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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
60/977,582	10/04/2007		105	08610005PR		

CONFIRMATION NO. 9258

FILING RECEIPT

OC000000026412945

30743
WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.
11491 SUNSET HILLS ROAD
SUITE 340
RESTON, VA 20190

Date Mailed: 10/25/2007

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Theodore S. Rappaport, Austin, TX;

Power of Attorney:
Michael Whitham--32635

If Required, Foreign Filing License Granted: 10/23/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 60/977,582**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Clearinghouse For Radio Quality and Service for Wireless Devices

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international

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Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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Doc Code:

PROVISIONAL APPLICATION FOR PATENT COVER SHEET - Page 1 of 2

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

Express Mail Label No. _____

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Theodore S.	**Rappaport**	**Austin, Texas**

☐ *Additional inventors are being named on* _____ *separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

CLEARINGHOUSE FOR RADIO QUALITY AND SERVICE FOR WIRELESS DEVICES

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☐ The address corresponding to Customer **30743**

OR

☐ Firm *or*

Address

City		State		ZIP	
Country		Telephone		Emai	

ENCLOSED APPLICATION PARTS *(check all that apply)*

☐ Application Data Sheet. See 37 CFR 1.76

☒ Specification *Number of Pages* **4**

☒ Drawing(s) *Number of Sheets* **6**

☐ CD(s), Number of CDs _____

☐ Other (specify) _____

Total # of sheets **10** = Application Size Fee **$0.00**

Fees Due: Filing Fee of $200 ($100 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which 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

METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fee and application size fee (if applicable).

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

☒ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Account Number: **50-2041**. A duplicative copy of this form is enclosed for fee processing.

$100.00
TOTAL FEE AMOUNT ($)

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If you need asssitance in completing the form, call 1-800-PTO-9199 and select option 2.

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PROVISIONAL APPLICATION COVER SHEET

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

☒ No.

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

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

SIGNATURE		Date	**October 4, 2007**
TYPED or PRINTED NAME	**Michael E. Whitham**	REGISTRATION NO. *(if appropriate)*	**32,635**
TELEPHONE	**703-787-9400**	Docket Number:	**08610005PR**

Clearinghouse for radio quality and service for wireless devices

Create a database of tower locations, frequencies, heights above ground, owners of spectrum, leaser of spectrum, type of license, date the license expires, type of services offered, etc. so that there exists, on the web, a position-tagged listing of wireless assets for multiple bands, and multiple carriers. This web site may be private access (password/subscriber protected) or open access to the world.

The clearinghouse includes a database accessible over the web that would be used for cataloging the wireless availability (signals, bandwidth/capacity, services, carriers who provide service) over multiple bands and for one or many carriers and services that are available to a particular wireless device in a specific location on earth. This invention can be extended to work for different kinds of wireless devices, for example WiFi LANs are different than cellular/WiMax/LTE phones, so you could imagine this clearinghouse invention being available for each type of service, or providing information for all services in a single clearinghouse.

We envision a (preferably public) clearinghouse that can be used/updated/accessed and built upon, by individual's experiences in accessing wireless connectivity across the globe. The reports of RF quality and capacity could be done by the user, where the user of the wireless device reports to the web clearinghouse its experiences over a wide range of bands, frequencies and services, or it can be done preferably in an automatic manner without user control, where phones or wireless devices (future wireless devices may be simple dongles, computers, IPhones, and a wide range of wearable or sensor devices). The idea is that the phones or wireless devices may access, either in real time or previously or intermittently, a database that contains a location-specific cataloging of radio coverage, services, carriers, bandwidths, and past user experiences, so that a wireless device could automatically determine what channel to tune to, what carrier to use, or what services to expect or access, without wasting transmit power, battery life, or with built in protection that scales the wireless device to access the wireless channel in a certain geographic area in a manner that matches the specific coverage/RF/quality of the location. This info could be obtained by the wireless device either before a user of the device travels to a location (download off of internet before leaving for trip, and determining trip path from Google Map, MapQuest, or road navigation system in the car), or could be determined on the fly as the user moves with her wireless device on the trip, either in band or out of band, across a wireless network during the travel. Given the location of the wireless device, and information of the radio frequency (RF) quality and coverage and the services and bands available for access, the wireless device may make good decisions as how to access wireless in the particular location, thereby saving battery life, cost, time, or improving connectivity for the particular desired application used by the user of the wireless device.

