm or Individual Name

| | | | | | |
|---|---|---|---|---|---|
| Address | | | | | |
| City | | State | | Zip | |
| Country | | Telephone | | Fax | |

I am the:

[ ] Applicant/Inventor.

[x] Assignee of record of the entire interest. See 37 CFR 3.71.
*Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)*

**SIGNATURE of Applicant or Assignee of Record**

| | | | |
|---|---|---|---|
| Signature | | Date | 4/28/2005 |
| Name | Wolfgang Mack | Telephone | (206) 326-1014 |
| Title and Company | Vice President Product Management, Adaptix, Inc. | | |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[ ] *Total of 1 forms are submitted.

OIPE JC118 MAY 0 2 2005 PATENT & TRADEMARK OFFICE

PTO/SB/96 (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
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# STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Randy J. Karr et al.

Application No./Patent No.: 10/095,307 Filed/Issue Date: March 11, 2002

Entitled: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELES S RF DATA COMMUNICATIONS

Adaptix, Inc. (Name of Assignee), a Corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [x] the assignee of the entire right, title, and interest; or

2. [ ] an assignee of less than the entire right, title and interest.
The extent (by percentage) of its ownership interest is _____ %

in the patent application/patent identified above by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

***OR***

B. [x] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: Karr, Randy J., et al. To: Vectrad Networks Corp.
The document was recorded in the United States Patent and Trademark Office at
Reel 012977, Frame 0333, or for which a copy thereof is attached.

2. From: Vectrad Networks Corporation To: Adaptix, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 015846, Frame 0080, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet.

[X] Copies of assignments or other documents in the chain of title are attached.
[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature — Date: 4/28/2005

Wolfgang Mack (Printed or Typed Name) — (206) 326-1014 (Telephone Number)

Vice President Product Management (Title)

25525589.1

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Karr | 060783/P018US/10200570 | 3972 |

29053 7590 12/07/2005

DALLAS OFFICE OF FULBRIGHT & JAWORSKI L.L.P.
2200 ROSS AVENUE
SUITE 2800
DALLAS, TX 75201-2784

| EXAMINER | |
|---|---|
| LEVITAN, DMITRY | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2662 | |

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/095,307 | KARR ET AL. | |
| | Examiner | Art Unit | |
| | Dmitry Levitan | 2662 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *6/12/ 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

*Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 24-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:

Regarding claim 24, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints.

Regarding claim 25, means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals.

The specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 25-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 limitation "establishing separate co-spatial reception and transmission beams" is unclear, because it is not understood, what beams are considered co-spatial: beams sharing any area of the transmit and receive beam footprints or the beams with the foot prints that are substantially co-spatial.

Claim 39 limitation "filtering requirements for received upstream... are greater than filtering requirements for received downstream" is unclear, because it is not understood what "greater" means in the context of the claim and how numerous filtering requirements for different frequency filters can be compared to each other.

*Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2-7, 10, 12, 14, 15, 18, 19, 21, 22, 23, 25, 27, 29-34 (as best understood) are rejected under 35 U.S.C. 102(b) as being anticipated by Arnold (US 5,475,677).

3. Regarding claims 1, 10 and 25, Arnold teaches a method, a system and a station for wireless data communication (digital telephone system on Fig. 1 and 6:40-65 for voice data communication) comprising:

Transmitting from a first station using a first frequency within a first band of operation (transmitting on downlink from a port/fixed base unit, in the licensed spectrum of 1930-1990 MHz to a portable unit on Fig. 1 and 6:57-60),

Receiving data at said first station using a second frequency within a second band of operation (inherently part of the system, because the port receives phone calls from the portable unit as described bellow) ,

Transmitting data from at least one other station to said first station using said second frequency within said second band of operation (transmitting from a portable unit on uplink in a frequency band of 1850-1910 MHz to the corresponding port on Fig. 1 and 6:60-64), and

Receiving data at said at least one other station using said first frequency within said first band of operation (inherently part of the system, because the portable units receive the phone calls transmitted from the port).

In addition, regarding claim 25, Arnold teaches means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and to receive data signals (inherently part of ports 30, 40, and 50 on Fig. 1, the ports utilize small antennas like 31, effectively making the reception and transmission antenna beams in different frequency bands co-spatial 8:33-38, as originating from the same antenna) and means for duplexing

said data signals received and transmitted in different bands of operation (circuitry on Fig. 3 and 10:35-11:15 for duplexing the signals).

4. Regarding claim 18, Arnold teaches stations comprising at least one dual band antenna (each port/station utilizing an antenna 31 on Fig. 1 and 8:33-37, the antenna is inherently dual band, because the operation of the system is dual band, as described above and a portable unit comprises a dual band antenna as shown on Fig. 2B and 9:66-10:10).

5. Regarding claim 22, Arnold teaches stations comprising one dual band antenna (see claim 18 rejection above), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

6. Regarding claim 23, Arnold teaches subscriber stations comprising one dual band antenna (as shown on Fig. 2 A and B, as antenna 203 on Fig. 2B transmits and receives on the shown paths 9:66-10:10), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

7. Regarding claims 3, 4, 19, 21, 29 and 31, Arnold teaches a hub station transmitting to a plurality of subscriber stations (port 30 transmitting to several portable units 34 and 36 shown on Fig. 1 and 7:58-65).

8. Regarding claims 5, 12 and 27, Arnold teaches separating the first and the second frequencies by a bandwidth of at least one percent of lower of said frequencies (80 MHz separation between frequencies, wherein the lower frequency is 1850 MHz, which produce the ratio of more than 1% 6:57-63).

9. Regarding claims 6, 7, 14, 15, 32-34, Arnold teaches frequencies in separate regulated bands and using downstream communication in the licensed band (licensed bands of 1850-1910 and 1930-1990 MHz 1:20-30).

10. Regarding claim 30, Arnold teaches hub station comprises a plurality of said antenna beams for communicating with a plurality of stations (inherently part of Arnold system, because the hub station/port 204 comprises two antennas 206 and 205, each having transmit and receive beams, for the reception diversity 9:30-45).

*Claim Rejections - 35 USC § 103*

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 2, 13 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold .

13. Regarding claims 2, 13 and 28, Arnold teaches the limitations of parent claims 1, 10 and 25, including separating the transmit and receive frequencies by more than 1% (see claim 5 rejection above) .

Arnold does not teach separating the frequencies by at least one octave.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add separating the frequencies by at least one octave to the system of Arnold

as a design choice, because separation of the frequencies by two or three octaves will work in the system as well.

14. Claims 8, 9, 11, 16, 17, 20, 26, 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold in view of Sugita (US 5,852,767).

15. Regarding claims 11 and 26 Arnold teaches all the limitations of the parent claims 10 and 25, including a duplexer separating transmitted and received signals at the second/mobile station (circuitry 300 on Fig. 3 and 6).

Arnold does not teach a duplexer separating transmitted and received signals and using filters at the first station.

Sugita teaches a duplexer separating transmitted and received signals at the first station (circuitry on Fig. 3, separating transmitted and received frequencies 4:1-13) and inherently using filters for the separation, because filtering the signals is essential for their separation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and using filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station.

16. Regarding claims 8, 9, 16, 17, 20 and 35-38 Arnold teaches all the limitations of the parent claims 1, 10 and 25, including using transmitted and received frequencies in separate regulated bands and using downstream communication in the licensed band (see the rejections above) and utilizing the unlicensed band in the other (TDD) mode.

Arnold does not teach using an unlicensed band for an upstream data communication.

Sugita teaches a system utilizing an unlicensed band in certain areas for data communication to reduce the interference with existing systems (system shown on Fig. 1, comprising a GPS component to identify an acceptable mobile station position for using an unlicensed band 1:20-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add utilizing an unlicensed band of Sugita and use the unlicensed band for an upstream data communication to the system of Arnold to reduce the system interference with the existing systems.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is (571) 272-3093. The examiner can normally be reached on 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dmitry Levitan
Patent Examiner.
12/06/05

| Notice of References Cited | Application/Control No. 10/095,307 | Applicant(s)/Patent Under Reexamination KARR ET AL. | |
|---|---|---|---|
| | Examiner Dmitry Levitan | Art Unit 2662 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-5,475,677 A | 12-1995 | Arnold et al. | 370/280 |
| * | B | US-5,852,767 A | 12-1998 | Sugita, Takehiro | 455/63.1 |
| * | C | US-6,212,172 B1 | 04-2001 | Barabash et al. | 370/277 |
| * | D | US-6,587,444 B1 | 07-2003 | Lenzo et al. | 370/330 |
| * | E | US-2002/0090974 A1 | 07-2002 | Hagn, Peter | 455/552 |
| * | F | US-6,389,059 B1 | 05-2002 | Smith et al. | 375/141 |
| * | G | US-6,404,300 B2 | 06-2002 | Ishida, Masaaki | 333/135 |
| * | H | US-2002/0132590 A1 | 09-2002 | Marshall, Christopher B. | 455/73 |
| * | I | US-2003/0054763 A1 | 03-2003 | Judd et al. | 455/20 |
| * | J | US-5,708,440 | 01-1998 | Trimble et al. | 342/357.06 |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## Index of Claims



| Application/Control No. | Applicant(s)/Patent under Reexamination |
|---|---|
| 10/095,307 | KARR ET AL. |
| **Examiner** | **Art Unit** |
| Dmitry Levitan | 2662 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| √ | Rejected | – | (Through numeral) Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | + | Restricted | I | Interference | O | Objected |

| Claim | | Date | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 12/04/05 | | | | | | | | |
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Bib Data Sheet

**CONFIRMATION NO. 3972**

| SERIAL NUMBER | FILING DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 10/095,307 | 03/11/2002<br>RULE | 370 | 2662 | 060783/P018US/10200570 |

APPLICANTS

Randy J. Karr, Maple Valley, WA;

Jean-Francois Grenon, Seattle, WA;
Frank D. Cole, Bothell, WA;

** CONTINUING DATA ********** NONE

** FOREIGN APPLICATIONS ********** NONE

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 04/06/2002

| Foreign Priority claimed | STATE OR | SHEETS | TOTAL | INDEPENDENT |
|---|---|---|---|---|
| ☐ yes ☒ no | COUNTRY | DRAWING | CLAIMS | CLAIMS |
| 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance | WA | 2 | 39 | 3 |
| Verified and Acknowledged: Examiner's Signature R. LEVITAN Initials | | | | |

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75201-2784

TITLE
Spectrum allocation system and method for multi-band wireless RF data communications

| FILING FEE | | |
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| Search Notes | Application/Control No. | Applicant(s)/Patent under Reexamination | |
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# AMENDMENT TRANSMITTAL LETTER

Docket No. 68144/P009US/10501230

| Application No. | Filing Date | Examiner | Art Unit |
|---|---|---|---|
| 10/095,307-Conf. #3972 | March 11, 2002 | D. Levitan | 2662 |

Applicant(s): Randy J. Karr et al.

Invention: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELES S RF DATA COMMUNICATIONS

**TO THE COMMISSIONER FOR PATENTS**

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

**CLAIMS AS AMENDED**

| | Claims Remaining After Amendment | Highest Number Previously Paid | Number Extra Claims Present | Rate | |
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| **Total Claims** | 25 | - 39 = | | x | |
| **Independent Claims** | 3 | - 3 = | | x | |
| **Multiple Dependent Claims (check if applicable)** | ☐ | | | | |
| **Other fee (please specify):** | | | | | |
| **TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:** | | | | | 0.00 |

☐ Large Entity ☒ Small Entity

☒ No additional fee is required for this amendment.

☐ Please charge Deposit Account No. _____ in the amount of $ _____
A duplicate copy of this sheet is enclosed.

☐ A check in the amount of $ _____ to cover the filing fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge and credit Deposit Account No. 06-2380 as described below. A duplicate copy of this sheet is enclosed.

☒ Credit any overpayment.

☒ Charge any additional filing or application processing fees required under 37 CFR 1.16 and 1.17.

R. Ross Viguet

Dated: 03/07/2006

R. Ross Viguet
Attorney Reg. No.: 42,203

FULBRIGHT & JAWORSKI L.L.P.
2200 Ross Avenue, Suite 2800
Dallas, Texas 75201-2784
(214) 855-8185

**Amendment Transmittal**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV 482724724 US, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below.

Dated: 03/07/2006 Signature: _____ (Phyllis Ewing)

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Dated: 03/07/2006 Signature: (Phyllis Ewing)

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Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr et al.

Application No.: 10/095,307 Confirmation No.: 3972

Filed: March 11, 2002 Art Unit: 2662

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELES S RF DATA COMMUNICATIONS Examiner: D. Levitan

## AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

### INTRODUCTORY COMMENTS

In response to the Office Action dated December 7, 2005, please amend the above-identified U.S. patent application as follows:

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.

**Remarks/Arguments** begin on page 6 of this paper.

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A spectrum allocation method for wireless data communication comprising the steps of:

transmitting data from a first station using a first frequency within a first band of operation;

receiving data at said first station using a second frequency within a second band of operation;

transmitting data from at least one other station to said first station using said second frequency within said second band of operation; and

receiving data at said at least one other station using said first frequency within said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

2. (Original) The method of claim 1 wherein said first frequency and said second frequency are separated by at least one octave.

3. (Original) The method of claim 1 wherein one of said stations is a hub station transmitting to at least one subscriber station.

4. (Original) The method of claim 1 wherein one of said stations is a hub station transmitting to a plurality of subscriber stations.

5. (Original) The method of claim 1 wherein said first frequency and said second frequency are separated by a bandwidth of at least one percent of the lower of said frequencies.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Currently Amended) A system for spectrum allocation in wireless data communication comprising:

a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation; and

at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

11. (Original) The system of claim 10 wherein each of said stations further comprise duplexers separating transmitted signals and received signals.

12. (Original) The system of claim 10 wherein said first frequency is separated from said second frequency by a bandwidth of at least one percent of the lower of one of said frequencies.

13. (Original) The system of claim 10 wherein said first frequency and said second frequency are separated by at least one octave.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Original) The system of claim 10 wherein each of said stations further comprise at least one dual band antenna.

19. (Original) The system of claim 10 wherein said first station is a hub station and said at least one other data communications station is at least one subscriber station.

20. (Canceled)

21. (Original) The system of claim 19 wherein said hub station transmits to a plurality of said subscriber stations.

22. (Original) The system of claim 19 wherein said hub station comprises at least one dual band antenna transmitting on said first frequency using a first antenna beam and receiving on said second frequency using a second antenna beam.

23. (Original) The system of claim 22 wherein said subscriber stations comprise at least one dual band antenna receiving on said first frequency using a first antenna beam and transmitting on said second frequency using a second antenna beam.

24. (Original) The system of claim 23 wherein said hub station first antenna beam and said subscriber station first antenna beam have co-spatial footprints and said hub station second antenna beam and said subscriber station second antenna beam have co-spatial footprints.

25. (Currently Amended) A data communications station using spectrum allocation for wireless data communications, said station comprising:

means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals; and

means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation;

wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band.

26. (Original) The station of claim 25 further comprising means for filtering said data signals.

27. (Original) The station of claim 25 wherein said frequencies are separated by a bandwidth of at least one percent of the lower of said frequencies used to transmit and receive data signals.

28. (Original) The station of claim 25 wherein said disparate frequencies are separated by at least one octave.

29. (Original) The station of claim 25 wherein said station is a hub station which communicates with a plurality of subscriber stations.

30. (Original) The station of claim 29 wherein said hub station comprises a plurality of said antenna beam means for communicating with said plurality of subscriber stations.

31. (Original) The station of claim 25 wherein said station is a subscriber station.

32. (Canceled)

33. (Canceled)

34. (Currently Amended) The station of claim [[33]] 25 wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station.

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. (Currently Amended) The station of claim [[37]] 34 ~~wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station and~~ wherein said at least one unlicensed band frequency is used for upstream data communications from at least one subscriber station to a hub station.

39. (Original) The station of claim 38 further comprising means for filtering said data signals, wherein filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications at said at least one subscriber station.

## REMARKS

### I. General

Claims 1-39 were pending in the application. Claims 1, 3-7, 10, 12, 14, 15, 18, 19, 21-23, 25, 27 and 29-34 stand rejected under 35 U.S.C. § 102. Claims 2, 8, 9, 11, 13, 16, 17, 20, 26, 28 and 35-38 stand rejected under 35 U.S.C. § 103. Claims 24-39 stand rejected under 35 U.S.C. § 112. Claims 6-9, 14-17, 20, 32, 33 and 35-37 are hereby canceled in light of amendments to claim 1, 10 and 25, rendering any rejections of these claims moot. Accordingly, claims 1-5, 10-13, 18, 19, 21-31, 34, 38 and 39 will remain pending in the application after entry of the present amendment. Applicant hereby traverses the outstanding objections and rejections, and respectfully requests reconsideration and withdrawal in light of the remarks contained herein.

### II. Amendments to the Claims

Claim 1 is amended to incorporate the limitations of claim 9. In light of this amendment, claims 6-8 and 9 are canceled. Claim 10 is amended to incorporate the limitations of claim 17. In light of this amendment, claims 14-17 and 20 are canceled. Claim 25 is amended to incorporate the limitations of claim 37. In light of this amendment, claims 32, 33 and 35-37 are canceled, and claims 34 and 38 are amended to update dependencies. Claim 38 is further amended in light if its dependency from claim 34. Applicant asserts that support for these amendments can be found in the originally-filed application, at least, in the originally filed claims, and that no new matter has been added.

### III. Rejections under 35 U.S.C. § 112

Claims 24-39 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claims 25-39 stand further rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Office Action identifies claims 24 and 25 as rejected under 35 U.S.C. § 112, first paragraph, and claims 25 and 39 as rejected under 35 U.S.C. § 112, second paragraph. The rejections of claims 26-38 result from the rejections of claims 25.