The clearinghouse/database on the web would communicate to wireless devices either in real time over the web, or prior to the wireless device going to a location, with information that allows the phone to determine the best or 2nd best (or a priority/ranked list) of frequencies, or carrier providers, or services, or bandwidths, based on the

customer's predetermined desires/needs (lowest cost service, highest data rate service, longest battery life service, etc). Or the user may adjust their desires for service priority on the fly as they travel and learn the quality of the networks they are in. This may e done automatically (with preset user settings) or may be visible/shown to the user through an application on the web or via the wireless device. Note that the carrier/service provider, or the wireless device manufacturer, or some other party, may also set the priorities for desired service based on price, availability, instant channel loading in the network, or other factors.

In fact, the world's RF/QoS/coverage/service map could be loaded on to a wireless device from the web clearinghouse, and the updated periodically or infrequently, at either the request of the phone user or automatically by the wireless device, to update the database of the RF/QoS/services, capabilities over location.

The phone/wireless device could access the web either through a user application or this could be done autonomously, where a web server that hosts the clearinghouse communicates over wireless or wired means with the wireless device. This can be done using low level formatting that would not be readable by a regular user, but which is loaded into memory of the wireless device.

The web server and clearinghouse may be central or distributed, and can store and represent the services, locations, frequencies, carrier/owners, and other information that would be useful for a wireless device to automatically determine what frequencies or applications or capabilities it might experience in a particular location on the globe. Global coordinates may be represented in many ways known to those skilled in the art, and the ability to autonomously access the web is well understood today.

Users may also, either by their own activities, or through the wireless device autonomously either known or unknown to the user, communicate updates or in-the-field readings of the various signals and capacities/bandwidths received by the wireless device in a particular location back to the clearinghouse. That is, wireless devices may report back (autonomously in a preferred embodiment) to the clearinghouse their user experiences over a wide range of frequencies, bands, applications, along with the location of the wireless device. The idea of using GPS or some other position location means, even if as crude as sensing what major tower or market or carrier signal or nearby TV or FM or AM transmitter, etc. received by the wireless device (crude position locationing) could be used, as could more accurate TDOA or GPS methods. In any case, the invention contemplates the ability of users to report back to the clearinghouse, either in real time or when they become located where network access is easy or free, the measured quality and coverage and capabilities of wireless in a particular location/geographic region. The courseness of the geographic region may be determined based on speed of user, the application used by the user, or set by the clearinghouse, or by many other methods. Similarly, the courseness or the position location may be specified or set by the clearinghouse, and more value or cost or premium preference may be given to certain subscribers or users of the clearinghouse who wish to have more accurate (fine resolution, say within a few meters, few hundred meters) of wireless spectrum

quality/availability than those who are satisfied with course position locationing (say a few thousand meters).

The measurements reported back to the clearinghouse by wireless users, just like the obtaining of various radio qualities and metrics for a particular location of the wireless user, may also be done without knowledge by the user, and may be done in an autonomous communication between the wireless device and clearinghouse.

This database can also be contributed to by users who wish to add/record their own experiences, either autonomously or manually through a public website through a clearinghouse method, as described in previous provisional patent applications. Carriers could enter their own database into the web clearinghouse, or the clearinghouse could use bots or automated web crawlers to find websites from FCC, Chinese government, private or public company wesbsites, Comsearch, etc. to build a large database of spectrum availability and tower locations and bandwidths/services with a common website. Note that this clearinghouse could also have users provide inputs as to their perceived or experiential views of radio coverage or phone/web quality when they were in a particular location. Note that the entry of this "performance" data could be added by users based on their own experience, and could also be provided by carriers based on their known intfrastructure locations. Alternatively, phones of the future, equipped with GPS or any other type of location capability, could automatically, without any human interaction, upload to the website, on a periodic, one-time, infrequent, or regular basis, the perceived/measured radio reception quality, bitrate, capacity, availability, average use profile, average available profile, statistics on outage or reliability or coverage or capacity carrying capabilities, or an evaluation of the RF or end-user application performance, and this information may be loaded to the clearinghouse for inclusion in the database that is available. The database is updated at various intervals that make sense for the implementation of the clearinghouse (daily, hourly, by minute, by week, and this may be done on a global or on a specific location basis across the clearinghouse database, that itself may be distributed or located centrally). The updated information is made available to users on an ongoing basis, for further utility and enjoyment.

Reporters of RF quality and quality of the services, and access to the clearinghouse may be shared between carriers, user populations, owners, etc. so that information may be made available to update the global clearinghouse while providing those updates to large numbers of users who own wireless devices, for the improvement of operation of the wireless devices, or benefit to the carrier(s) or to the customers of wireless devices or customers of the wireless service access.

Note that once this clearinghouse is crated, then future phones or wireless devices could access this internet site, either conducted by the person who is the subscriber, or automatically by the phone device itself, or the carrier or service provider, and even the application that is intended to be used at the specific location, and over a wireless channel, to rapidly determine the type of coverage/ quality of coverage, the various

vendors in the geographic region of the user, how to best send the message, how to conserve bandwidth, improve battery life, etc.

This clearinghouse will also allow reporters of information to be ranked based on their accuracy and collaboration with other reporters of quality/RF/services/information and the service providers or spectrum allocations, themselves, would be ranked by the clearinghouse (e.g. at this Location, WiMax band is best, and gets 5 stars, whereas PCS Band has band coverage and only gets 1 star, etc). Individuals who report in their observations may also be ranked (.e.g. Bill Smith does a good job reporting quality of different radio bands and services near Austin, and gets 5 stars, or a 99% rating, as opposed to someone who frauds the system by reporting bogus measurements – the peer group or the web crawlers/data analysis of the database would find these outliers and give them lower rankings, say 1 star or 10% accuracy)..these could be weighted to give assessment of the entire radio spectrum and services/quality/coverage in any location on the earth. This will be a critical and vital invention for the future of multiband radios, and has clear applications in open-access wireless which is likely to evolve with the 700 MHz FCC spectrum auction, and the entrance of Google, Amazon, EBay/Skype into the wireless world. This also has strong impact and will assist the evolution of Cognitive or Software defined radios. See Figures 1 through 6 for additional concepts and ideas that show how to implement this invention.

RF and Quality Clearinghouse
for Multiband Wireless Devices
T S Rappaport 10/4/07