**A. 35 U.S.C. § 112, First Paragraph, Rejection**

In rejecting claim 24 under 35 U.S.C. § 112, first paragraph, the Examiner baldly concludes that the specification does not adequately describe "how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and hot to make hub station second antenna beam and subscriber station antenna beam having co-spatial footprints," Office Action at page 2. Similarly, in rejecting claim 25, the Examiner merely concludes that the specification does not adequately describe "means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals," id. The Examiner further concludes that "[t]he specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation," id.

In setting forth a proper rejection under 35 U.S.C. § 112, first paragraph, "the examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention," M.P.E.P. § 2164.04 (citing *In re Wright*, 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993)). Accordingly, the Examiner is directed make specific findings of fact, supported by evidence, and only then drawing conclusions regarding enablement of the claimed invention based on these findings of fact, see id.

The Examiner has not provided any finding of fact or supporting evidence as to why one of ordinary skill in the art would not have been enabled to make and use the claimed invention from a reading of the present specification. Accordingly, the 35 U.S.C. § 112, first paragraph, rejection of record is improper and wholly unsubstantiated.

Moreover, Applicant respectfully asserts that a proper rejection for lack of enablement under 35 U.S.C. § 112, first paragraph, with respect to the identified aspects of claims 24 and 25 cannot properly be made. Specifically, the disclosure provided within the present specification, when considered in light of the knowledge of one of ordinary skill in the art, clearly enabled one of ordinary skill in the art to make and use the invention without undue experimentation, see M.P.E.P. § 2164.01.



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With respect to claim 24 reciting "said hub station first antenna beam and said subscriber station first antenna beam hav[ing] co-spatial footprints and said hub station second antenna beam and said subscriber station second antenna beam hav[ing] co-spatial footprints," it is unclear whether the Examiner's position is that one of skill in the art would not be able to create antenna beams without undue experimentation or that one of skill in the art would not be able to create antenna beams having co-spatial foot prints. If the former is the basis of the rejection, Applicant points out that beam forming techniques using phased arrays or adaptive arrays are well known to one of ordinary skill in the wireless communications arts, as evidenced by the plethora of antenna design texts available (e.g., a search of Amazon.com produced "Practical Antenna Handbook" by Joseph J. Carr (2001) and "Antenna Theory and Design, 2nd Edition" by Warren L. Stutzman and Gary A. Thiel (1997)). If the latter is the basis of the rejection, Applicant points out that one of ordinary skill in the art would be fully capable of orienting the foregoing antenna beams of the hub and subscriber station to cause the footprints thereof to be co-spatial, see paragraph [0035] of the present specification (wherein one of ordinary skill in the art would understand that "footprint" relates to an antenna pattern, and "co-spatial" refers to overlap with respect to those antenna patterns).

With respect to claim 25 reciting "means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals," it appears that the Examiner's position is that one of skill in the art would not be able to establish separate co-spatial reception and transmission antenna beams without undue experimentation because use of different frequency bands is so clearly within the skill of one of ordinary skill in the art. As shown above, beam forming techniques using phased arrays or adaptive arrays are well known to one of ordinary skill in the wireless communications arts. One of ordinary skill in the art cannot be said to lack the skills to orient separate transmit and receive beams such that these beams are co-spatial (or sharing the same space).

Although the above identified aspects of these claims are respectfully asserted to be self enabling, see M.P.E.P. § 2164, Applicant further asserts that one of ordinary skill in the art would understand how to make and use the invention in light of the disclosure, for



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example paragraphs [0031], [0032] and [0035]. Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 112, first paragraph, rejections of record.

### B. 35 U.S.C. § 112, Second Paragraph, Rejection

The Office Action states that it is not understood what beams are considered to be co-spatial in claim 25. Applicant asserts that one of ordinary skill in the art would understand that "co-spatial ... antenna beams," at least in light of paragraphs [0031], [0032] and [0035] of the disclosure, refers to substantial antenna pattern overlap. Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 112, second paragraph, rejection of claim 25.

Regarding claim 39, the Office Action asserts that the phrase "filtering requirements for received upstream ... are greater than filtering requirements for received downstream ...," is unclear, because it is not understood what is meant by "greater." Applicant respectfully disagrees. Applicant asserts that one of ordinary skill in the art would understand that "greater" refers to the out-of band rejection ratio in light of the disclosure, for example paragraphs [0021], [0022] and [0034]-[0038]. Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 112, second paragraph, rejection of claim 24.

## IV. Rejections under 35 U.S.C. § 102

Claims 1, 2-7, 10, 12, 14, 15, 18, 19, 21, 22, 23, 25, 27 and 29-34 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,475,677 to Arnold et al. ("Arnold"). All independent claims are amended to include limitations of claims rejected under 35 U.S.C. § 103. Therefore, the all claims are discussed in light of the 35 U.S.C. § 103 rejections.

## V. Rejections under 35 U.S.C. § 103

Claims 2, 13 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold. Claims 8, 9, 11, 16, 17, 20, 26 and 35-38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold in view of U.S. Patent No. 5,852,767 to Sugita ("Sugita"). Since claims 6-9, 14-17, 20, 32, 33 and 35-37 are canceled, the rejections of these claims are moot

In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. M.P.E.P. § 2143.03. Applicant asserts that the rejections do not satisfy these criteria.

Independent claim 1 is amended to include the limitations of claim 9, rendering the 35 U.S.C. § 102(b) rejection of claim 1 moot. The arguments herein for claim 1 are made in light of the rejection of former claim 9. Independent claim 10 is amended to include the limitations of claim 17, rendering the 35 U.S.C. § 102(b) rejection of claim 10 moot. The arguments herein for claim 10 are made in light of the rejection of former claim 17. Independent claim 25 is amended to include the limitations of claim 37, rendering the 35 U.S.C. § 102(b) rejection of claim 25 moot. The arguments herein for claim 25 are made in light of the rejection of former claim 37.

Claims 1 and 10 now recite "one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band." The Office Action admits that Arnold does not teach this aspect of claims 1 and 10. The Office Action introduces Sugita in an attempt to meet this aspect of the claims. Similarly, claim 25 now recites "wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band."

Applicant respectfully asserts that the proffered combination of Arnold with Sugita does not meet all the limitations of claims 1, 10 or 25. Applicant further asserts that each reference teaches away from the modification suggested by the Office Action.

In contrast with the modification suggested by the Office Action, both Arnold and Sugita teach that licensed band and unlicensed band operation are mutually exclusive modes of operation. That is, both Arnold and Sugita teach only modes of operation where licensed bands are used for both transmission and reception or else unlicensed bands are used for transmission and reception. For example, Arnold, states that unlicensed operation uses time-division duplexing (TDD) and licensed operation uses frequency-division duplexing (FDD).



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Arnold, column 7, lines 11-57. Operation in one of these modes is exclusively licensed or unlicensed, for both transmission and reception. Arnold, column 7, lines 53-57. That is, both transmission and reception are simultaneously in a licensed band using FDD or else both transmission and reception are simultaneously in an unlicensed band using TDD. Likewise, Sugita teaches that both transmission and reception are simultaneously in either a licensed or unlicensed band. Sugita, column 6. lines 25-42.

Thus, a combination of Arnold and Sugita would merely continue to provide a system that operates with mutually exclusive licensed and unlicensed modes, and would not include the use of a licensed band for one of transmission and reception and the simultaneous use of an unlicensed band for the other of transmission and reception. Therefore, Applicant respectfully asserts that the combination of Arnold and Sugita does not teach or suggest all limitations of claims 1, 10 or 25. Accordingly, Applicant requests the Examiner withdraw any rejections of claims 1, 10 and 25, based on Arnold or a combination of Arnold with Sugita.

## VI. Dependent claims

Claims 2-5, 11-13, 18, 19, 21-4, 26-31, 34, 38 and 39 depend from a respective one of base claim 1, 10 and 25, and thus inherit all the limitations of their respective base claim. Applicant asserts that these dependent claims are patentable for, at least, the reasons set forth above with respect to claims 1, 10 and 25. Accordingly, Applicant requests the Examiner withdraw the U.S.C. § 102(b) rejections of claims 2-5, 11-13, 18, 19, 21-4, 26-31, 34, 38 and 39.

## VII. Conclusion

In view of the above, Applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 06-2380, under Order No. 68144/P009US/10501230 from which the undersigned is authorized to draw.

Dated: 03/07/2006

Respectfully submitted,

By _____

R. Ross Viguet
Registration No.: 42,203
FULBRIGHT & JAWORSKI L.L.P.
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(214) 855-8185
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Attorney for Applicant

## PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 10095307

### CLAIMS AS FILED - PART I

| | (Column 1) | (Column 2) |
|---|---|---|
| TOTAL CLAIMS 39 (38) | | |
| FOR | NUMBER FILED | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS | 39 minus 20= | * 19 |
| INDEPENDENT CLAIMS | 3 minus 3 = | * |
| MULTIPLE DEPENDENT CLAIM PRESENT | | ☐ |

* If the difference in column 1 is less than zero, enter "0" in column 2

| SMALL ENTITY TYPE ☐ | | OR | OTHER THAN SMALL ENTITY | |
|---|---|---|---|---|
| RATE | FEE | | RATE | FEE |
| BASIC FEE | 370.00 | OR | BASIC FEE | 740.00 |
| X$ 9= | 171 | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL | $541 | OR | TOTAL | |

### CLAIMS AS AMENDED - PART II

| | (Column 1) | | (Column 2) | (Column 3) |
|---|---|---|---|---|
| AMENDMENT A 3/7/06 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| Total | * 25 | Minus | ** 39 | = |
| Independent | * 5 | Minus | *** 3 | = |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM | | | | ☐ |

| SMALL ENTITY | | OR | OTHER THAN SMALL ENTITY | |
|---|---|---|---|---|
| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
| X$ 9= | | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

| | (Column 1) | | (Column 2) | (Column 3) |
|---|---|---|---|---|
| AMENDMENT B | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| Total | * | Minus | ** | = |
| Independent | * | Minus | *** | = |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM | | | | ☐ |

| SMALL ENTITY | | OR | OTHER THAN SMALL ENTITY | |
|---|---|---|---|---|
| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
| X$ 9= | | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

| | (Column 1) | | (Column 2) | (Column 3) |
|---|---|---|---|---|
| AMENDMENT C | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| Total | * | Minus | ** | = |
| Independent | * | Minus | *** | = |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM | | | | ☐ |

| SMALL ENTITY | | OR | OTHER THAN SMALL ENTITY | |
|---|---|---|---|---|
| RATE | ADDITIONAL FEE | | RATE | ADDITIONAL FEE |
| X$ 9= | | OR | X$18= | |
| X42= | | OR | X84= | |
| +140= | | OR | +280= | |
| TOTAL ADDIT. FEE | | OR | TOTAL ADDIT. FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Karr | 060783/P018US/10200570 | 3972 |

29053 7590 03/21/2006

DALLAS OFFICE OF FULBRIGHT & JAWORSKI L.L.P.
2200 ROSS AVENUE
SUITE 2800
DALLAS, TX 75201-2784

| EXAMINER | |
|---|---|
| LEVITAN, DMITRY | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2616 | |

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

A

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/095,307 | KARR ET AL. | |
| | Examiner | Art Unit | |
| | Dmitry Levitan | 2616 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5,10-13,18,19,21-30,34,38 and 39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,10-13, 18, 19, 21-30, 34, 38 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Amendment, filed 03/07/06, has been entered. Claims 1-5,10-13, 18, 19, 21-30, 34, 38 and 39 remain pending.

***Claim Rejections - 35 USC § 112***

1. In light of Applicant's remarks the rejection of claim 25 under 35 U.S.C. 112, first paragraph is withdrawn.

2. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:

Regarding claim 24, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints.

The specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation.

3. In light of Applicant's remarks the rejection of claim 25 under 35 U.S.C. 112, second paragraph is withdrawn.

4. Claim 39 is rejected, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 limitation "filtering requirements for received upstream... are greater than filtering requirements for received downstream" is unclear, because it is not understood what "greater" means in the context of the claim and how numerous filtering requirements for different frequency filters can be compared to each other.

***Claim Rejections - 35 USC § 103***

1. Claims 1-5, 10-13, 19, 21-23, 25-30, 34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold in view of Sugita (US 5,852,767).

2. Regarding claims 1, 10, 25, 34 and 38, Arnold teaches a method, a system and a station for wireless data communication (digital telephone system on Fig. 1 and 6:40-65 for voice data communication) comprising:

Transmitting from a first station using a first frequency within a first band of operation (transmitting on downlink from a port/fixed base unit, in the licensed spectrum of 1930-1990 MHz to a portable unit on Fig. 1 and 6:57-60),

Receiving data at said first station using a second frequency within a second band of operation (inherently part of the system, because the port receives phone calls from the portable unit as described bellow) ,

Transmitting data from at least one other station to said first station using said second frequency within said second band of operation (transmitting from a portable unit on uplink in a frequency band of 1850-1910 MHz to the corresponding port on Fig. 1 and 6:60-64), and

Receiving data at said at least one other station using said first frequency within said first band of operation (inherently part of the system, because the portable units receive the phone calls transmitted from the port).

In addition, regarding claim 25, Arnold teaches means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and to receive data signals (inherently part of ports 30, 40, and 50 on Fig. 1, the ports utilize small antennas like 31, effectively making the reception and transmission antenna beams in different frequency bands co-spatial 8:33-38, as originating from the same antenna) and means for duplexing said data signals received and transmitted in different bands of operation (circuitry on Fig. 3 and 10:35-11:15 for duplexing the signals).

Arnold does not teach using an unlicensed band for an upstream data communication.

Sugita teaches a system utilizing an unlicensed band in certain areas for data communication to reduce the interference with existing systems (system shown on Fig. 1, comprising a GPS component to identify an acceptable mobile station position for using an unlicensed band 1:20-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add utilizing an unlicensed band of Sugita and use the unlicensed band for an upstream data communication in the system of Arnold, keeping utilizing the licensed band in downstream to reduce the system interference with the existing systems, when the number of licensed or unlicensed frequencies is limited.

3. Regarding claim 18, Arnold teaches stations comprising at least one dual band antenna (each port/station utilizing an antenna 31 on Fig. 1 and 8:33-37, the antenna is inherently dual

band, because the operation of the system is dual band, as described above and a portable unit comprises a dual band antenna as shown on Fig. 2B and 9:66-10:10).

4. Regarding claim 22, Arnold teaches stations comprising one dual band antenna (see claim 18 rejection above), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

5. Regarding claim 23, Arnold teaches subscriber stations comprising one dual band antenna (as shown on Fig. 2 A and B, as antenna 203 on Fig. 2B transmits and receives on the shown paths 9:66-10:10), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

6. Regarding claims 3, 4, 19, 21, 29 and 31, Arnold teaches a hub station transmitting to a plurality of subscriber stations (port 30 transmitting to several portable units 34 and 36 shown on Fig. 1 and 7:58-65).

7. Regarding claims 5, 12 and 27, Arnold teaches separating the first and the second frequencies by a bandwidth of at least one percent of lower of said frequencies (80 MHz separation between frequencies, wherein the lower frequency is 1850 MHz, which produce the ratio of more than 1% 6:57-63).

8. Regarding claim 30, Arnold teaches hub station comprises a plurality of said antenna beams for communicating with a plurality of stations (inherently part of Arnold system, because the hub station/port 204 comprises two antennas 206 and 205, each having transmit and receive beams, for the reception diversity 9:30-45).

9. Regarding claims 11 and 26 Arnold teaches all the limitations of the parent claims 10 and 25, including a duplexer separating transmitted and received signals at the second/mobile station (circuitry 300 on Fig. 3 and 6).

Arnold does not teach a duplexer separating transmitted and received signals and using filters at the first station.

Sugita teaches a duplexer separating transmitted and received signals at the first station (circuitry on Fig. 3, separating transmitted and received frequencies 4:1-13) and inherently using filters for the separation, because filtering the signals is essential for their separation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and using filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station.

10. Regarding claims 2, 13 and 28, Arnold teaches the limitations of parent claims 1, 10 and 25, including separating the transmit and receive frequencies by more than 1% (see claim 5 rejection above)

Arnold does not teach separating the frequencies by at least one octave.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add separating the frequencies by at least one octave to the system of Arnold as a design choice, because separation of the frequencies by two or three octaves will work in the system as well.

***Response to Arguments***

11. Applicant's arguments filed 03/07/06 have been fully considered but they are not persuasive.

On page 7 of the Response, Applicant argues that claim 24 limitation, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints, are well known and refers to antenna design texts/books.

Examiner respectfully disagrees.

The Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The limitations of the claim, as above, are essential to the practice of the invention, but are not supported by the disclosure. Disclosure contains no information on beam forming techniques using phased or adaptive arrays or any other method of creating antenna beams having co-spatial footprints.

On page 9 of the Response, Applicant argues that claim 39 limitations "filtering requirements for received upstream... are greater than filtering requirements for received downstream" are clear.

Examiner respectfully disagrees.

Filtering requirements for filters are numerous and are not limited to out-of band rejection ratio (claim 39 does not comprise out-of band rejection ratio).

Two filters, operating in different frequency bands are characterized by two groups of filtering requirements, like in-band attenuation, frequency range, size, weight, etc.

Therefore, calling filtering requirements better for one of the filters is unclear, without clarifying the specific requirement, as some of the requirements could be better but the other could be worse.

On pages 10-11 of the Response, Applicant argues that using licensed frequency range for communicating in one direction and unlicensed frequency range for the other direction is not obvious over Arnold and Sugita.

Examiner respectfully disagrees.