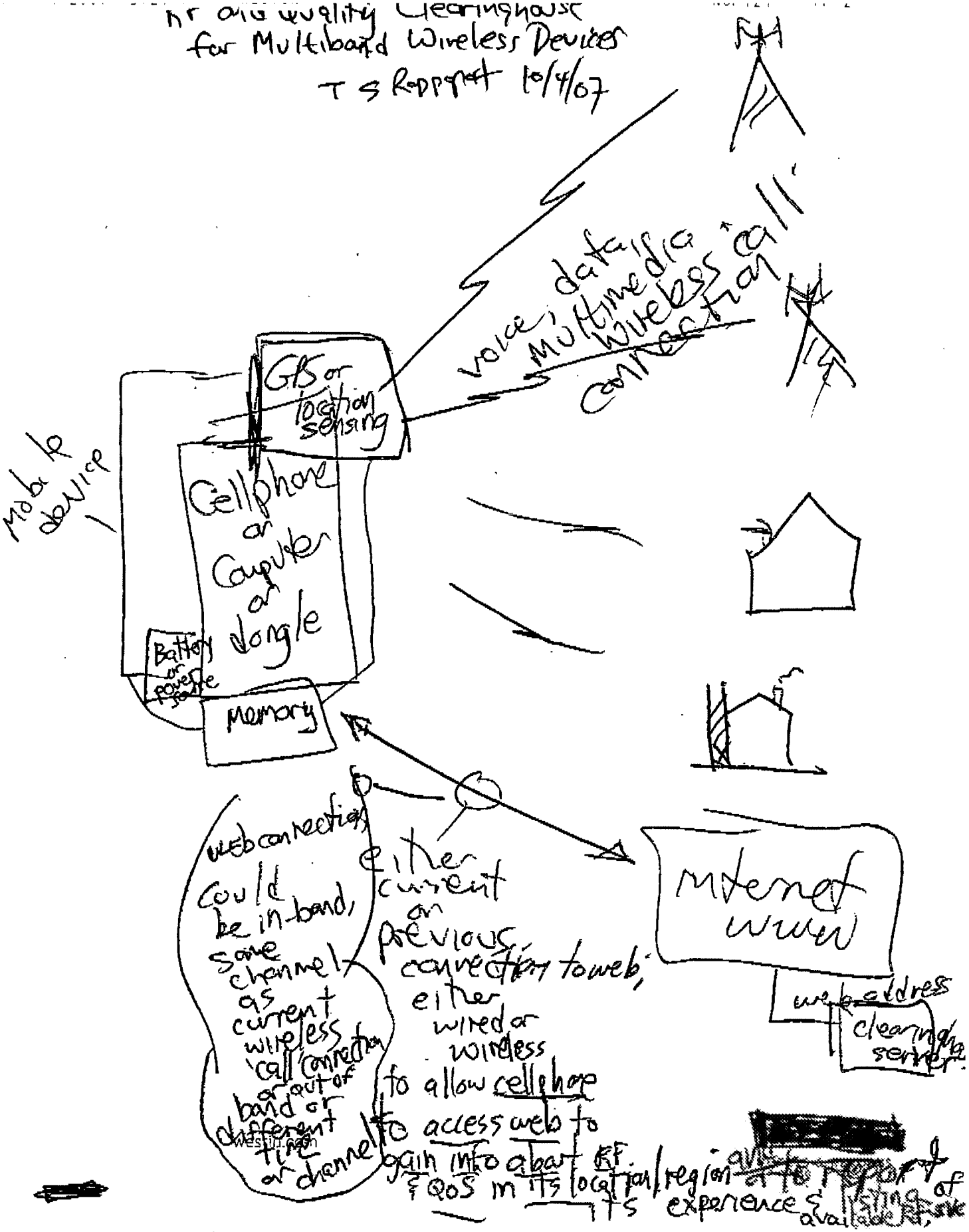
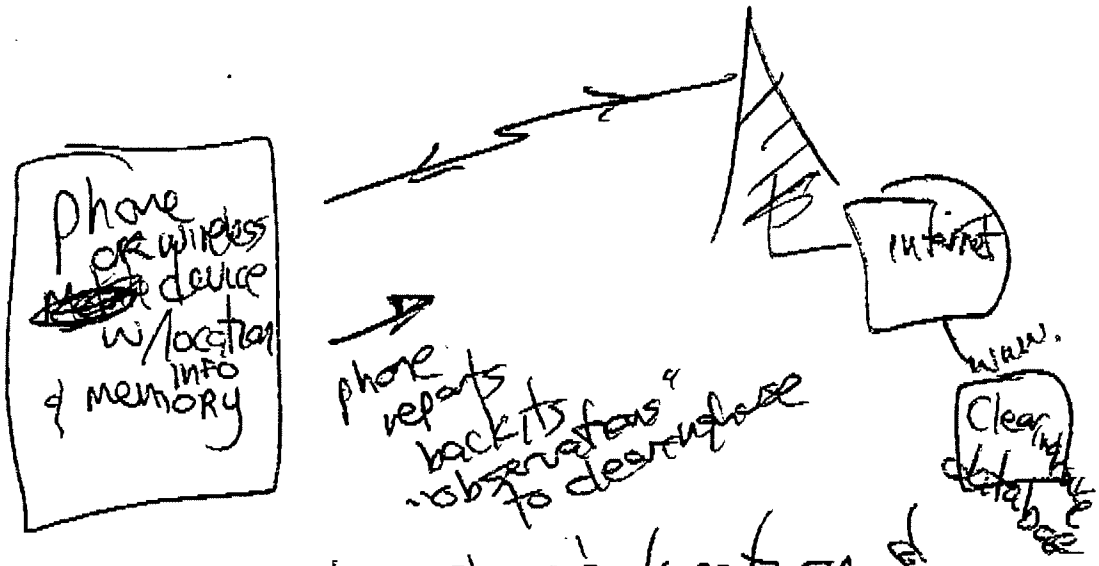


Fig 1.

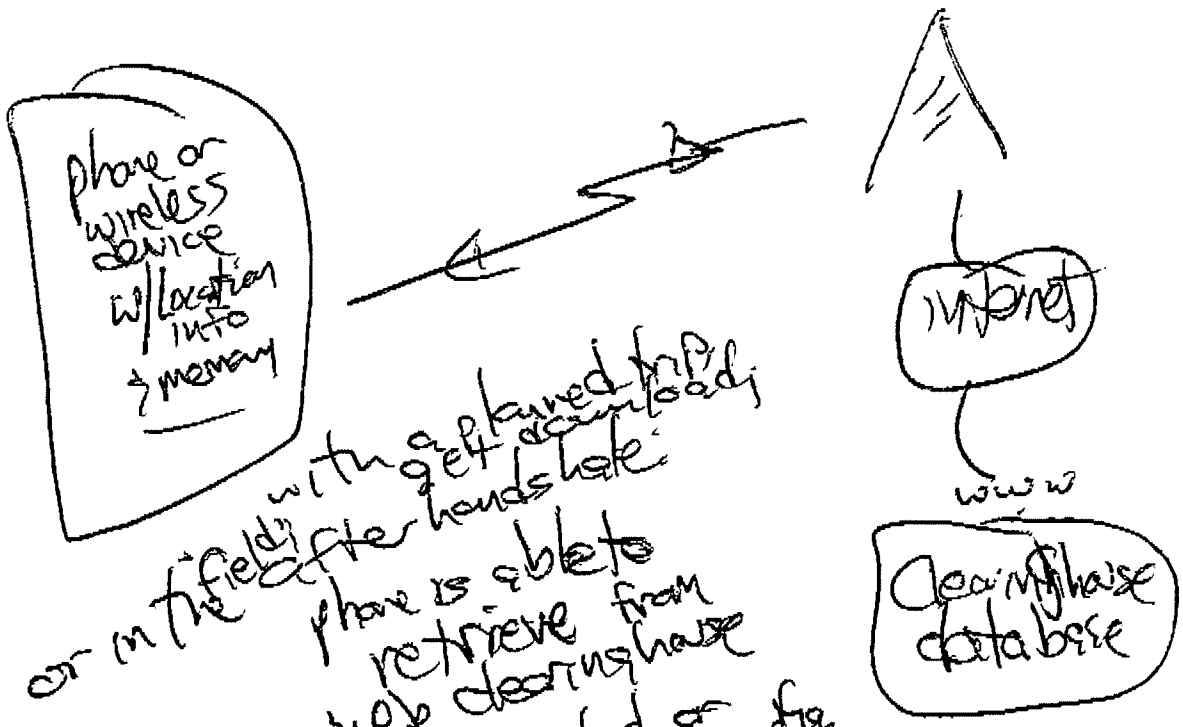


Reporting phone's location & user experience/QoS & available carriers/bands/services may be real-time, periodic, or infrequent, polled, or stored and forward later.

Shown here as wireless, but could be when device is connected by wired/optical connection.

Fig 2

[redacted] [redacted]



or in the field with a planned trip, get download after handshake.
phone is able to retrieve from web clearinghouse (automated or w/user interaction retrieval) the local "state" of RF environment, what services, frequencies, carriers, locations of towers, so the phone can use power & allocate spectrum better

Fig 3

[redacted]

[redacted]