Arnold teaches a system, comprising separate frequencies for transmission and receive operations (5:55-65) and capable operating in licensed and unlicensed frequency ranges (5:45-50) and Sugita teaches selecting the unlicensed frequency range to decrease the interference (4:1-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use unlicensed band for an upstream data communication and licensed band in downstream, when the number of licensed or unlicensed frequencies is limited.

***Conclusion***

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is (571) 272-3093. The examiner can normally be reached on 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on (571) 272-7529. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DL

Dmitry Levitan
Patent Examiner.
03/16/06

CHI PHAM
SUPERVISORY PATENT EXAMINER
3/17/06

## Index of Claims

| Application/Control No. | Applicant(s)/Patent under Reexamination |
|---|---|
| 10/095,307 | KARR ET AL. |
| **Examiner** | **Art Unit** |
| Dmitry Levitan | 2616 |

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## Search Notes

| Application/Control No. | Applicant(s)/Patent under Reexamination | |
|---|---|---|
| 10/095,307 | KARR ET AL. | |
| **Examiner** | **Art Unit** | |
| Dmitry Levitan | 2616 | |

### SEARCHED

| Class | Subclass | Date | Examiner |
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| 320 | 276 | 3/16/06 | DL |
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### INTERFERENCE SEARCHED

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### SEARCH NOTES (INCLUDING SEARCH STRATEGY)

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| LEEE, EAST | 3/16/06 | DL |
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05-15-06

$AF/2662

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV568259185US, on the date shown below in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: May 12, 2006 Signature: (Phyllis Ewing)

OIPE IAP22 MAY 12 2006 PATENT & TRADEMARK OFFICE

Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr et al.

Application No.: 10/095,307 Confirmation No.: 3972

Filed: March 11, 2002 Art Unit: 2662

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS Examiner: D. Levitan

**NOTICE OF APPEAL**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby appeals to the Board of Appeals from the decision of the Patent Examiner dated March 21, 2006, finally rejecting claims 1-5, 10-13, 18, 19, 21-30, 34, 38 and 39 of the above-identified patent application.

Our check in the amount of $250.00 covering the fee set forth in 37 CFR 41.20(b)(1) is enclosed. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 06-2380, under Order No. 68144/P009US/10501230.

Dated: May 12, 2006

Respectfully submitted,

By _____
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*Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).*

# FEE TRANSMITTAL
## For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

**TOTAL AMOUNT OF PAYMENT** ($) 250.00

| Complete if Known | |
|---|---|
| Application Number | 10/095,307-Conf. #3972 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Examiner Name | D. Levitan |
| Art Unit | 2662 |
| Attorney Docket No. | 68144/P009US/10501230 |

**METHOD OF PAYMENT** (check all that apply)

☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: 06-2380 Deposit Account Name: Fulbright & Jaworski L.L.P.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

**FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

| | FILING FEES | | SEARCH FEES | | EXAMINATION FEES | | |
|---|---|---|---|---|---|---|---|
| | | Small Entity | | Small Entity | | Small Entity | |
| Application Type | Fee ($) | Fee ($) | Fee ($) | Fee ($) | Fee ($) | Fee ($) | Fees Paid ($) |
| Utility | 300 | 150 | 500 | 250 | 200 | 100 | |
| Design | 200 | 100 | 100 | 50 | 130 | 65 | |
| Plant | 200 | 100 | 300 | 150 | 160 | 80 | |
| Reissue | 300 | 150 | 500 | 250 | 600 | 300 | |
| Provisional | 200 | 100 | 0 | 0 | 0 | 0 | |

**2. EXCESS CLAIM FEES**

| Fee Description | Fee ($) | Small Entity Fee ($) |
|---|---|---|
| Each claim over 20 (including Reissues) | 50 | 25 |
| Each independent claim over 3 (including Reissues) | 200 | 100 |
| Multiple dependent claims | 360 | 180 |

| Total Claims | Extra Claims | Fee ($) | Fee Paid ($) |
|---|---|---|---|
| _____ - = | _____ x | _____ = | _____ |

HP = highest numer of total claims paid for, if greater than 20.

| Indep. Claims | Extra Claims | Fee ($) | Fee Paid ($) |
|---|---|---|---|
| _____ - = | _____ x | _____ = | _____ |

HP = highest numer of independent claims paid for, if greater than 3.

| Multiple Dependent Claims | |
|---|---|
| Fee ($) | Fee Paid ($) |
| _____ | _____ |
| _____ | _____ |

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

| Total Sheets | Extra Sheets | Number of each additional 50 or fraction thereof | Fee ($) | Fee Paid ($) |
|---|---|---|---|---|
| _____ - 100 = | _____ /50 | _____ (round up to a whole number) x | _____ = | _____ |

**4. OTHER FEE(S)**

| | Fees Paid ($) |
|---|---|
| Non-English Specification, $130 fee (no small entity discount) | |
| Other (e.g., late filing surcharge): 1401 Notice of appeal | 250.00 |

**SUBMITTED BY**

| | | | | | |
|---|---|---|---|---|---|
| Signature | R. Ross Viguet | Registration No. (Attorney/Agent) | 42,203 | Telephone | (214) 855-8185 |
| Name (Print/Type) | R. Ross Viguet | | | Date | May 12, 2006 |

**Fee Transmittal**

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV568259185US, on the date shown below in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: May 12, 2006 Signature: _____ (Phyllis Ewing)

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# TRANSMITTAL OF APPEAL BRIEF

Docket No.
68144/P009US/10501230

In re Application of: Randy J. Karr et al.

| Application No. | Filing Date | Examiner | Group Art Unit |
|---|---|---|---|
| 10/095,307-Conf. #3972 | March 11, 2002 | D. Levitan | 2616 |

Invention: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELES S RF DATA COMMUNICATIONS

**TO THE COMMISSIONER OF PATENTS:**

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: May 12, 2006 .

The fee for filing this Appeal Brief is $ 250.00 .

☐ Large Entity ☒ Small Entity

☐ A petition for extension of time is also enclosed.

The fee for the extension of time is _____ .

☒ A check in the amount of $ 250.00 is enclosed.

☐ Charge the amount of the fee to Deposit Account No. 06-2380 .
This sheet is submitted in duplicate.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. 06-2380 .
This sheet is submitted in duplicate.

Dated: June 30, 2006

R. Ross Viguet
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**Appeal Brief Transmittal**

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV568259287US, on the date shown below in an envelope addressed to: MS Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: June 30, 2006 Signature: (Jan Cleveland)

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OIPE IAP64
JUN 30 2006
PATENT & TRADEMARK OFFICE

Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr et al.

Application No.: 10/095,307 — Confirmation No.: 3972

Filed: March 11, 2002 — Art Unit: 2616

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS — Examiner: D. Levitan

## APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on May 12, 2006, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.02:

| | |
|---|---|
| I. | Real Party In Interest |
| II. | Related Appeals, Interferences and Judicial Proceedings |
| III. | Status of Claims |
| IV. | Status of Amendments |
| V. | Summary of Claimed Subject Matter |
| VI. | Grounds of Rejection to be Reviewed on Appeal |
| VII. | Argument |
| VIII. | Claims |
| IX. | Evidence |
| X. | Related Proceedings |



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| | |
|---|---|
| Appendix A | Claims |
| Appendix B | Evidence |
| Appendix C | Related Proceedings |

## I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Adaptix, Inc.

## II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF CLAIMS

### A. Total Number of Claims in Application

There are 25 claims pending in application.

### B. Current Status of Claims

1. Claims pending: 1-5, 10-13, 18, 19, 21-31, 34, 38 and 39
2. Claims canceled: 6-9, 14-17, 20, 32, 33 and 35-37
3. Claims withdrawn from consideration but not canceled: None
4. Claims allowed: None
5. Claims rejected: 1-5, 10-13, 18, 19, 21-31, 34, 38 and 39
6. Claims objected to: None

### C. Claims On Appeal

The claims on appeal are claims 1-5, 10-13, 18, 19, 21-31, 34, 38 and 39

## IV. STATUS OF AMENDMENTS

Appellant did not file an Amendment After Final Rejection. The claims enclosed herein as Appendix A are the current claims, and include the amendments filed by Appellant on March 7, 2006

## V. SUMMARY OF CLAIMED SUBJECT MATTER

According to claim 1, a spectrum allocation method for wireless data communication comprises the steps of transmitting data from a first station using a first frequency within a first band of operation (pg. 10, par. 29, lines 1-3) receiving data at said first station using a second frequency within a second band of operation (pg. 10, par. 29, lines 1-3); transmitting data from at least one other station to said first station using said second frequency within said second band of operation (pg. 10, par. 29, lines 1-3); and receiving data at said at least one other station using said first frequency within said first band of operation (pg. 10, par. 29, lines 1-3; See also discussion of Fig 1 on pg. 11, par. 30, lines 3-10); wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 10, a system for spectrum allocation in wireless data communication comprises a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation (pg. 10, par. 29, lines 1-3; element 10 of Fig. 1); and at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation (pg. 10, par. 29, lines 1-3; element 206 of Fig. 2); wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 24, a hub station first antenna beam and a subscriber station first antenna beam have co-spatial footprints and a hub station second antenna beam and a subscriber station second antenna beam have co-spatial footprints (pg 13, par. 35, lines 4-11).

According to claim 25, a data communications station using spectrum allocation for wireless data communications comprises means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different



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bands of operation to transmit and receive data signals (pg. 10, par. 29, lines 1-3; elements 201-203 and 301-303 of Figs. 2 and 3); and means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation (elements 202 and 302 of Figs. 2 and 3); wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 39, a station further comprises means for filtering said data signals, wherein filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications at said at least one subscriber station (pgs. 8-9, par. 22, lines 1-11).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-5, 10-13, 18, 19, 21-23, 25-31, 34 and 38 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,475,677 to Arnold et al. ("Arnold") in view of US Patent No. 5,852,767 to Sugita ("Sugita").

Whether claim 24 properly stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Whether claim 39 properly stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.

## VII. ARGUMENT

### A. First Ground of Rejection

Claims 1-5, 10-13, 18, 19, 21-23, 25-31, 34 and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold in view of Sugita. In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art

must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

1. The Final Office Action Provides Insufficient Motivation to Combine Arnold with Sugita for Claims 1-5

Appellant respectfully asserts that the Office Action provides insufficient motivation to combine Arnold with Sugita. In determining the propriety of a case for obviousness, it is necessary to ascertain whether the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Appellant asserts that neither Arnold nor Sugita provides any suggestion that the modification proposed in the Final Office Action, dated March 21, 2006 ("Final Action") would result in any improvement.

Independent claim 1 recites "transmitting ... using a first frequency; receiving ... using a second frequency ... wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band. The Final Action admits that Arnold does not teach the limitation of using a licensed band for one direction of communication and an unlicensed band for another. The Final Action, therefore, attempts to combine Sugita with Arnold, alleging that the combination teaches the above-recited limitations.

Arnold teaches a wireless communication system that operates in either a licensed mode or an unlicensed mode. Arnold, abstract, lines 1-7 Appellant notes that neither Arnold nor Sugita teaches or suggests the desirability of modifying Arnold to transmit in a licensed band while receiving signals in an unlicensed band, or the reverse. That is, the motivation to combine Arnold with Sugita cannot be found in the references themselves. Appellant also asserts that, as shown below, the nature of the problem to be solved does not provide the necessary motivation, nor does the knowledge of ones of ordinary skill in the art.

Further, the motivation provided in the Final Action is incorrect and is therefore improper for an additional reason. The Final Action states that "Sugita teaches selecting the unlicensed frequency range to decrease the interference," citing column 4, lines 1-13 of

Sugita. Final Action at page 8. Not only does the cited section of Sugita not contain the teaching alleged by Sugita, but Arnold contradicts the allegations in the Final Action. Specifically, Arnold states, "within the unlicensed spectrum, multiple users of possibly different service providers may be competing for use of available frequencies and time slots." Arnold, col. 7, lines 21-25. The statement of motivation provided by the Final Action is contradicted by one of the cited references.

The Final Action also states that "[i]t would have been obvious ... to use an unlicensed band for an upstream data communication and licensed band in downstream, when the number of licensed or unlicensed frequencies is limited." Final Action at page 8. Appellant notes that Arnold teaches use of unlicensed frequencies when unlicensed frequencies are available, and the use of licensed frequencies when unlicensed frequencies are unavailable. Arnold, col. 7, lines 33-36 and 43-47. Arnold, therefore already teaches a solution when the number of frequencies is limited that is markedly different than the one suggested in the Final Action. That is, Arnold keeps both transmission and reception in either licensed or unlicensed bands, and does not suggest that any other solution is needed or desirable.

Sugita also teaches a solution when the number of frequencies is limited that is markedly different than the one suggested in the Final Action. Specifically, Sugita teaches that a transmitter simply not operate, if number of frequencies is limited. Sugita, col. 2, lines 35-45. Sugita also provides a solution to limitations on licenses: use unlicensed bands. Sugita, col. 1, lines 19-27. Thus, the nature of the problem to be solved does not provide motivation for the proposed combination, because each reference already provides its own solution that is intended to be complete, but is notably different than the teachings of the other reference. The Final Action does not explain how one of ordinary skill in the art would seek to find a solution different that the ones already suggested by the references. Therefore, the motivation suggested by the Final Action cannot be supported by the cited references.

Appellant asserts that the motivation provided by the Final Action is incorrect and is not supported by the cited references. Thus, the motivation provided by the Office Action, to combine Arnold with Sugita, is insufficient, rendering the proffered combination improper.



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Accordingly, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a) rejections of claims 1-5 under the proffered combination of Arnold and Sugita.

2. The Final Office Action Provides Insufficient Motivation to Combine Arnold with Sugita for Claims 10-13, 18, 19, 21-23

Claims 10-13, 18, 19, 21-23 are rejected under the combination of Arnold with Sugita. Appellant respectfully asserts that, as shown above, the Office Action provides insufficient motivation to combine Arnold with Sugita. Accordingly, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a) rejections of claims 10-13, 18, 19, 21-23 under the proffered combination of Arnold and Sugita.

3. The Final Office Action Provides Insufficient Motivation to Combine Arnold with Sugita for Claims 25-31, 34 and 38

Claims 25-31, 34 and 38 are rejected under the combination of Arnold with Sugita. Appellant respectfully asserts that, as shown above, the Office Action provides insufficient motivation to combine Arnold with Sugita. Accordingly, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a) rejections of claims 25-31, 34 and 38 under the proffered combination of Arnold and Sugita.

4. The Proffered Combination Does Not Teach or Suggest All Limitations of Independent Claim 1 or Dependent Claims 3-5

Claim 1 recites "one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band." The Office Action admits that Arnold does not teach this aspect of claim 1. The Office Action introduces Sugita in an attempt to meet this aspect of the claims.

Appellant respectfully asserts that the proffered combination of Arnold with Sugita does not meet all the limitations of claim 1. Arnold teaches only modes of operation where licensed bands are used for both transmission and reception or else unlicensed bands are used for both transmission and reception. For example, Arnold states that unlicensed operation uses time-division duplexing (TDD) and licensed operation uses frequency-division duplexing (FDD). Arnold, column 7, lines 11-57. Appellant notes that TDD and FDD are different modes of operation, and that Arnold teaches that only one of these modes is used at

a time. That is, Arnold's system operates in an exclusively licensed or unlicensed manner, for both transmission and reception. Arnold, column 7, lines 53-57. Arnold teaches that both transmission and reception are simultaneously in a licensed band using FDD or else both transmission and reception are simultaneously in an unlicensed band using TDD.

Sugita teaches a communication system that becomes operational for 2-way communication only when an unlicensed band is available without expected interference, and if so, communicates with both transmission and reception using an unlicensed band. Sugita, col. 3, lines 52-57. Therefore, a modification of Arnold using Sugita would result in a method that would prevent transmission, unless both transmission and reception could be done using an unlicensed band. If so, then the resulting method would use purely the unlicensed band, as Arnold already teaches.

The modification to Arnold by using the teaching of Sugita would therefore be to prevent transmission in some circumstances, rather than transmitting in one band and receiving in another. Therefore, Appellant respectfully asserts that the combination of Arnold and Sugita does not teach or suggest all limitations of claim 1. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 1 be reversed.

Claims 3-5 depend from claim 1, and thus inherit all the limitations of claim 1. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 1. Therefore, the proffered combination cannot teach or suggest every limitation of claims 3-5. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 3-5 be reversed.

5. The Proffered Combination Does Not Teach or Suggest All Limitations of Dependent Claim 2

Claim 2 recites "said first frequency and said second frequency are separated by at least one octave." Neither of Arnold or Sugita teaches this amount of separation between a transmission and reception frequency, nor has the Examiner shown otherwise. Further, claim 2 depends from claim 1, and thus inherits all limitations of claim 1. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 1. Therefore, the proffered combination cannot teach or suggest every limitation of



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claim 2. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 2 be reversed.

6. The Proffered Combination Does Not Teach or Suggest All Limitations of Independent Claim 10 or Dependent Claims 11, 12, 19 and 21

Claim 10 recites "one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band." The Office Action admits that Arnold does not teach this aspect of claim 10. The Office Action introduces Sugita in an attempt to meet this aspect of the claims.

Appellant respectfully asserts that the proffered combination of Arnold with Sugita does not meet all the limitations of claim 10. As shown above, Arnold teaches that licensed band and unlicensed band operation are mutually exclusive modes of operation, while Sugita teaches a communication system that is either operational for 2-way communication using an unlicensed band, or else does not transmit. Therefore, a modification of Arnold using Sugita would result in a system that either did not transmit unless both transmission and reception could be done using an unlicensed band. If so, then the resulting system would use purely the unlicensed band, as Arnold already teaches.

Therefore, Appellant respectfully asserts that the combination of Arnold and Sugita does not teach or suggest all limitations of claim 10. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 10 be reversed.

Claims 11, 12, 19 and 21 depend from claim 10, and thus inherit all the limitations of claim 10. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 10. Therefore, the proffered combination cannot teach or suggest every limitation of claims 11, 12, 19 and 21. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 11, 12, 19 and 21 be reversed.

7. The Proffered Combination Does Not Teach or Suggest All Limitations of Dependent Claim 13

Claim 13 recites "said first frequency and said second frequency are separated by at least one octave." Neither of Arnold or Sugita teaches this amount of separation between a

transmission and reception frequency, nor has the Examiner shown otherwise. Further, claim 13 depends from claim 10, and thus inherits all limitations of claim 10. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 10. Therefore, the proffered combination cannot teach or suggest every limitation of claim 13. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 13 be reversed.

8. The Proffered Combination of Arnold with Sugita Does Not Teach or Suggest All Limitations of Dependent Claim 18

Claim 18 recites "each of said stations further comprise at least one dual band antenna." The combination of Arnold with Sugita does not teach or suggest a dual band antenna, as required by claim 18.

The Final Action cites antenna 31 of Figure 1; antenna 203 of Figure 2B; column 8, lines 33-37, and column 9, line 66 through column 10, line 10 of Arnold. However, none of the cited sections teach or suggest a dual band antenna. Sugita is not relied upon in addressing the limitations introduced by claim 18. Appellant notes that the cited sections of Arnold merely mention either a single antenna 31 without mention of dual bands, or else two antennas, 205 and 206, that both operate at the same frequency. Arnold, col. 8, lines 33-34; col. 9, line 66 to col. 10, line 8. Therefore, the combination of Arnold and Sugita does not teach or suggest a dual band antenna, as required by claim 18. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 18 be reversed.

Further, claim 18 depends from claim 10, and thus inherits all limitations of claim 10. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 10. Therefore, the proffered combination cannot teach or suggest every limitation of claim 18. Accordingly, for this further reason, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 18 be reversed.

9. The Proffered Combination of Arnold with Sugita Does Not Teach or Suggest All Limitations of Dependent Claim 22

Claim 22 recites "said hub station comprises at least one dual band antenna ...." As shown above, the combination of Arnold with Sugita does not teach or suggest a dual band



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antenna, and does not teach a dual band antenna at a hub station. Therefore, the combination of Arnold and Sugita does not teach or suggest all the limitations of claim 22. Further, claim 22 depends from claim 10, and thus inherits all limitations of claim 10. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 10. Therefore, for this additional reason, the proffered combination cannot teach or suggest every limitation of claim 22. Accordingly, for at least these reasons, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 22 be reversed.

10. The Proffered Combination of Arnold with Sugita Does Not Teach or Suggest All Limitations of Dependent Claim 23

Claim 23 recites "said subscriber stations comprise at least one dual band antenna ...." As shown above, the combination of Arnold with Sugita does not teach or suggest a dual band antenna, and does not teach a dual band antenna at a subscriber station. Therefore, the combination of Arnold and Sugita does not teach or suggest all the limitations of claim 23. Further, claim 23 depends from claim 10, and thus inherits all limitations of claim 10. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 10. Therefore, for this additional reason, the proffered combination cannot teach or suggest every limitation of claim 23. Accordingly, for at least these reasons, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 23 be reversed.

11. The Proffered Combination Does Not Teach or Suggest All Limitations of Independent Claim 25 or Dependent Claims 26, 27, 29-31, 34 and 38

Claim 25 recites "wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band." The Office Action admits that Arnold does not teach this aspect of claim 25. The Office Action introduces Sugita in an attempt to meet this aspect of the claims.

Appellant respectfully asserts that the proffered combination of Arnold with Sugita does not meet all the limitations of claim 25. As shown above, Arnold teaches that licensed band and unlicensed band operation are mutually exclusive modes of operation, while Sugita teaches a communication system that is either operational for 2-way communication using an unlicensed band, or else does not transmit. Therefore, a modification of Arnold using Sugita

would result in a system that either did not transmit unless both transmission and reception could be done using an unlicensed band. If so, then the resulting system would use purely the unlicensed band, as Arnold already teaches.

Therefore, Appellant respectfully asserts that the combination of Arnold and Sugita does not teach or suggest all limitations of claim 25. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 25 be reversed.

Claims 26, 27, 29-31, 34 and 38 depend from base claim 25, and thus inherit all the limitations of claim 25. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 25. Therefore, the proffered combination cannot teach or suggest every limitation of claims 26, 27, 29-31, 34 and 38. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 26, 27, 29-31, 34 and 38 be reversed.

12. The Proffered Combination Does Not Teach or Suggest All Limitations of Dependent Claim 28

Claim 28 recites "said disparate frequencies are separated by at least one octave." Neither of Arnold or Sugita teaches this amount of separation between a transmission and reception frequency, nor has the Examiner shown otherwise. Further, claim 28 depends from claim 25, and thus inherits all limitations of claim 25. As shown above, the proffered combination of Arnold with Sugita does not teach or suggest every limitation of claim 25. Therefore, the proffered combination cannot teach or suggest every limitation of claim 28. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 28 be reversed.

B. Second Ground of Rejection

Claim 24 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

In rejecting claim 24 under 35 U.S.C. § 112, first paragraph, the Final Action baldly states that the specification does not adequately describe "how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how

to make hub station second antenna beam and subscriber station antenna beam having co-spatial footprints." Final Action at page 2. The Final Action clarifies, by stating that "[The] [d]isclosure contains no information on beamforming techniques using phased or adaptive arrays or any other method of creating antenna beams having co spatial footprints." Final Action at page 7.

Appellant respectfully asserts that a rejection for lack of enablement under 35 U.S.C. § 112, first paragraph, with respect to the identified aspects of claim 24 cannot properly be made. Specifically, the disclosure provided within the present specification, when considered in light of the knowledge of one of ordinary skill in the art, clearly enables one of ordinary skill in the art to make and use the invention without undue experimentation. For example, see paragraph [0035] of the originally-filed application.

Appellant points out that beam forming techniques using phased arrays or adaptive arrays are well known to one of ordinary skill in the wireless communications arts, as evidenced by the plethora of antenna design texts available (e.g., a search of Amazon.com produced "Practical Antenna Handbook" by Joseph J. Carr (2001) and "Antenna Theory and Design, 2nd Edition" by Warren L. Stutzman and Gary A. Thiel (1997)). This general knowledge, combined with the originally-filed disclosure therefore enables one of ordinary skill in the art to make and use the invention.

Further, Appellant notes that the Final Action alleges that "Arnold teaches means for establishing separate co-spatial reception and transmission beams" in column 8, lines 33-38. Final Action at page 4. Appellant disagrees with the Final Actions interpretation of Arnold, and notes that Arnold does not contain information on beamforming techniques using phased or adaptive arrays, or any other method of creating antenna beams having co spatial footprints. However, in making the allegation, the Final Action appears to be relying on the knowledge of one of ordinary skill in the art to enable interpretation of the cited section of Arnold in the alleged manner.

Therefore, Appellant understands the statement on page 4 of the Final Action to imply that establishing separate co-spatial reception and transmission beams is within the ability of one of ordinary skill in the art. Appellant therefore asserts that the limitations of claim 24,



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i.e. making a hub station first antenna beam and a subscriber station first antenna beam have co-spatial footprints and making a hub station second antenna beam and a subscriber station second antenna beam have co-spatial footprints, are enabled. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 112, first paragraph, rejection of claim 24 be reversed.

C. Third Ground of Rejection

Claim 39 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention. Specifically, the Final Action asserts that "filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications ..." is unclear, because it is not understood what "greater" means.

Appellant notes that if the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite. *Ex parte Porter*, 25 USPQ2d 1144, 1145 (Bd. Pat. Appl & Inter. 1992). Appellant asserts that one of ordinary skill in the art would understand that "greater" refers to the out-of band rejection ratio in light of the disclosure, for example paragraph [0022] and also paragraphs [0021] and [0034]-[0038] of the originally-filed application. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 112, second paragraph, rejection of claim 39 be reversed.

## VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Appellant on March 7, 2006.

## IX. EVIDENCE

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted, hence the attached Appendix B is blank.



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X. RELATED PROCEEDINGS

No related proceedings are referenced in II. above, and copies of decisions in related proceedings are not provided, hence the attached Appendix C is blank.

Dated: June 30, 2006

Respectfully submitted,

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV568259287US, on the date shown below in an envelope addressed to: MS Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: June 30, 2006

Signature: Jan Cleveland

(Jan Cleveland

By R. Ross Viguet

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No. 10/095,307**

1. A spectrum allocation method for wireless data communication comprising the steps of:

transmitting data from a first station using a first frequency within a first band of operation;

receiving data at said first station using a second frequency within a second band of operation;

transmitting data from at least one other station to said first station using said second frequency within said second band of operation; and

receiving data at said at least one other station using said first frequency within said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

2. The method of claim 1 wherein said first frequency and said second frequency are separated by at least one octave.

3. The method of claim 1 wherein one of said stations is a hub station transmitting to at least one subscriber station.

4. The method of claim 1 wherein one of said stations is a hub station transmitting to a plurality of subscriber stations.

5. The method of claim 1 wherein said first frequency and said second frequency are separated by a bandwidth of at least one percent of the lower of said frequencies.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)



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10. A system for spectrum allocation in wireless data communication comprising:

a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation; and

at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

11. The system of claim 10 wherein each of said stations further comprise duplexers separating transmitted signals and received signals.

12. The system of claim 10 wherein said first frequency is separated from said second frequency by a bandwidth of at least one percent of the lower of one of said frequencies.

13. The system of claim 10 wherein said first frequency and said second frequency are separated by at least one octave.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. The system of claim 10 wherein each of said stations further comprise at least one dual band antenna.

19. The system of claim 10 wherein said first station is a hub station and said at least one other data communications station is at least one subscriber station.

20. (Canceled)



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21. The system of claim 19 wherein said hub station transmits to a plurality of said subscriber stations.

22. The system of claim 19 wherein said hub station comprises at least one dual band antenna transmitting on said first frequency using a first antenna beam and receiving on said second frequency using a second antenna beam.

23. The system of claim 22 wherein said subscriber stations comprise at least one dual band antenna receiving on said first frequency using a first antenna beam and transmitting on said second frequency using a second antenna beam.

24. The system of claim 23 wherein said hub station first antenna beam and said subscriber station first antenna beam have co-spatial footprints and said hub station second antenna beam and said subscriber station second antenna beam have co-spatial footprints.

25. A data communications station using spectrum allocation for wireless data communications, said station comprising:

means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals; and

means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation;

wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band.

26. The station of claim 25 further comprising means for filtering said data signals.

27. The station of claim 25 wherein said frequencies are separated by a bandwidth of at least one percent of the lower of said frequencies used to transmit and receive data signals.

28. The station of claim 25 wherein said disparate frequencies are separated by at least one octave.

29. The station of claim 25 wherein said station is a hub station which communicates with a plurality of subscriber stations.

30. The station of claim 29 wherein said hub station comprises a plurality of said antenna beam means for communicating with said plurality of subscriber stations.

31. The station of claim 25 wherein said station is a subscriber station.

32. (Canceled)

33. (Canceled)

34. The station of claim 25 wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station.

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. The station of claim 34 wherein said at least one unlicensed band frequency is used for upstream data communications from at least one subscriber station to a hub station.

39. The station of claim 38 further comprising means for filtering said data signals, wherein filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications at said at least one subscriber station.



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## APPENDIX B

**Evidence: None**

## APPENDIX C

**Related Proceedings: None**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Karr | 060783/P018US/10200570 | 3972 |

29053 7590 08/02/2006

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| EXAMINER | |
|---|---|
| LEVITAN, DMITRY | |
| ART UNIT | PAPER NUMBER |
| 2616 | |

DATE MAILED: 08/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/095,307 | KARR ET AL. | |
| | Examiner | Art Unit | |
| | Dmitry Levitan | 2616 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5,10-13,18,19,21-30,34,38 and 39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,10-13,18,19,21-30,34,38 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

***Response to Amendment***

1. In view of the Appeal Brief filed on 6/30/06, PROSECUTION IS HEREBY REOPENED. Clarified rejection of the claims under 35 U.S.C. 103(a) is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

(See last page).

***Claim Rejections - 35 USC § 112***

1. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:

Regarding claim 24, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints.

The specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation.

2. Claim 39 is rejected, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 limitation "filtering requirements for received upstream... are greater than filtering requirements for received downstream" is unclear, because it is not understood what "greater" means in the context of the claim and how numerous filtering requirements for different frequency filters can be compared to each other.

***Claim Rejections - 35 USC § 103***

1. Claims 1-5, 10-13, 19, 21-23, 25-30, 34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold (US 5,475,677).

2. Regarding claims 1, 10 and 25, Arnold teaches a method, a system and a station for wireless data communication (digital telephone system on Fig. 1 and 6:40-65 for voice data communication) comprising:

Transmitting from a first station using a first frequency within a first band of operation (transmitting on downlink from a port/fixed base unit, in the licensed spectrum of 1930-1990 MHz to a portable unit on Fig. 1 and 6:57-60),

Receiving data at said first station using a second frequency within a second band of operation (inherently part of the system, because the port receives phone calls from the portable unit as described bellow) ,

Transmitting data from at least one other station to said first station using said second frequency within said second band of operation (transmitting from a portable unit on uplink in a frequency band of 1850-1910 MHz to the corresponding port on Fig. 1 and 6:60-64), and

Receiving data at said at least one other station using said first frequency within said first band of operation (inherently part of the system, because the portable units receive the phone calls transmitted from the port).

Arnold does not teach transmitting data in an unlicensed band and receiving data in the licensed band for one of the stations.

Currently numerous wireless devices are competing for a limited number of available frequencies to communicate with each other. Very often the needed frequencies are unusable due to fading losses, high interference or being in use by other devices.

Since Arnold is capable of transmitting and receiving both licensed and unlicensed bands, it would have been obvious to one of ordinary skill in the art at the time the invention was made to transmit data in an unlicensed band and receive data in the licensed band for one of the stations in the system of Arnold, for the system flexibility, when frequencies for transmission or receiving in licensed or unlicensed bands are not available due to the system load or excessive

noise, therefore utilizing a transmission frequency in one band and a receiving frequency in the other band.

In addition, regarding claim 25, Arnold teaches means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and to receive data signals (inherently part of ports 30, 40, and 50 on Fig. 1, the ports utilize small antennas like 31, effectively making the reception and transmission antenna beams in different frequency bands, as the system operates in FDD and TDD modes, co-spatial 8:33-38, as originating from the same antenna) and means for duplexing said data signals received and transmitted in different bands of operation (circuitry on Fig. 3 and 10:35-11:15 for duplexing the signals).

3. Regarding claims 3, 4, 19, 21, 29 and 31, Arnold teaches a hub station transmitting to a plurality of subscriber stations (port 30 transmitting to several portable units 34 and 36 shown on Fig. 1 and 7:58-65).

4. Regarding claims 5, 12 and 27, Arnold teaches separating the first and the second frequencies by a bandwidth of at least one percent of lower of said frequencies (80 MHz separation between frequencies, wherein the lower frequency is 1850 MHz, which produce the ratio of more than 1% 6:57-63).

5. Regarding claim 18, Arnold teaches stations comprising at least one dual band antenna (each port/station uses one of the duplicate antennas 205 or 206, used for the space diversity 9:30-37 on Fig. 2A, each of the antennas 205 or 206 is selected for the operation on the basis of the signal fading 9:37-60 and inherently operates with different uplink and downlink frequencies in FDD mode 9:45-50, making each of the antennas a dual band antenna. Also each of the same

antennas operate in TDD mode, therefore using additional, third, frequency band, as TDD operational frequency band is different from the FDD bands).

6. Regarding claim 22, Arnold teaches stations comprising one dual band antenna (see claim 18 rejection above), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

7. Regarding claim 23, Arnold teaches subscriber stations comprising one dual band antenna (multiple antennas are used at a portable unit for the microscopic diversity 2:57-3:10, shown on Fig. 2 A and B, as antennas 202 and 203, each of the antennas 202 or 203 is selected for the operation on the basis of the signal fading 9:45-60 and inherently operates with different uplink and downlink frequencies in FDD mode 9:45-50, making each of the antennas a dual band antenna. Also each of the same antennas operate in TDD mode, therefore using additional, third, frequency band, as TDD operational frequency band is different from the FDD bands), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

8. Regarding claim 30, Arnold teaches hub station comprises a plurality of said antenna beams for communicating with a plurality of stations (inherently part of Arnold system, because the hub station/port 204 comprises two antennas 206 and 205, each having transmit and receive beams, for the reception diversity 9:30-45).

9. Regarding claims 2, 13 and 28, Arnold teaches the limitations of parent claims 1, 10 and 25, including separating the transmit and receive frequencies by more than 1% (see claim 5 rejection above) .

Arnold does not teach separating the frequencies by at least one octave.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add separating the frequencies by at least one octave to the system of Arnold as a design choice, because separation of the frequencies by two or three octaves will work in the system as well.

10. Regarding claims 34 and 38, Arnold teaches the limitations of parent claim 25 (see claim 25 rejection above) .

Arnold does not teach using one licensed frequency for downstream communication from a hub station to a subscriber station and one unlicensed frequencies for an upstream communication.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use one licensed frequency for downstream communication from a hub station to a subscriber station and one unlicensed frequencies for an upstream communication in the system of Arnold as a design choice, because in the environment, where there are no unlicensed frequencies available for downlink communication and no licensed frequencies available for the upstream communication, it is the only choice to establish communication between the hub and the subscriber station.

11. Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold (US 5,475,677) in view of Sugita (5,852,767).

Arnold teaches all the limitations of the parent claims 10 and 25, including a duplexer separating transmitted and received signals at the second/mobile station (circuitry 300 on Fig. 3 and 6).

Arnold does not teach a duplexer separating transmitted and received signals and using filters at the first station.

Sugita teaches a duplexer separating transmitted and received signals at the first station (circuitry on Fig. 3, separating transmitted and received frequencies 4:1-13) and inherently using filters for the separation, because filtering the signals is essential for their separation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and using filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station.

***Response to Arguments***

12. Applicant's arguments filed 06/30/06 have been fully considered but they are not persuasive.

On page 13 of the Brief, Applicant argues that claim 24 limitation, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints, are well known and refers to antenna design texts/books.

Examiner respectfully disagrees.

The Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The limitations of the claim, as above, are essential to the practice of the invention, but are not supported by the disclosure. Disclosure contains no information on beam

forming techniques using phased or adaptive arrays or any other method of creating antenna beams having co-spatial footprints.

On page 14 of the Brief, Applicant argues that claim 39 limitations "filtering requirements for received upstream… are greater than filtering requirements for received downstream" are clear.

Examiner respectfully disagrees.

Filtering requirements for filters are numerous and are not limited to out-of band rejection ratio (claim 39 does not comprise out-of band rejection ratio).
Two filters, operating in different frequency bands are characterized by two groups of filtering requirements, like in-band attenuation, frequency range, size, weight, etc.
Therefore, calling filtering requirements better for one of the filters is unclear, without clarifying the specific requirement, as some of the requirements could be better but the other could be worse.

***Conclusion***

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Levitan whose telephone number is (571) 272-3093. The examiner can normally be reached on 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on (571) 272-7529. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dmitry Levitan
Patent Examiner.
07/20/06

DORIS H. TO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

## Index of Claims

| Application/Control No. | Applicant(s)/Patent under Reexamination |
|---|---|
| 10/095,307 | KARR ET AL. |
| **Examiner** | **Art Unit** |
| Dmitry Levitan | 2616 |

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## Search Notes

| Application/Control No. | Applicant(s)/Patent under Reexamination |
|---|---|
| 10/095,307 | KARR ET AL. |
| **Examiner** | **Art Unit** |
| Dmitry Levitan | 2616 |

### SEARCHED

| Class | Subclass | Date | Examiner |
|---|---|---|---|
| 370 | 276-282 | 7/20/06 | DL |
| | 295 | | |
| | 310 | | |
| | 343 | | |
| 455 | 39 | | |
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### INTERFERENCE SEARCHED

| Class | Subclass | Date | Examiner |
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### SEARCH NOTES (INCLUDING SEARCH STRATEGY)

| | DATE | EXMR |
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| IEEE, EAST | 7/20/06 | DL |
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Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr et al.

Application No.: 10/095,307 | Confirmation No.: 3972

Filed: March 11, 2002 | Art Unit: 2616

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS | Examiner: D. Levitan

## SECOND APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant hereby requests reinstatement of the Appeal. As required under § 41.37(a), this brief is filed within two months of the second Notice of Appeal, filed in this case concurrently with this brief, and is in furtherance of said Notice of Appeal and the first Notice of Appeal filed May 12, 2006.

The fees required under § 41.20(b)(2) were dealt with in the TRANSMITTAL OF APPEAL BRIEF filed May 12, 2006. Appellant believes that, according to M.P.E.P. § 1204.01, no further fees are required for this Second Appeal Brief.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.02:


| | |
|---|---|
| I. | Real Party In Interest |
| II. | Related Appeals, Interferences and Judicial Proceedings |
| III. | Status of Claims |
| IV. | Status of Amendments |
| V. | Summary of Claimed Subject Matter |
| VI. | Grounds of Rejection to be Reviewed on Appeal |

| | |
|---|---|
| VII. | Argument |
| VIII. | Claims |
| IX. | Evidence |
| X. | Related Proceedings |
| Appendix A | Claims |
| Appendix B | Evidence |
| Appendix C | Related Proceedings |


## I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Adaptix, Inc.

## II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF CLAIMS

### A. Total Number of Claims in Application

There are 25 claims pending in application.

### B. Current Status of Claims

1. Claims pending: 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39
2. Claims canceled: 6-9, 14-17, 20, 32, 33, and 35-37
3. Claims withdrawn from consideration but not canceled: None
4. Claims allowed: None
5. Claims rejected: 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39
6. Claims objected to: None

### C. Claims On Appeal

The claims on appeal are claims 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39.

## IV. STATUS OF AMENDMENTS

Appellant did not file an Amendment After Final Rejection. The claims attached hereto as Appendix A are the current claims, and include the amendments filed by Appellant on March 7, 2006.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

According to claim 1, a spectrum allocation method for wireless data communication comprises the steps of transmitting data from a first station using a first frequency within a first band of operation (pg. 10, par. 29, lines 1-3) receiving data at said first station using a second frequency within a second band of operation (pg. 10, par. 29, lines 1-3); transmitting data from at least one other station to said first station using said second frequency within said second band of operation (pg. 10, par. 29, lines 1-3); and receiving data at said at least one other station using said first frequency within said first band of operation (pg. 10, par. 29, lines 1-3; See also discussion of Fig 1 on pg. 11, par. 30, lines 3-10); wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 10, a system for spectrum allocation in wireless data communication comprises a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation (pg. 10, par. 29, lines 1-3; element 10 of Fig. 1); and at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation (pg. 10, par. 29, lines 1-3; element 206 of Fig. 2); wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 11, each station comprises duplexers separating transmitted signals and received signals (202, Fig 2; 203, Fig 3; pg. 12, par. 32, line 1; pg. 14, par. 36, lines 1-2) According to claim 24, a hub station first antenna beam and a subscriber station first antenna beam have co-spatial footprints and a hub station second antenna beam and a subscriber station second antenna beam have co-spatial footprints (pg 13, par. 35, lines 4-11).



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According to claim 25, a data communications station using spectrum allocation for wireless data communications comprises means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals (pg. 10, par. 29, lines 1-3; elements 201-203 and 301-303 of Figs. 2 and 3); and means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation (elements 202 and 302 of Figs. 2 and 3); wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band (pg. 11, par. 29, lines 11-12).

According to claim 26, a station comprises means for filtering data signals (pgs. 8-9, par. 22, lines 1-11). According to claim 39, a station comprises means for filtering data signals, wherein filtering requirements for received upstream data communications at a hub are greater than filtering requirements for received downstream data communications at a subscriber station (pgs. 8-9, par. 22, lines 1-11).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34, and 38 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,475,677 to Arnold et al. ("Arnold").

Whether claims 11 and 26 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold in view of US Patent No. 5,852,767 to Sugita ("Sugita").

Whether claim 24 properly stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Whether claim 39 properly stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.



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## VII. ARGUMENT

Appellant notes the presence of several typographical errors in various listings of claim status in the second (current) Final Office Action, mailed August 2, 2006 ("Final Action"). For example, the Summary page of the Final Action omits claim 31 from the lists of pending and rejected claims, as well as the list of claims rejected under 35 U.S.C. § 103 on page 3. Claim 31 is addressed, however, in the body of the rejection on page 5 of the Final Action. Claim 18 is omitted from the list on page 3, but is also addressed in the body of the rejection on page 5. Further, the list of claims rejected on page 3 erroneously includes claim 11, which is not included in the body of the Arnold rejection. Rather, claim 11 is included in the list for rejections over Arnold and Sugita, and is misidentified as claim 10 in the body of that rejection on page 7.

### A. First Ground of Rejection

Claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34, and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold. In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

Appellant notes that in the Final Action, Appellee admits that Arnold does not teach all the limitations for any of the claims. See Final Action, pages 4 and 7. In a previous final Office Action, mailed March 21, 2006, Appellee introduced Sugita to overcome the deficiencies of Arnold. Appellant then argued against the motivation to combine Arnold with Sugita in an earlier Appeal Brief, filed June 30, 2006.

After alleging that Appellant's arguments were "not persuasive," Appellee then changed the basis for the rejections of claim 1, as well as claims 2-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34, and 38. That is, Appellee dropped the combination of Arnold with Sugita



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that Appellant had argued against, and introduced a new ground of rejection. Specifically, the current Final Action alleges that "it would have been obvious" to modify Arnold alone in order to meet the limitations of claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34, and 38.

1. There is No Expectation of Success For Modifying Arnold to Meet the Limitations of Independent Claims 1 or 10, or Dependent Claims 3-5, 12, 19 or 21

Independent claim 1 recites "transmitting ... using a first frequency; receiving ... using a second frequency ... wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band." Independent claim 10 also recites "one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band."

The Final Action admits that Arnold does not teach the limitation of using a licensed band for one direction of communication and an unlicensed band for another. Final Action, page 4. The Final Action then attempts to modify Arnold to meet this aspect of the claim.

Appellant respectfully asserts that there is no reasonable expectation of success for the modification proposed in the Final Action, and further, that Arnold actually teaches away from the proposed modification. That is, Arnold teaches using a mode of operation in the unlicensed band that is not compatible with the mode of operation used in the licensed band. Compare the teaching of Time Division Duplexing (TDD) for an unlicensed band in col. 7, lines 12-25, with the teaching of Frequency Division Duplexing (FDD) for a licensed band in col. 10, lines 11-16. According to Arnold, both transmission and reception should either be simultaneously in a licensed band using FDD or else both transmission and reception should be simultaneously in an unlicensed band using TDD. Arnold, abstract, lines 1-7.

Arnold teaches that FDD is used with licensed uplink and downlink frequencies separated by a predefined amount (80 MHz), but that use of FDD in the unlicensed band "is not possible." Arnold, col. 10, lines 11-16 and col. 7, lines 15-16. That is, Arnold teaches away from using different frequencies for uplink and downlink when operating with a frequency in an unlicensed band. Therefore, Arnold teaches away from transmitting using a first frequency and receiving using a second frequency, wherein one of the frequencies is in a licensed band and another of the frequencies is an unlicensed band, as required by the claims.

With the reference teaching both that licensed operation requires FDD for the 80 MHz frequency separation, and that FDD "is not possible" for unlicensed operation, there is no expectation of success when modifying the cited reference as suggested by the Final Action. Since the cited reference teaches away from the modification proposed in the Final Action, and there is no reasonable expectation of success, Appellant respectfully asserts that the present invention is not obvious over Arnold. Accordingly, Appellant respectfully requests reversal of all 35 U.S.C. § 103(a) rejections over Arnold, which include claims 1-5, 10, 12, 13, 18, 19, and 21-23.

2. There is No Motivation to Modify Arnold to Meet the Limitations of Independent Claims 1 or 10, or Dependent Claims 3-5, 12, 19 or 21

In determining the propriety of a case for obviousness, it is necessary to ascertain whether the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 U.S.P.Q. 560, 562 (CCPA 1972). Appellant asserts that Arnold does not provide any suggestion that the modification proposed in the Final Action would result in any improvement.

Arnold teaches a wireless communication system that operates entirely in either a licensed mode or an unlicensed mode. Arnold, abstract, lines 1-7. Appellant notes that Arnold does not teach or suggest the desirability of transmitting in a licensed band while receiving signals in an unlicensed band, or the reverse. That is, the motivation to modify Arnold cannot be found in the reference itself. Appellant also asserts that, as shown below, the nature of the problem to be solved does not provide the necessary motivation.

The Final Action states that "it would have been obvious ... to transmit in an unlicensed band and receive data in the licensed band ... when frequencies for transmission or receiving in licensed or unlicensed bands are not available ...." Final Action at page 4. Appellant notes that Arnold teaches use of unlicensed frequencies when unlicensed frequencies are available, and the use of licensed frequencies when unlicensed frequencies are unavailable. Arnold, col. 7, lines 33-36 and 43-47.



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Arnold therefore already teaches a solution when the number of frequencies is limited that is markedly different than the one suggested in the Final Action. That is, Arnold keeps both transmission and reception together in either licensed or unlicensed bands, and does not suggest that any other solution is needed or desirable. Thus, the nature of the problem to be solved does not provide motivation for the proposed modification, because Arnold already provides its own solution that is intended to be complete. The Final Action does not explain why one of ordinary skill in the art would seek to find a solution different that the one already suggested by Arnold.

Appellant asserts that Appellee is relying on impermissible hindsight in order to piece together the elements of the claims based on knowledge gleaned from Appellant's disclosure. Appellant asserts that without the teachings of Appellant's disclosure one of ordinary skill in the art would not find it obvious to transmit using a first frequency and receive using a second frequency, wherein one of the frequencies is in a licensed band and another of the frequencies is an unlicensed band.

The motivation provided by the Final Action to modify Arnold is insufficient, and is therefore improper. Accordingly, Appellant respectfully requests reversal of all 35 U.S.C. § 103(a) rejections over Arnold, which include claims 1-5, 10, 12, 13, 18, 19 and 21-23.

3. The Proposed Modification of Arnold Does Not Teach or Suggest All Limitations of Dependent Claim 2 or 13

Claim 2 recites "said first frequency and said second frequency are separated by at least one octave." Claim 13 recites "said first frequency and said second frequency are separated by at least one octave." Arnold does not teach this amount of separation between a transmission and reception frequency. Rather, Arnold teaches 80 MHz separation when operating in licensed mode at approximately 1900 MHz. Arnold, col. 6, lines 57-63. 80 MHZ is not an octave at 1900 MHz.

Therefore, even the proposed modification of Arnold does not teach or suggest all the limitations of claim 2 or 13. Further, claims 2 and 13 depend from claims 1 and 10 respectively, and each inherits all the limitations of its base claim. As shown above, claims 1, and 10 are patentable over Arnold. Claims 2 and 13 are thus patentable for at least the same

reasons as claims 1 and 10, respectively. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 2 and 13 be reversed.

4. The Proposed Modification of Arnold Does Not Teach or Suggest All Limitations of Dependent Claim 18, 22 or 23

Claim 18 recites "each of said stations further comprise at least one dual band antenna." Claim 22 recites "said hub station comprises at least one dual band antenna ...." Claim 23 recites "said subscriber stations comprise at least one dual band antenna ...." Even if Arnold were modified as suggested in the Final Action, it does not teach or suggest these limitations.

The Final Action cites antennas 205 and 206 of Figure 2A, and column 9, lines 30-60 of Arnold. However, none of the cited sections teach or suggest a dual band antenna. Rather, Arnold teaches a bandwidth of only 1850 MHz to 1990 MHz, which is only 7%. Appellant asserts that one of ordinary skill in the art would not consider an antenna with a 7% bandwidth requirement to be a dual band antenna.

Therefore, even the proposed modification of Arnold does not teach or suggest all the limitations of claim 18, 22 or 23. Further, claims 18, 22 and 23 depend from claim 10, and thus inherit all the limitations of claim 10. As shown above, claim 10 is patentable over Arnold. Claims 18, 22 and 23 are patentable for at least the same reasons as claim 10. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 18, 22 and 23 be reversed.

5. The Cited Portion of Arnold Does Not Meet the Limitations of Independent Claim 25, or Dependent Claims 27, 29-31, 34 or 38

Independent claim 25 recites "means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation." The Final Action alleges that front end arrangement 300 of Arnold is a duplexer.

Appellant respectfully asserts that the cited portion of Arnold is not a duplexer as required by claim 25. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejections of claims 25, 27-31, 34 and 38.

6. There is No Expectation of Success For Modifying Arnold to Meet the Limitations of Independent Claim 25, or Dependent Claims 27, 29-31, 34 or 38

Independent claim 25 recites "wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band." The Final Action admits that Arnold does not teach the limitation of using a licensed band for one direction of communication and an unlicensed band for another. Final Action, page 4. The Final Action then attempts to modify Arnold to meet this aspect of the claim.

Appellant respectfully asserts that, as shown above for claims 1 and 10, there is no reasonable expectation of success for the modification proposed in the Final Action, and further, that Arnold actually teaches away from the proposed modification.

Therefore, Appellant respectfully asserts that the present invention is not obvious over Arnold. Accordingly, Appellant respectfully requests reversal of all 35 U.S.C. § 103(a) rejections over Arnold, which include claims 25, 27-31, 34 and 38.

7. There is No Motivation to Modify Arnold to Meet the Limitations of Independent Claim 25, or Dependent Claims 27, 29-31, 34 or 38

Appellant asserts that, as shown above for claims 1 and 10, Arnold does not provide any suggestion that the modification proposed in the Final Action would result in any improvement. The motivation provided by the Final Action to modify Arnold is insufficient, and is therefore improper. Accordingly, Appellant respectfully requests reversal of all 35 U.S.C. § 103(a) rejections over Arnold, which include claims 25, 27-31, 34 and 38.

8. The Proposed Modification of Arnold Does Not Teach or Suggest All Limitations of Dependent Claim 28

Claim 28 recites "said first frequency and said second frequency are separated by at least one octave." Arnold does not teach this amount of separation between a transmission and reception frequency. Rather, Arnold teaches 80 MHz separation when operating in licensed mode at approximately 1900 MHz. Arnold, col. 6, lines 57-63. 80 MHZ is not an octave at 1900 MHz.



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Therefore, even the proposed modification of Arnold does not teach or suggest all the limitations of claim 28. Further, claim 28 depends from claim 25 respectively, and thus inherits all the limitations of base claim 25. As shown above, claim 25 is patentable over Arnold. Claim 28 is thus patentable for at least the same reasons as claim 25. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claim 28 be reversed.