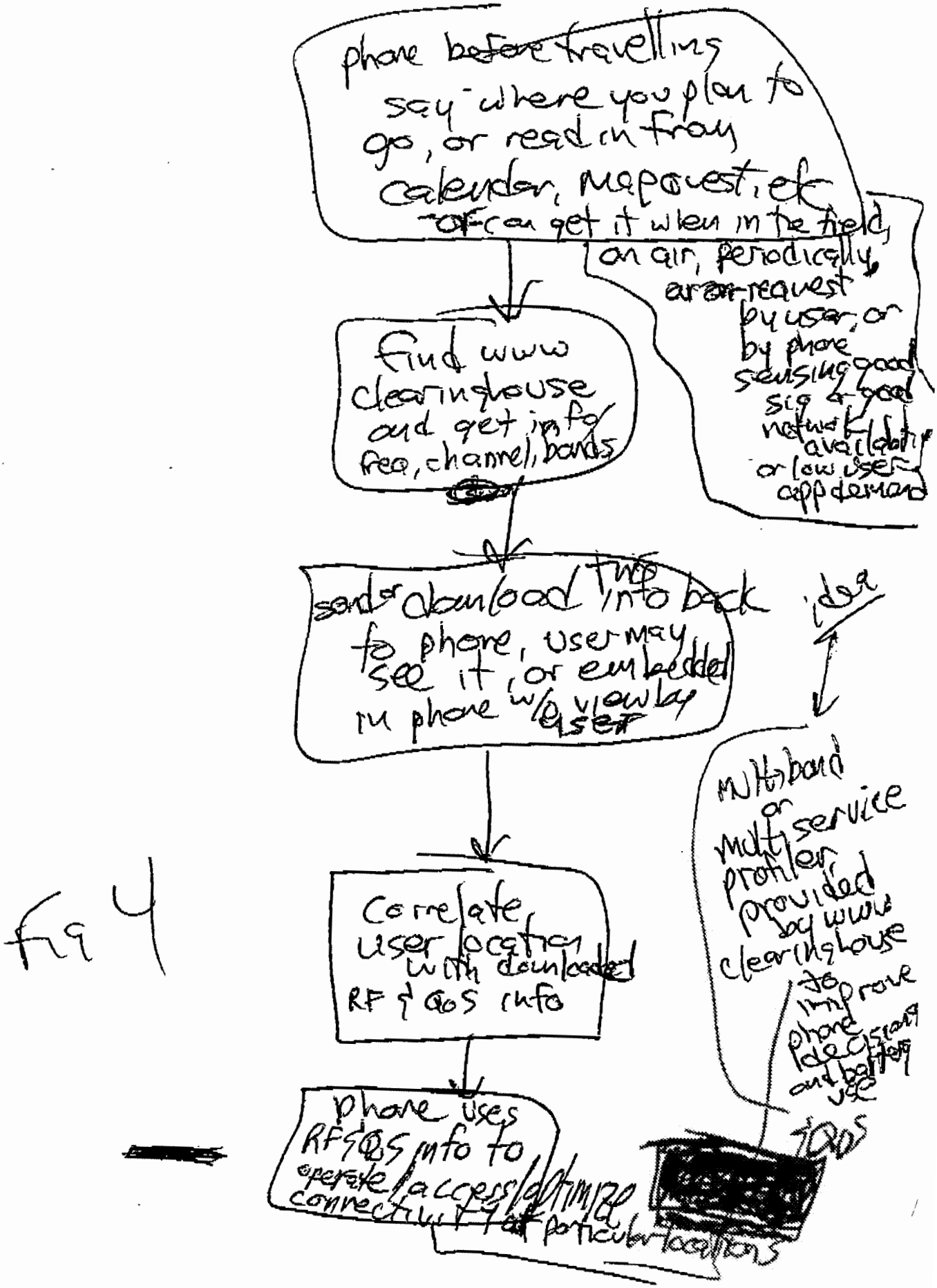