B. Second Ground of Rejection

Claims 11 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arnold in view of Sugita. In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

1. The Proffered Combination Does Not Teach or Suggest All Limitations of Dependent Claim 11

Claim 11 depends from claim 10, and thus inherits all the limitations of claim 10. As shown above, Arnold does not teach or suggest every limitation of claim 10. Sugita is not relied upon to provide the missing limitations. Therefore, the proffered combination cannot teach or suggest every limitation of claim 11. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 11 be reversed.

Moreover, consistent with the requirements set forth in *Grahm v. John Deere*, 383 U.S. 1 (1966), M.P.E.P. § 706.02(j) directs the Appellee to set forth in the Office action: (1) the relevant teachings of the prior art relied upon; (2) the difference or differences in the claim over the applied references; (3) the proposed modification of the applied references necessary to arrive at the claimed subject matter; and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification. However, the rejection of record provides no information with



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respect to proposed modification of the applied references relied upon by the Appellee to reject the subject matter of claim 11 nor an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the required modification. Accordingly, the rejection of record is improper and should be withdrawn.

2. The Proffered Combination Does Not Teach or Suggest All Limitations of Dependent Claim 26

Claim 26 depends from claim 25, and thus inherit all the limitations of claim 25. As shown above, Arnold does not teach or suggest every limitation of claim 25. Sugita is not relied upon to provide the missing limitations. Therefore, the proffered combination cannot teach or suggest every limitation of claim 26. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claim 26 be reversed.

Moreover, in rejecting claim 26, the Appellee states that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and suing filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station." Final Action at page 8. However, it is well settled that the fact that references can be combined or modified is not sufficient to establish a prima facie case of obviousness. M.P.E.P. § 2143.01. The language of the recited motivation is circular in nature, stating that it is obvious to make the modification (add a duplexer to multiplex two signals) because it is obvious to achieve the result (provide a multiplexed signal to a single antenna). Such language is merely a statement that the reference can be modified, and does not state any desirability for making the modification. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). Thus, the motivation provided by the Appellee is improper, as the motivation must establish the desirability for making the modification. Accordingly, the rejection of record is improper.

Additionally, the Appellee has not provided an objective reason to combine the teachings of the references. *See* M.P.E.P. 2142.01. The reason provided by the Appellee—i.e., "to improve system operation," is a general incentive, and not an objective reason. Applicant points out that "[a] general incentive does not make obvious a particular result, nor

does the existence of techniques by which those efforts can be carried out." *In re Deuel*, 51 F.3d 1552, 1559 (Fed. Cir. 1995). Therefore, the motivation provided by the Appellee for combining Arnold with Shugita is improper.

D. Third Ground of Rejection

Claim 24 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Final Action points to the limitations that two antenna beams have "co-spatial footprints." In rejecting claim 24, the Final Action baldly states that the disclosure is not enabling, because it "contains no information on beamforming techniques using phased or adaptive arrays or any other method of creating antenna beams having co spatial footprints." Final Action at pages 8-9.

Appellant respectfully asserts that a rejection for lack of enablement under 35 U.S.C. § 112, first paragraph, with respect to the identified aspects of claim 24 cannot properly be made. Specifically, the disclosure provided within the present specification, when considered in light of the knowledge of one of ordinary skill in the art, clearly enables one of ordinary skill in the art to make and use the invention without undue experimentation. For example, see paragraph [0035] of the originally-filed application.

Appellant points out that beamforming techniques using phased arrays or adaptive arrays are well known to one of ordinary skill in the wireless communications arts, as evidenced by the plethora of antenna design texts available (e.g., a search of Amazon.com produced "Practical Antenna Handbook" by Joseph J. Carr (2001) and "Antenna Theory and Design, 2nd Edition" by Warren L. Stutzman and Gary A. Thiel (1997)). This general knowledge, combined with the originally-filed disclosure therefore enables one of ordinary skill in the art to make and use the invention.

Appellant also notes that claim 24 does not require beamforming using phased or adaptive arrays. Rather, claim 24 allows for selection of pre-fabricated, fixed beam antennas based on information used by one of ordinary skill in the art, such as published antenna beam patterns. The use of such antennas, as well as the ability to orient such antennas to provide co-spatial footprints is well within the skill of one of ordinary skill in the art, having the benefit of the teaching of the patent specification, without undue experimentation.



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Further, Appellant notes that Final Action alleges that "Arnold teaches means for establishing separate co-spatial reception and transmission beams" in column 8, lines 33-38. Final Action at page 5. While Appellant disagrees with the Appellee's interpretation of Arnold, Appellant notes that the current application contains more information regarding antenna pattern selection than does the passage from Arnold that was cited by Appellee. Thus, the Final Action appears to be relying on the knowledge of one of ordinary skill in the art to enable interpretation of Arnold in the alleged manner.

Therefore, Appellant understands the statement on page 5 of the Final Action to imply that establishing separate co-spatial reception and transmission beams is within the ability of one of ordinary skill in the art. Appellant therefore asserts that the limitations of claim 24, i.e. making a hub station first antenna beam and a subscriber station first antenna beam have co-spatial footprints and making a hub station second antenna beam and a subscriber station second antenna beam have co-spatial footprints, are enabled. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 112, first paragraph, rejection of claim 24 be reversed.

E. Fourth Ground of Rejection

Claim 39 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention. Specifically, page 3 of the Final Action asserts that "filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications ..." is unclear, because it is not understood what "greater" means.

Appellant notes that if the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite. *Ex parte Porter*, 25 U.S.P.Q.2d 1144, 1145 (Bd. Pat. Appl & Inter. 1992). Appellant asserts that one of ordinary skill in the art would understand that "greater" refers to the out-of band rejection ratio of adjacent bands in light of the disclosure of the originally-filed application.

On page 9 of the Final Action, Appellee asserts that there are numerous requirements for filters in addition to the out-of-band rejection ratio. However, Appellant asserts that the



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discussion in the specification, such as in paragraphs [0021], [0022] and [0034]-[0038], which describes interference and regulatory considerations for adjacent frequency bands makes it reasonably clear to one of ordinary skill in the art that the "greater" filtering requirement means more stringent reduction of potential interference in adjacent frequency bands. One of even minimal skill in the art would understand this to mean a higher out-of-band rejection ratio for adjacent frequency bands.

Appellant asserts that the scope of claim 39 would be reasonably ascertainable by those skilled in the art, and is therefore not indefinite. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 112, second paragraph, rejection of claim 39 be reversed.

## VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Appellant on March 7, 2006.

## IX. EVIDENCE

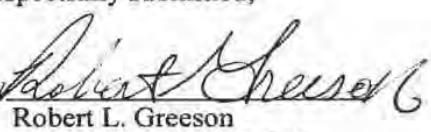
No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the Appellee is being submitted, hence the attached Appendix B is blank.

## X. RELATED PROCEEDINGS

No related proceedings are referenced in II. above, and copies of decisions in related proceedings are not provided, hence the attached Appendix C is blank.

Dated: November 2, 2006

Respectfully submitted,

By 

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No. 10/095,307**

1. A spectrum allocation method for wireless data communication comprising the steps of:

transmitting data from a first station using a first frequency within a first band of operation;

receiving data at said first station using a second frequency within a second band of operation;

transmitting data from at least one other station to said first station using said second frequency within said second band of operation; and

receiving data at said at least one other station using said first frequency within said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

2. The method of claim 1 wherein said first frequency and said second frequency are separated by at least one octave.

3. The method of claim 1 wherein one of said stations is a hub station transmitting to at least one subscriber station.

4. The method of claim 1 wherein one of said stations is a hub station transmitting to a plurality of subscriber stations.

5. The method of claim 1 wherein said first frequency and said second frequency are separated by a bandwidth of at least one percent of the lower of said frequencies.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)



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Page 146

10. A system for spectrum allocation in wireless data communication comprising:

a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation; and

at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

11. The system of claim 10 wherein each of said stations further comprise duplexers separating transmitted signals and received signals.

12. The system of claim 10 wherein said first frequency is separated from said second frequency by a bandwidth of at least one percent of the lower of one of said frequencies.

13. The system of claim 10 wherein said first frequency and said second frequency are separated by at least one octave.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. The system of claim 10 wherein each of said stations further comprise at least one dual band antenna.

19. The system of claim 10 wherein said first station is a hub station and said at least one other data communications station is at least one subscriber station.

20. (Canceled)



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Page 147

21. The system of claim 19 wherein said hub station transmits to a plurality of said subscriber stations.

22. The system of claim 19 wherein said hub station comprises at least one dual band antenna transmitting on said first frequency using a first antenna beam and receiving on said second frequency using a second antenna beam.

23. The system of claim 22 wherein said subscriber stations comprise at least one dual band antenna receiving on said first frequency using a first antenna beam and transmitting on said second frequency using a second antenna beam.

24. The system of claim 23 wherein said hub station first antenna beam and said subscriber station first antenna beam have co-spatial footprints and said hub station second antenna beam and said subscriber station second antenna beam have co-spatial footprints.

25. A data communications station using spectrum allocation for wireless data communications, said station comprising:

means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and receive data signals; and

means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation;

wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band.

26. The station of claim 25 further comprising means for filtering said data signals.

27. The station of claim 25 wherein said frequencies are separated by a bandwidth of at least one percent of the lower of said frequencies used to transmit and receive data signals.

28. The station of claim 25 wherein said disparate frequencies are separated by at least one octave.

29. The station of claim 25 wherein said station is a hub station which communicates with a plurality of subscriber stations.

30. The station of claim 29 wherein said hub station comprises a plurality of said antenna beam means for communicating with said plurality of subscriber stations.

31. The station of claim 25 wherein said station is a subscriber station.

32. (Canceled)

33. (Canceled)

34. The station of claim 25 wherein said at least one licensed band frequency is used for downstream data communications from a hub station to at least one subscriber station.

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. The station of claim 34 wherein said at least one unlicensed band frequency is used for upstream data communications from at least one subscriber station to a hub station.

39. The station of claim 38 further comprising means for filtering said data signals, wherein filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications at said at least one subscriber station.



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## APPENDIX B

**Evidence: None**

## APPENDIX C

**Related Proceedings: None**



TP-Link Ex. 1004
Page 151

# Electronic Acknowledgement Receipt

| | |
|---|---|
| EFS ID: | 1289436 |
| Application Number: | 10095307 |
| International Application Number: | |
| Confirmation Number: | 3972 |
| Title of Invention: | Spectrum allocation system and method for multi-band wireless RF data communications |
| First Named Inventor/Applicant Name: | Randy J. Karr |
| Customer Number: | 29053 |
| Filer: | David H. Tannenbaum/Lorraine Davidoff |
| Filer Authorized By: | David H. Tannenbaum |
| Attorney Docket Number: | 060783/P018US/10200570 |
| Receipt Date: | 02-NOV-2006 |
| Filing Date: | 11-MAR-2002 |
| Time Stamp: | 14:12:05 |
| Application Type: | Utility |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes) | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 10095307.pdf | 1031275 | yes | 25 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal letter | 1 | 1 |
| | Notice of Appeal Filed | 2 | 2 |
| | Affidavit/Dec/Exhibit after Notice of Appeal | 3 | 4 |
| | Appeal Brief Filed | 5 | 25 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 1031275 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

PTO/SB/21 (07-06)
Approved for use through 09/30/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# TRANSMITTAL FORM

*(to be used for all correspondence after initial filing)*

| | |
|---|---|
| Total Number of Pages in This Submission | 25 |

| | |
|---|---|
| Application Number | 10/095,307-Conf. #3972 |
| Filing Date | March 11, 2002 |
| First Named Inventor | Randy J. Karr |
| Art Unit | 2616 |
| Examiner Name | D. Levitan |
| Attorney Docket Number | 68144/P009US/10501230 |

## ENCLOSURES (*Check all that apply*)

- [ ] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC **(Appeal Notice, 2nd Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please identify below):

  Statement Concerning Fees (2 pgs)

Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm Name | FULBRIGHT & JAWORSKI L.L.P. | | |
| Signature | Robert Greeson | | |
| Printed name | Robert L. Greeson | | |
| Date | November 2, 2006 | Reg. No. | 52,966 |

25687402.1

PTO/SB/31 (07-06)
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| **NOTICE OF APPEAL** FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES | Docket Number (Optional) 68144/P009US/10501230 |
|---|---|

| | |
|---|---|
| In re Application of | Randy J. Karr et al. |
| Application Number | 10/095,307-Conf. #3972 |
| Filed | March 11, 2002 |
| For | SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS |
| Art Unit | 2616 |
| Examiner | D. Levitan |

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 41.20(b)(1)) $ 0.00

[x] Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: $ 0.00

[ ] A check in the amount of the fee is enclosed.

[ ] Payment by credit card. Form PTO-2038 is attached.

[ ] The Director has already been authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.

[x] The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 06-2380 . I have enclosed a duplicate copy of this sheet.

[ ] A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is enclosed.

I am the

[ ] applicant /inventor.

[ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

[ ] attorney or agent of record.
Registration number _____

[x] attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34. 52,966

Robert L. Greeson
Signature

Robert L. Greeson
Typed or printed name

(214) 855-7430
Telephone number

November 2, 2006
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[ ] *Total of 1 forms are submitted.

25687269.1

Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr et al.

Application No.: 10/095,307 | Confirmation No.: 3972

Filed: March 11, 2002 | Art Unit: 2616

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS | Examiner: D. Levitan

## STATEMENT CONCERNING FEES

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Prosecution was reopened in this matter prior to a decision on the merits by the Board of Patent Appeals and Interferences. Therefore, the fees paid for the first Notice of Appeal (filed 5/12/06) and first Appeal Brief (filed 6/30/06) should be applied to this appeal. Accordingly, no fee is included with this Notice of Appeal and Appeal Brief which accompany this Statement.

Applicant believes no fee is due with this response. However, if a fee is due, please charge Deposit Account No. 06-2380, under Order No. 68144-P009US-10501230 from which the undersigned is authorized to draw.

Dated: November 2, 2006

Respectfully submitted,

By Robert Greeson

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/095,307 | 03/11/2002 | Randy J. Karr | 060783/P018US/10200570 | 3972 |

29053 7590 12/19/2006
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| EXAMINER | |
|---|---|
| LEVITAN, DMITRY | |
| **ART UNIT** | **PAPER NUMBER** |
| 2616 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 2 MONTHS | 12/19/2006 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/095,307
Filing Date: March 11, 2002
Appellant(s): KARR ET AL.

MAILED
DEC 19 2006
GROUP 2600

Robert L. Greeson
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/02/06 appealing from the Office action mailed 08/02/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

| | | |
|---|---|---|
| 5,475,677 | ARNOLD | 12-1995 |
| 5,852,767 | SUGITA | 12-1998 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 112***

1. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not provide sufficient details to enable a skilled in the art to make and use the invention because it does not adequately describe the following:

Regarding claim 24, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints.

The specification does not provide enough details about the structure and operation of the elements associated with the above identified claimed features to enable one skilled in the art to make and use the invention without undue experimentation.

2. Claim 39 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 limitation "filtering requirements for received upstream... are greater than filtering requirements for received downstream" is unclear, because it is not understood what

"greater" means in the context of the claim and how numerous filtering requirements for different frequency filters can be compared to each other.

***Claim Rejections - 35 USC § 103***

1. Claims 1-5, 10, 12,13, 18, 19, 21-23, 25-31, 34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold (US 5,475,677).

2. Regarding claims 1, 10 and 25, Arnold teaches a method, a system and a station for wireless data communication (digital telephone system on Fig. 1 and 6:40-65 for voice data communication) comprising:

Transmitting from a first station using a first frequency within a first band of operation (transmitting on downlink from a port/fixed base unit, in the licensed spectrum of 1930-1990 MHz to a portable unit on Fig. 1 and 6:57-60),

Receiving data at said first station using a second frequency within a second band of operation (inherently part of the system, because the port receives phone calls from the portable unit as described bellow) ,

Transmitting data from at least one other station to said first station using said second frequency within said second band of operation (transmitting from a portable unit on uplink in a frequency band of 1850-1910 MHz to the corresponding port on Fig. 1 and 6:60-64), and

Receiving data at said at least one other station using said first frequency within said first band of operation (inherently part of the system, because the portable units receive the phone calls transmitted from the port).

Arnold does not teach transmitting data in an unlicensed band and receiving data in the licensed band for one of the stations.

Currently numerous wireless devices are competing for a limited number of available frequencies to communicate with each other. Very often the needed frequencies are unusable due to fading losses, high interference or being in use by other devices.

Since Arnold is capable of transmitting and receiving both licensed and unlicensed bands, it would have been obvious to one of ordinary skill in the art at the time the invention was made to transmit data in an unlicensed band and receive data in the licensed band for one of the stations in the system of Arnold, for the system flexibility, when frequencies for transmission or receiving in licensed or unlicensed bands are not available due to the system load or excessive noise, therefore utilizing a transmission frequency in one band and a receiving frequency in the other band.

In addition, regarding claim 25, Arnold teaches means for establishing separate co-spatial reception and transmission antenna beams, said beams employing disparate frequencies in different bands of operation to transmit and to receive data signals (inherently part of ports 30, 40, and 50 on Fig. 1, the ports utilize small antennas like 31, effectively making the reception and transmission antenna beams in different frequency bands, as the system operates in FDD and TDD modes, co-spatial 8:33-38, as originating from the same antenna) and means for duplexing said data signals received and transmitted in different bands of operation (circuitry on Fig. 3 and 10:35-11:15 for duplexing the signals).

3. Regarding claims 3, 4, 19, 21, 29 and 31, Arnold teaches a hub station transmitting to a plurality of subscriber stations (port 30 transmitting to several portable units 34 and 36 shown on Fig. 1 and 7:58-65).

4. Regarding claims 5, 12 and 27, Arnold teaches separating the first and the second frequencies by a bandwidth of at least one percent of lower of said frequencies (80 MHz separation between frequencies, wherein the lower frequency is 1850 MHz, which produce the ratio of more than 1% 6:57-63).