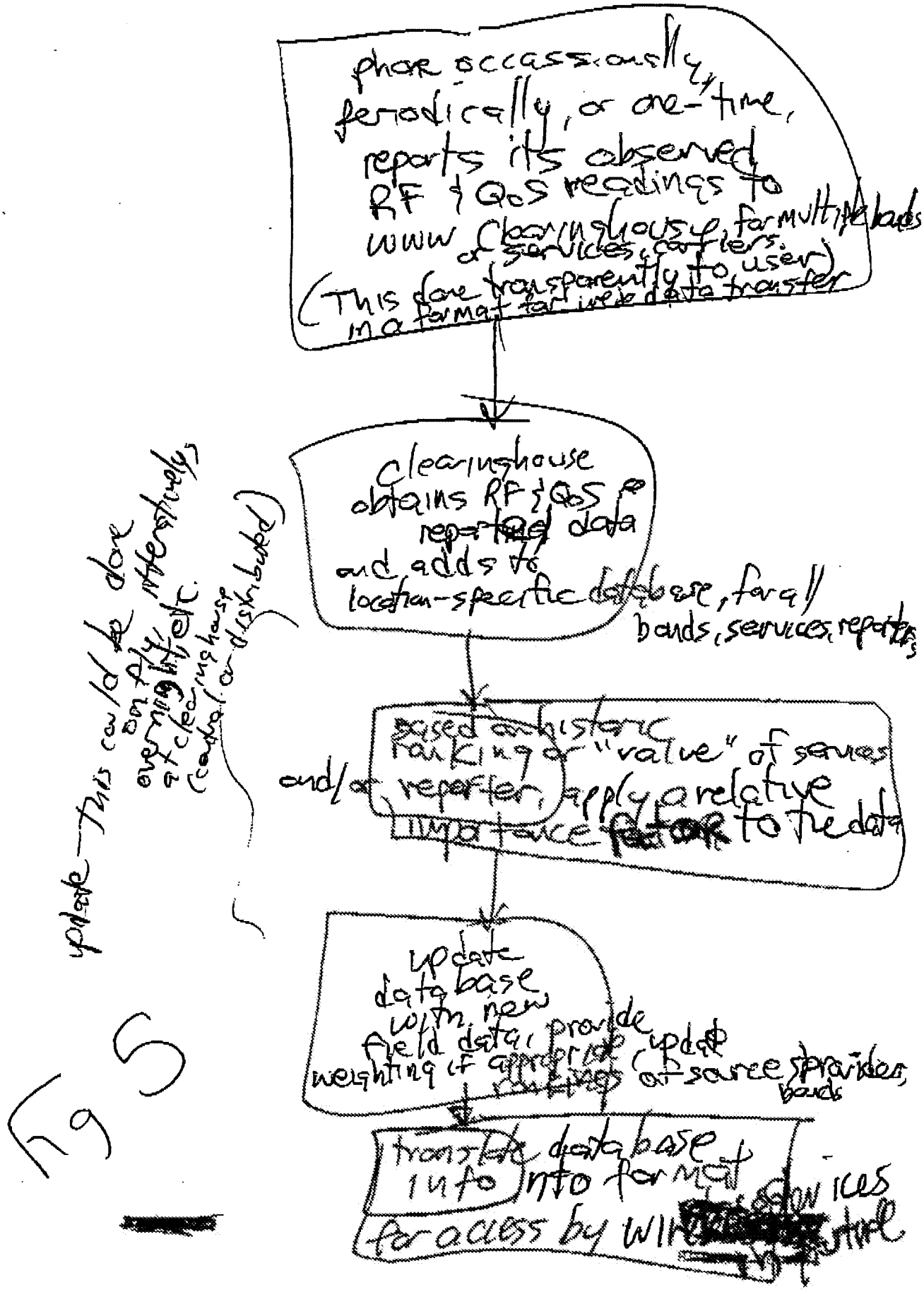