5. Regarding claim 18, Arnold teaches stations comprising at least one dual band antenna (each port/station uses one of the duplicate antennas 205 or 206, used for the space diversity 9:30-37 on Fig. 2A, each of the antennas 205 or 206 is selected for the operation on the basis of the signal fading 9:37-60 and inherently operates with different uplink and downlink frequencies in FDD mode 9:45-50, making each of the antennas a dual band antenna. Also each of the same antennas operate in TDD mode, therefore using additional, third, frequency band, as TDD operational frequency band is different from the FDD bands).

6. Regarding claim 22, Arnold teaches stations comprising one dual band antenna (see claim 18 rejection above), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

7. Regarding claim 23, Arnold teaches subscriber stations comprising one dual band antenna (multiple antennas are used at a portable unit for the microscopic diversity 2:57-3:10, shown on Fig. 2 A and B, as antennas 202 and 203, each of the antennas 202 or 203 is selected for the operation on the basis of the signal fading 9:45-60 and inherently operates with different uplink and downlink frequencies in FDD mode 9:45-50, making each of the antennas a dual band

antenna. Also each of the same antennas operate in TDD mode, therefore using additional, third, frequency band, as TDD operational frequency band is different from the FDD bands), inherently using first and second beams for transmission and receive operations, because any antenna has transmission and receive beams.

8. Regarding claim 30, Arnold teaches hub station comprises a plurality of said antenna beams for communicating with a plurality of stations (inherently part of Arnold system, because the hub station/port 204 comprises two antennas 206 and 205, each having transmit and receive beams, for the reception diversity 9:30-45).

9. Regarding claims 2, 13 and 28, Arnold teaches the limitations of parent claims 1, 10 and 25, including separating the transmit and receive frequencies by more than 1% (see claim 5 rejection above) .

Arnold does not teach separating the frequencies by at least one octave.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add separating the frequencies by at least one octave to the system of Arnold as a design choice, because separation of the frequencies by two or three octaves will work in the system as well.

10. Regarding claims 34 and 38, Arnold teaches the limitations of parent claim 25 (see claim 25 rejection above) .

Arnold does not teach using one licensed frequency for downstream communication from a hub station to a subscriber station and one unlicensed frequencies for an upstream communication.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use one licensed frequency for downstream communication from a hub station to a subscriber station and one unlicensed frequencies for an upstream communication in the system of Arnold as a design choice, because in the environment, where there are no unlicensed frequencies available for downlink communication and no licensed frequencies available for the upstream communication, it is the only choice to establish communication between the hub and the subscriber station.

11. Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold (US 5,475,677) in view of Sugita (5,852,767).

Arnold teaches all the limitations of the parent claims 10 and 25, including a duplexer separating transmitted and received signals at the second/mobile station (circuitry 300 on Fig. 3 and 6).

Arnold does not teach a duplexer separating transmitted and received signals and using filters at the first station.

Sugita teaches a duplexer separating transmitted and received signals at the first station (circuitry on Fig. 3, separating transmitted and received frequencies 4:1-13) and inherently using filters for the separation, because filtering the signals is essential for their separation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and using filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station.

**(10) Response to Argument**

On page 5 of the Brief Appellant indicated typographical errors in the claim rejection listing on page 3 of the Final Office action. These typographical errors have been corrected in the current Examiner Answer.

On pages 5, 6 and 10 of the Brief Appellant argues that there is no expectation of success for modifying Arnold to meet the limitations of claims 1 or 10, or 3-5.

Examiner respectfully disagrees.

Appellant arguments directed to the modes of operation of Arnold in licensed (FDD) and unlicensed (TDD) bands are not limitations of the claims.

Examiner did not base his rejections of the claims on the modes of operation in licensed and unlicensed bands of Arnold.

However, the citation of Arnold regarding the use of FDD in the unlicensed band is misquoted, because Arnold teaches the problems of using both uplink and downlink FDD simultaneously in the unlicensed band. Claims 1 and 10 limitations are directed to using the unlicensed band for only one of the links: uplink or downlink, but never to both at the same time.

On pages 7, 8 and 10, of the Brief Appellant argues that there is no motivation to modify Arnold to meet the limitations of claims 1 or 10, or 3-5.

Examiner respectfully disagrees.

Examiner clearly indicated in the rejection of claims 1, 10 and 25, that the necessity of establishing communications is the motivation for the modification of Arnold.

When the frequencies in licensed and unlicensed bands are limited due to the bands overload, it would have been obvious to one of ordinary skill in the art at the time the invention was made to transmit data in an unlicensed band and receive data in the licensed band for one of the stations in the system of Arnold, as this mode could be the only one possibility available to establish communications with the base station.

On pages 8 and 9 of the Brief Appellant argues that Arnold does not teach first and second frequencies separated by at least an octave, which makes claims 2 and 13 patentable.

Examiner respectfully disagrees.

It is clearly stated in the rejection of claims 2, 13 and 28, that Arnold teaches separation of the first and second frequencies more than 1% 6:57-63, but Arnold does not teach the separation of at least one octave. However, the claims were rejected as an obvious design choice, because the separation of two or more octaves will work in the system as well.

On page 9 of the Brief Appellant argues that Arnold does not teach dual band antenna.

Examiner respectfully disagrees.

Arnold teaches a dual band antenna 205 or 206, shown on Fig. 2A, as any antenna, operating in two bands, is dual band antenna (see claim 18 rejection above). Applicant's arguments directed to rejecting the antenna operating in two bands due to the "7%" ratio of bandwidth to the frequency are not relevant as were not directly claimed.

In addition, disclosure comprises no information on definition of dual band antenna according the calculated ratio.

On page 9 of the Brief Appellant argues that front end arrangement of Arnold is not a duplexer.

Examiner respectfully disagrees.

Because Appellant provide no arguments to support his statement regarding duplexer of Arnold, Examiner would like to refer to the claim 25 rejection above, explaining operation of circuitry on Fig. 3 for duplexing the signal.

On pages 11 and 12 of the Brief Appellant argues that teachings of Arnold and Sugita cannot be combined.

Examiner respectfully disagrees.

It is clearly stated in the rejection of claims 11 and 26, that Arnold teaches separation of frequencies at the first station, therefore adding separation of the frequencies at the second station of Sugita, would have been obvious to one of ordinary skill in the art at the time the invention was made, because the use of a single antenna, clearly preferred for economical and space reasons, requires the separation of transmit and receive frequencies of Sugita.

On page 13 of the Brief, Applicant argues that claim 24 limitation, how to make hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints, are well known and refers to antenna design texts/books.

Examiner respectfully disagrees.

The Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The limitations of the claim, as above, are essential to the practice of the invention, but are not supported by the disclosure. Disclosure contains no information on beam forming techniques using phased or adaptive arrays or any other method of creating antenna beams having co-spatial footprints.

Appellant did not indicate a portion of the cited Antenna design books directed to claim 24 limitations : "hub station first antenna beam and subscriber station first antenna beam having co-spatial footprints and how to make hub station second antenna beam and subscriber station second antenna beam having co-spatial footprints", what clearly indicates requires "undue experimentation" as indicated in the claim rejection.

On page 14 of the Brief, Applicant argues that claim 39 limitations "filtering requirements for received upstream... are greater than filtering requirements for received downstream" are clear in the context of the claim.

Examiner respectfully disagrees.

Cited portions of disclosure do not comprise any information on out-of band rejection ratio of adjacent bands to clarify filtering requirements of the claim, as asserted by Appellant.

Filtering requirements for filters are numerous and are not limited to out-of band rejection ratio (claim 39 does not comprise out-of band rejection ratio).

Two filters, operating in different frequency bands are characterized by two groups of filtering requirements, like in-band attenuation, frequency range, size, weight, etc.

Therefore, calling filtering requirements better for one of the filters is unclear, without clarifying the specific requirement, as some of the requirements could be better but the other could be worse.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Dmitry Levitan DL

Conferees:

Hassan Kizou HK

Doris To DT

Docket No.: 68144/P009US/10501230
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Randy J. Karr, et al.

Application No.: 10/095,307 | Confirmation No.: 3972

Filed: March 11, 2002 | Art Unit: 2616

For: SPECTRUM ALLOCATION SYSTEM AND METHOD FOR MULTI-BAND WIRELESS RF DATA COMMUNICATIONS | Examiner: D. Levitan

## APPELLANT'S REPLY BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

## REPLY TO EXAMINER'S ANSWER UNDER 37 CFR 1.193(B)

This Reply Brief is in response to the Examiner's Answer mailed December 19, 2006 and is in furtherance of the Notice of Appeal, dated May 12, 2006 and received by the United States Patent Office on May 12, 2006, and Appellant's Brief, dated June 30, 2006 and received by the United States Patent Office on June 30, 2006 and a second Notice of Appeal and Appellant's Brief, dated November 2, 2006 and received by the United States Patent Office on November 2, 2006.

No fee is required for this REPLY BRIEF.

This brief contains items under the following headings pursuant to M.P.E.P. § 1208:

I. Status of Claims
II. Grounds for Rejection to be Reviewed on Appeal
III. Arguments
IV. Conclusion

## I. STATUS OF CLAIMS

The status of the claims remains as identified in the Second Appeal Brief submitted November 2, 2006, which is as follows:

### A. Total Number of Claims in Application

There are 25 claims pending in application.

### B. Current Status of Claims

1. Claims pending: 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39
2. Claims canceled: 6-9, 14-17, 20, 32, 33, and 35-37
3. Claims withdrawn from consideration but not canceled: None
4. Claims allowed: None
5. Claims rejected: 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39
6. Claims objected to: None

### C. Claims On Appeal

The claims on appeal are claims 1-5, 10-13, 18, 19, 21-31, 34, 38, and 39.

## II. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34, and 38 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,475,677 to Arnold et al. (hereinafter *Arnold*).

Whether claims 11 and 26 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Arnold* in view of U.S. Patent No. 5,852,767 to Sugita ( hereinafter *Sugita*).

Whether claim 24 properly stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Whether claim 39 properly stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.

## III. ARGUMENT

Appellant respectfully traverses the outstanding rejections of the pending claims, and requests that the Board reverse the outstanding rejections in light of the remarks contained herein. As in the Second Appeal Brief of November 2, 2006, (hereinafter Second Appeal Brief) Appellant argues many of the rejected claims separately. Thus, Appellant respectfully asserts that separately argued claims do not stand or fall together, *see* 37 C.F.R. § 41.31(c)(1)(vii).

Appellant hereby reasserts those arguments that are presented for the separately argued claims in the Appellant's Second Appeal Brief. For brevity, Appellant does not include those arguments herein, but instead submits the following supplemental remarks in reply to the Examiner's Answer.

### A. 35 U.S.C. § 103(a) rejection of claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34 and 38 as unpatentable over *Arnold*

Claims 1-5, 10, 12, 13, 18, 19, 21-23, 25, 27-31, 34 and 38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Arnold*. In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

#### 1. Claims 1 and 10

Independent claim 1 recites "transmitting ... using a first frequency; receiving ... using a second frequency ... wherein one of said frequencies is in a licensed band and

another of said frequencies is an unlicensed band." Independent claim 10 also recites "one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band." The Examiner's Answer, dated December 19, 2006 (hereinafter Examiner's Answer) admits that *Arnold* does not teach the limitation of using a licensed band for one direction of communication and an unlicensed band for another. Examiner's Answer, page 5. The Examiner's Answer then attempts to modify *Arnold* to meet this aspect of the claim.

Appellant respectfully asserts that the proposed modification changes the principle operation of the reference, that there is no reasonable expectation of success for the proposed modification, that *Arnold* explicitly teaches away from the proposed modification, and that *Arnold* suggests no motivation to make the proposed modification. Accordingly, Appellant respectfully requests that the Board reverse the outstanding rejections.

a. The proposed modification changes the principle operation of the reference

It is well settled that "[i]f the proposed modification...would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious". *In re Ratti*, 270 F.2d 810, 123 USPQ 349. Further, modifications requiring the substantial reconstruction and redesign of elements shown in the reference will not support an obviousness rejection. *In re Ratti*, 270 F.2d at 813, 123 USPQ at 352. The suggested modification changes the principle operation of the reference and requires substantial redesign of elements shown in *Arnold*, therefore *Arnold* will not support an obviousness rejection.

For example, *Arnold* explains "since the time within a portable's uplink frame available to switch frequencies is limited due to the diversity and handoff measurements that must be performed, a fast-switching synthesizer would otherwise be required to switch frequencies between transmitting and receiving each burst." *Arnold*, col. 10, lines 25-30. "In order to avoid fast-switching of the frequency of the synthesizer...the portable incorporates transmitter and receiver circuitry designed to operate at different frequencies which, as will be shown, **must** be separated by the 80 MHz difference between corresponding uplink and downlink RF signals" (emphasis added). *Arnold*, col. 10, lines 33-39. Accordingly, *Arnold* teaches that his transmitter and receiver circuitry operates at frequencies which must be

separated by 80 MHz, and the principle operation of this circuitry is to avoid the need for a fast-switching synthesizer.

If *Arnold* were modified to receive on a licensed band while transmitting on an unlicensed band (or vice-versa), then the receiving frequency and the transmitting frequency would not be separated by 80 MHz because, according to *Arnold*, the FCC allocated licensed bands operate between 1930 and 1990 MHz and between 1850 and 1910 MHz and allocated the unlicensed band to operate between 1920 and 1930 MHz. As *Arnold* teaches the bands are between these frequencies, there is no channel within the licensed band which is an 80 MHz separation from a channel in the unlicensed band thereby making it impossible for a licensed signal to be separated from an unlicensed signal by 80 MHz. Accordingly, because *Arnold* requires the frequency **must** be separated by 80 MHz for *Arnold*'s circuitry to operate, modifying *Arnold* to receive in the licensed band while transmitting in the unlicensed band would render *Arnold*'s circuitry inoperable.

Further, assuming arguendo that the bands were inclusive of the end frequencies rather then operative *between* the end frequencies as taught by *Arnold*, the only licensed and unlicensed channels separated by the required 80 MHz are channels 1850 MHz and 1930 MHz. Because modifying *Arnold* to only receive or transmit on a single channel severely limits *Arnold*'s capabilities, even though there is one licensed channel separated from an unlicensed channel by the required 80 MHz, one of ordinary skill in the art would not be motivated to make the suggested modification.

Furthermore, according to *Arnold*, if the channels are not separated by 80 MHz, a fast-switching synthesizer would be required to switch frequencies between receiving and transmitting each burst. Therefore, modifying *Arnold* as suggested would require substantial redesign of the circuitry shown in *Arnold*. Further, because "a fast-switching synthesizer would...add considerably to the cost of the portable, negating the low-cost design objective," making *Arnold's* circuitry inoperable and causing the need for a fast-switching synthesizer would change the principal operation of *Arnold*'s invention.

b. There is no reasonable expectation of success

According to M.P.E.P. § 2143.02, the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). However, there is no reasonable expectation of success for the modification proposed, therefore the prior art should not be modified as suggested to reject the claims as *prima facie* obvious.

For example, if *Arnold's* portable transmits on an unlicensed channel, then *Arnold's* method prevents the portable from receiving on a licensed channel (or vice-versa). *Arnold* teaches that when the portable is turned on, it will scan the unlicensed band for suitable ports in that band. *Arnold*, col. 7, lines 34-36. "If the portable is not within range of a port in a unlicensed band...the portable will then scan the licensed band" *Arnold*, col. 7, lines 43-45. According to *Arnold*'s method, the portable does not scan the licensed band if an unlicensed channel is available. Therefore, the portable could not successfully transmit on a licensed band while receiving on an unlicensed band (or vice-versa) because the portable will not scan for the licensed channel since an unlicensed channel was found. Further, because *Arnold* teaches unlicensed uplinks and downlinks occur on the same frequency channel, it would be impossible for an unlicensed uplink channel to be found without also finding an unlicensed downlink channel (or vice-versa). *Arnold*, col. 7, lines 18-20. Therefore, if the portable in *Arnold* finds an available unlicensed channel, that channel will be used for both uplinking and downlinking, and the portable will not scan the licensed band at all. As a result, the suggested modification has no reasonable expectation of success.

In another example, because *Arnold*'s portable only transmits with a single port at a time, the portable could not transmit on a licensed band while receiving on an unlicensed band (or vice-versa). *Arnold* teaches that at one time a portable connects to single port; "the 'best' port having a vacant time slot." *Arnold*, col. 9, lines 6-10. Further, *Arnold* does not teach that a port transmits in the licensed band while receiving in the unlicensed band (or vice-versa). See FIGURE 1. Therefore, because a portable only connects to a single port at a time, and each port operates either on an unlicensed band or a licensed band (not both), a portable could not transmit on an unlicensed band to an unlicensed band operable port while receiving on a licensed band from a licensed band operable port. Accordingly, the suggested modification does not have a reasonable likelihood of success.

Further, one of ordinary skill in the art would not be motivated to modify *Arnold*'s port to transmit in the unlicensed band and receive in the licensed band (or vice-versa). Ports operable in the unlicensed bands are connected to the switch located at the central office to provide access to a wireline telephone network. *Arnold*, col. 8, lines 1-20. In contrast, ports operable in the licensed bands transmit time division multiplexed (TDM) bit streams on a predefined carrier frequency using quadrature phase shift keying (QPSK) modulation. *Arnold*, col. 8, lines 21-36. Accordingly, because the unlicensed band port is operable on a wireline telephone network and the licensed band port is not, a port operable in the licensed band is not operable in the unlicensed band (and vice-versa). It would require substantial unsuggested modification in order for *Arnold*'s port to receive in the licensed band while transmitting in the unlicensed band (or vice-versa). Accordingly, one of ordinary skill in the art would not be motivated to modify *Arnold* such that a portable could transmit in the licensed band while receiving in the unlicensed band from a single port.

In yet another example, *Arnold* teaches using the spectrum between 1920 and 1930 when operating in the unlicensed band. *Arnold*, col. 7, lines 11-14. *Arnold* goes on to state that "within this spectrum, frequency duplexing...is *not possible*" (emphasis added). *Arnold*, col. 7, lines 13-16. Furthermore, *Arnold* teaches frequency duplexing when communication on licensed bands. *Arnold*, Abstract. Therefore, because frequency duplexing is taught when operating on the licensed band and frequency duplexing "is not possible" when operating in the unlicensed band, *Arnold*'s portable would not be capable of transmitting on the licensed band while receiving on an unlicensed band (or vice-versa). Accordingly, not only does the suggested modification not have a likelihood of success, but the suggested modification also changes the principle operation of *Arnold*'s invention and would require substantial unsuggested modification in order to meet the claims.

c. The reference teaches away from the suggested modification

"A prior art reference that 'teaches away' from the claimed invention is a significant factor to be considered in determining obviousness." M.P.E.P. 2145 X D 1. Moreover, M.P.E.P. § 2141.02 directs that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention."

Accordingly, because *Arnold* teaches away from the Appellee's suggested modification, the motivation provided is improper.

*Arnold* uses a mode of operation in the unlicensed band which *Arnold* teaches as incompatible with the mode of operation used in the licensed band. Compare the teaching of Time Division Duplexing (TDD) for an unlicensed band in col. 7, lines 12-25, with the teaching of Frequency Division Duplexing (FDD) for a licensed band in col. 10, lines 11-16. According to *Arnold*, both transmission and reception should either be in a licensed band using FDD or else both transmission and reception should be in an unlicensed band using TDD. *Arnold*, abstract, lines 1-7. Accordingly, as *Arnold* expressly teaches both transmission and reception should be in the same spectrum, *Arnold* teaches away from the suggested modification.

In another example, *Arnold*'s goal is to avoid service provider air time charges, and *Arnold* notes a user must pay for "air time" when operating on the licensed band but will not have such charges when operating on the unlicensed band. *Arnold*, col. 4 lines 54. Accordingly, *Arnold*'s solution of keeping both transmission and reception together in the unlicensed band when a channel is available goes to *Arnold*'s very goal: avoiding service provider charges. Therefore, because the suggested modification would utilize a licensed band even though an unlicensed band is available, the suggested modification goes against *Arnold*'s expressed goal. Therefore, *Arnold* teaches away from the suggested modification.

d. There is no motivation to make the suggested modification

In determining the propriety of a case for obviousness, it is necessary to ascertain whether the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 U.S.P.Q. 560, 562 (CCPA 1972). Appellant asserts that *Arnold* does not provide any suggestion that the modification proposed in the Final Action would result in any improvement, therefore the reference would not be sufficient for one of ordinary skill to make the proposed modification.

*Arnold* teaches a wireless communication system that operates entirely in either a licensed mode or an unlicensed mode. *Arnold*, abstract, lines 1-7. Appellant notes that



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*Arnold* does not teach or suggest the desirability of transmitting in a licensed band while receiving signals in an unlicensed band, or the reverse. That is, the motivation to modify *Arnold* cannot be found in the reference itself. Appellant also asserts that, as shown below, the nature of the problem to be solved does not provide the necessary motivation.

The Examiner's Answer states that "it would have been obvious ... to transmit in an unlicensed band and receive data in the licensed band ... when frequencies for transmission or receiving in licensed or unlicensed bands are not available ...." Examiner's Answer, page 5. As explained above, *Arnold* teaches use of unlicensed frequencies when unlicensed frequencies are available, and the use of licensed frequencies when unlicensed frequencies are unavailable. *Arnold*, col. 7, lines 33-36 and 43-47. *Arnold* therefore already teaches a solution when the number of frequencies is limited that is markedly different than the one suggested in the Examiner's Answer. That is, *Arnold* keeps both transmission and reception together in either licensed or unlicensed bands, and does not suggest that any other solution is needed or desirable. Thus, the nature of the problem to be solved does not provide motivation for the proposed modification, because *Arnold* already provides its own solution that is intended to be complete. The Appellee does not explain why one of ordinary skill in the art would seek to find a solution different than the one already suggested by *Arnold*.

Moreover, Appellant asserts that Appellee is relying on impermissible hindsight in order to piece together the elements of the claims based on knowledge gleaned from Appellant's disclosure. Appellant asserts that without the teachings of Appellant's disclosure one of ordinary skill in the art would not find it obvious to transmit using a first frequency and receive using a second frequency, wherein one of the frequencies is in a licensed band and another of the frequencies is an unlicensed band.

As a result, the motivation provided by the Appellee to modify *Arnold* is insufficient and therefore improper. Accordingly, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a) rejections of claims 1 and 10 over *Arnold*.

**2. Dependent claims 2 and 12**

Claim 2 recites "said first frequency and said second frequency are separated by at least one octave." Claim 13 recites "said first frequency and said second frequency are



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separated by at least one octave." *Arnold* does not teach this amount of separation between a transmission and reception frequency. Rather, *Arnold* teaches that when operating in TDD mode, transmission and reception are on the same channel and when operating in FDD mode transmission and reception are separated by 80 MHz at approximately 1900 MHz. *Arnold*, col. 10, lines 12-28. As 0 MHz is not one octave and 80 MHZ at 1900 MHz is not one octave, the proposed modification does not teach or suggest each limitation of claims 2 and 12.

The Examiner's Answer states that the claims are rejected as an "obvious design choice, because the separation of two or more octaves will work in the system as well." Examiner's Answer, page 10. The Appellant disagrees. *Arnold* states that in order for the "transmitting and receiving circuitry designed to operate at different IF frequencies, as will be shown, [the signals] **must** be separated by the 80 MHz difference between corresponding uplink and downlink RF signals" (emphasis added). Accordingly, as *Arnold* expressly teaches away from modifying the 80 MHz separation, the separation of two or more octaves would not work as well as suggested by the Appellee. Likewise, because *Arnold* requires transmitting and receiving on the same channel in the unlicensed mode, contrary to the Appellee's suggestion, the separation of two or more octaves would likewise not work as well. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 2 and 13 be reversed as it is not an obvious design choice.

### 3. Dependent claims 18, 22, and 23

Claim 18 recites "each of said stations further comprise at least one dual band antenna." Claim 22 recites "said hub station comprises at least one dual band antenna..." Claim 23 recites "said subscriber stations comprise at least one dual band antenna..." Even if *Arnold* were modified as suggested in the Final Action, it does not teach or suggest these limitations. The Examiner's Answer cites antennas 205 and 206 of Figure 2A, and column 9, lines 30-60 of *Arnold* as teaching these limitations. Examiner's Answer, page 6. However, none of the cited sections teach or suggest a dual band antenna. Rather, *Arnold* teaches a bandwidth of only 1850 MHz to 1990 MHz, which is only 7%. Appellant asserts that one of ordinary skill in the art would not consider an antenna with a 7% bandwidth requirement to be a dual band antenna.



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The Examiner's Answer states that "[a]pplicant's arguments directed to rejecting the antenna operating in two bands due to the '7%' ratio of bandwidth to the frequency are not relevant as were not directly claimed." Examiner's Answer, page 10. Appellant agrees that the 7% ratio of bandwidth is not claimed and does not intend claims 18, 22 and 23 to be so limited. Instead, Appellant asserts that Appellee misunderstands Appellant's argument. One of ordinary skill in the art would not consider an antenna with a 7% bandwidth requirement to be a dual band antenna. Accordingly, one of ordinary skill in the art reading *Arnold* would not conclude that *Arnold* discloses a dual band antenna. As *Arnold* does not disclose a dual band antenna, the proposed modification does not teach or suggest all of claims 18, 22 and 23's limitations. Therefore, even the proposed modification of *Arnold* does not teach or suggest all the limitations of claim 18, 22 or 23. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claims 18, 22 and 23 be reversed.

**4. Claims 3-5, 13, 19 and 21**

Dependent claims 3-5, 13, 19 and 21 depend from independent claims 1 and 10 and therefore inherit all the limitations therein. Accordingly, at least for the reasons explained above, Appellant asserts claims 3-5, 13, 19 and 21 are improperly rejected and requests that the Board reverse the rejections of record.

**5. Claims 25, 27, 29-31, 34 and 38**

a. All the claims' limitations are not taught or suggested by *Arnold*

Independent claim 25 recites "means for duplexing said data signals received and transmitted on said disparate frequencies in said different bands of operation." The Appellee alleges that front end arrangement 300 of *Arnold* is a duplexer. Examiner's Answer, page 5.

Because the cited circuitry in *Arnold* does not duplex "said data signals received and transmitted on said disparate frequencies in said different bands of operation" but instead mixes the downlink signal with a synthesizer signal, Appellant respectfully asserts that the cited portion of *Arnold* is not a duplexer as required by claim 25. *Arnold*, col. 10, line 35 - col. 11, line 15. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejection of claims 25.

b. Improper motivation

Independent claim 25 recites "wherein at least one of said disparate frequencies is in a licensed band and at least one other of said disparate frequencies is in an unlicensed band." The Examiner's Answer admits that *Arnold* does not teach the limitation of using a licensed band for one direction of communication and an unlicensed band for another. Examiner's Answer, page 5. The Appellee then attempts to modify *Arnold* to meet this aspect of the claim.

Appellant respectfully asserts that, as shown above for claims 1 and 10, the proposed modification changes the principle operation of the reference, that there is no reasonable expectation of success for the proposed modification, that *Arnold* explicitly teaches away from the proposed modification, and that *Arnold* suggests no motivation to make the proposed modification. Therefore, Appellant asserts that the present invention is not obvious over *Arnold*. Accordingly, Appellant respectfully requests reversal of all 35 U.S.C. § 103(a) rejections of claims 25, 27-31, 34 and 38 over *Arnold*.

**6. Claim 28**

Claim 28 recites "said first frequency and said second frequency are separated by at least one octave." As explained above regarding claims 2 and 13, *Arnold* does not teach this amount of separation between a transmission and reception frequency nor would one of skill in the art be motivated to modify *Arnold* to meet claim 28. Therefore, even the proposed modification of *Arnold* does not teach or suggest all the limitations of claim 28. Further, claim 28 depends from claim 25, inherits all the limitations therein, and thus, claim 28 is patentable for at least the same reasons as claim 25. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejections of claim 28 be reversed.

**B. 35 U.S.C. § 103(a) rejection of claims 11 and 26 as being unpatentable over *Arnold* in view of *Sugita***

**1. Claim 11 and 26**

Claims 11 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Arnold* in view of *Sugita*. In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

Claims 11 and 26 depend from claims 10 and 25, and thus inherit all the limitations therein. As shown above, *Arnold* does not teach or suggest every limitation of claims 10 and 25. *Sugita* is not relied upon to provide the missing limitations. Therefore, the proffered combination cannot teach or suggest every limitation of claims 11 and 26. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 103(a) rejection of claims 11 and 26 be reversed.

Moreover, in rejecting claim 26, the Appellee states that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to add a duplexer separating transmitted and received signals and using filters of Sugita to the system of Arnold to improve the system operation with a single antenna at the first station." Examiner's Answer, page 8. However, it is well settled that the fact that references can be combined or modified is not sufficient to establish a prima facie case of obviousness. M.P.E.P. § 2143.01. The language of the recited motivation is circular in nature, stating that it is obvious to make the modification (add a duplexer to multiplex two signals) because it is obvious to achieve the result (provide a multiplexed signal to a single antenna). Such language is merely a statement that the reference can be modified, and does not state any desirability for making the modification. The mere fact that reference can be modified does not render the resultant modification obvious unless the prior art also suggests the desirability of the modification. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). Thus, the motivation provided by the Appellee is improper, as the motivation must establish the desirability for making the modification. Accordingly, the rejection of record is improper.

Additionally, the Appellee has not provided an objective reason to modify the teachings of the reference. *See* M.P.E.P. 2142.01. The reason provided by the Appellee—i.e., "to improve system operation," is a general incentive, and not an objective reason.



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Applicant points out that "[a] general incentive does not make obvious a particular result, nor does the existence of techniques by which those efforts can be carried out." *In re Deuel*, 51 F.3d 1552, 1559 (Fed. Cir. 1995). Therefore, the motivation provided by the Appellee for combining *Arnold* with *Sugita* is improper.

### C. 35 U.S.C. § 112, first paragraph, rejection of claim 24

Claim 24 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner's Answer points to the limitations that two antenna beams have "co-spatial footprints." Examiner's Answer, page 3. In rejecting claim 24, the Examiner's Answer baldly states that the disclosure is not enabling, because it "contains no information on beamforming techniques using phased or adaptive arrays or any other method of creating antenna beams having co-spatial footprints." Examiner's Answer, page 3. However, "[d]etailed procedures for making and using the invention may not be necessary if the description of the invention itself is sufficient to permit those skilled in the art to make and use the invention." M.P.E.P. 2164. The disclosure provided within the present specification, when considered in light of the knowledge of one of ordinary skill in the art, clearly enables one of ordinary skill in the art to make and use the invention without undue experimentation. Paragraph [0035] of the originally-filed application, considered in light of the fact that beamforming techniques using phased arrays or adaptive arrays are well known to one of ordinary skill in the wireless communications arts, as evidenced by the plethora of antenna design texts available which show such beamforming (e.g., a search of Amazon.com produced "Practical Antenna Handbook" by Joseph J. Carr (2001) and "Antenna Theory and Design, 2nd Edition" by Warren L. Stutzman and Gary A. Thiel (1997)) shows that this general knowledge, combined with the originally-filed disclosure enables one of ordinary skill in the art to make and use the invention.

Appellant therefore asserts that the limitations of claim 24, i.e., making a hub station first antenna beam and a subscriber station first antenna beam have co-spatial footprints and making a hub station second antenna beam and a subscriber station second antenna beam have co-spatial footprints, are enabled. As a result, Appellant respectfully requests that the 35 U.S.C. § 112, first paragraph, rejection of claim 24 be reversed.



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**D. 35 U.S.C. § 112, second paragraph, rejection of claim 39**

Claim 39 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention. Specifically, pages 3-4 of the Examiner's Answer asserts that "filtering requirements for received upstream data communications at said hub are greater than filtering requirements for received downstream data communications ..." is unclear, because it is not understood what "greater" means.

However, if the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite. *Ex parte Porter*, 25 U.S.P.Q.2d 1144, 1145 (Bd. Pat. Appl & Inter. 1992). Therefore, because one of ordinary skill in the art would understand that "greater" refers to the out-of-band rejection ratio of adjacent bands in light of the disclosure of the originally-filed application, the scope of claim 39 would be ascertainable by one of ordinary skill in the art.

On page 12 of the Examiner's Answer, Appellee asserts that filtering requirements for filters are numerous and are not limited to out-of-band rejection ratio. However, as Appellant explained in the Second Appeal Brief, one of ordinary skill in the art would understand that the "greater" filtering requirement means more stringent reduction of potential interference in adjacent frequency bands. One of even minimal skill in the art would understand this to mean a higher out-of-band rejection ratio for adjacent frequency bands.

Appellee responded to the previous explanation by stating that "calling filtering requirements better for one of the filters is unclear...as some of the requirements could be better but the other could be worse" (emphasis added). Appellant respectfully asserts Appellee's argument is moot as claim 39 recites "greater" not "better." Accordingly, as explained in Appellant's Second Appeal Brief, Appellant asserts that the scope of claim 39 would be reasonably ascertainable by those skilled in the art, and is therefore not indefinite. Accordingly, Appellant respectfully requests that the 35 U.S.C. § 112, second paragraph, rejection of claim 39 be reversed.

## IV. CONCLUSION

A copy of the claims involved in the present appeal is attached hereto as Appendix A.



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Appellant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 06-2380, under Order No. 68144/P009US/10501230 from which the undersigned is authorized to draw.

Dated: February 19, 2007

Respectfully submitted,

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No. 10/095,307**

1. A spectrum allocation method for wireless data communication comprising the steps of:

transmitting data from a first station using a first frequency within a first band of operation;

receiving data at said first station using a second frequency within a second band of operation;

transmitting data from at least one other station to said first station using said second frequency within said second band of operation; and

receiving data at said at least one other station using said first frequency within said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

2. The method of claim 1 wherein said first frequency and said second frequency are separated by at least one octave.

3. The method of claim 1 wherein one of said stations is a hub station transmitting to at least one subscriber station.

4. The method of claim 1 wherein one of said stations is a hub station transmitting to a plurality of subscriber stations.

5. The method of claim 1 wherein said first frequency and said second frequency are separated by a bandwidth of at least one percent of the lower of said frequencies.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)



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10. A system for spectrum allocation in wireless data communication comprising:

a first data communications station transmitting data on a first frequency in a first band of operation and receiving data on a second frequency in a second band of operation; and

at least one other data communications station transmitting data on said second frequency in said second band of operation and receiving data on said first frequency in said first band of operation;

wherein one of said frequencies is in a licensed band and another of said frequencies is an unlicensed band.

11. The system of claim 10 wherein each of said stations further comprise duplexers separating transmitted signals and received signals.

12. The system of claim 10 wherein said first frequency is separated from said second frequency by a bandwidth of at least one percent of the lower of one of said frequencies.

13. The system of claim 10 wherein said first frequency and said second frequency are separated by at least one octave.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. The system of claim 10 wherein each of said stations further comprise at least one dual band antenna.

19. The system of claim 10 wherein said first station is a hub station and said at least one other data communications station is at least one subscriber station.

20. (Canceled)



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