phone before travelling say where you plan to go, or read in from calendar, mapquest, etc
or can get it when in the field, on air, periodically, or on request by user, or by phone sensing good sig & good network availability or low user app demand
find www clearinghouse and get info freq, channel, bands
send download info back to phone, user may see it, or embedded in phone w/o viewing by user
idea
multi-band or multi service profiler provided by www clearinghouse to improve phone processing and battery use
correlate user location with downloaded RF & QoS info
phone uses RF&QoS info to operate/access/optimize connection at particular locations
QoS

Fig 4


phone occassionally, periodically, or one-time, reports its observed RF & QoS readings to www clearinghouse, for multiple bands or services, carriers.
(This done transparently to user) in a format for web data transfer
clearinghouse obtains RF & QoS reported data and adds to location-specific database, for all bands, services, reporters
based on historic ranking or "value" of services and/or reporter, apply a relative importance factor to the data
update database with new field data, provide weighting if appropriate, update rankings of source providers, bands
translate database info into format for access by wir[redacted]ices
update - This could be done on fly, iteratively, overnight, etc. at clearinghouse (central or distributed)
Fig 5

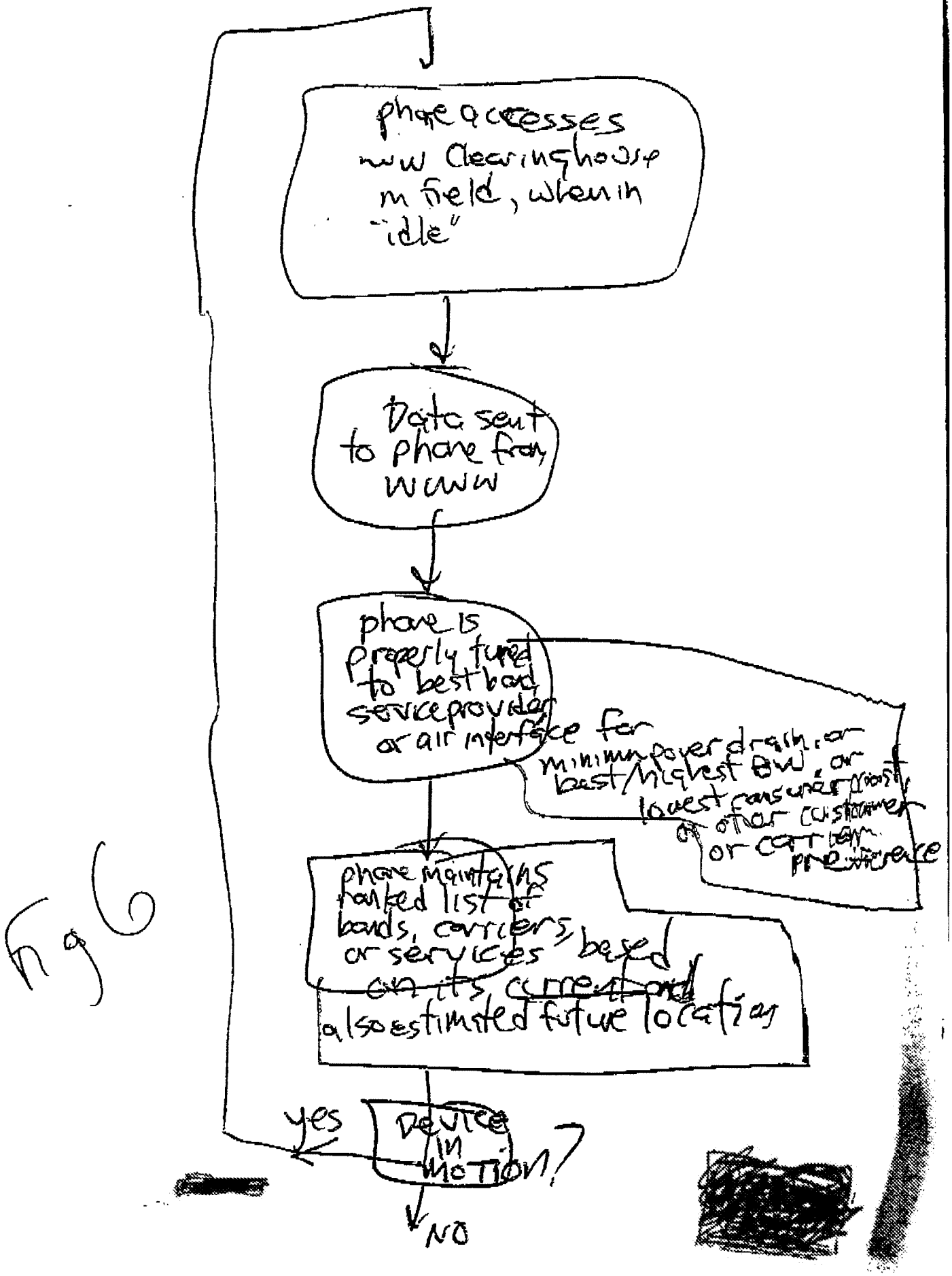

phone accesses www Clearinghouse in field, when in "idle"
Data sent to phone from www
phone is properly tuned to best band service provider or air interface for minimum power drain, or best/highest BW, or lowest consumer cost or other customer or carrier preference
phone maintains ranked list of bands, carriers, or services based on its current and also estimated future locations
Device in motion?
yes
NO

Fig 6

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Clearinghouse For Radio Quality and Service for Wireless Devices
First Named Inventor/Applicant Name:	Theodore S. Rappaport
Filer:	Michael E. Whitham
Attorney Docket Number:	08610005PR

Filed as Small Entity

Provisional Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Provisional Application filing fee	2005	1	105	105
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**105**

Electronic Acknowledgement Receipt

EFS ID:	2282001
Application Number:	60977582
International Application Number:	
Confirmation Number:	9258
Title of Invention:	Clearinghouse For Radio Quality and Service for Wireless Devices
First Named Inventor/Applicant Name:	Theodore S. Rappaport
Customer Number:	30743
Filer:	Michael E. Whitham
Filer Authorized By:	
Attorney Docket Number:	08610005PR
Receipt Date:	04-OCT-2007
Filing Date:	
Time Stamp:	18:38:52
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$105
RAM confirmation Number	3033
Deposit Account	502041
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

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Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		08610005PR.pdf	547046 65ac0ded5687ce6c6f467c274ac66621 3b7e9fc4	yes	12
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Fee Worksheet (PTO-06)		1	2	
	Specification		3	6	
	Drawings		7	12	
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	fee-info.pdf	8133 53c9ae6a0dce06511f6a85c1919834e0 4bffc714	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	555179		

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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.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.