

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 November 2007 (29.11.2007)

PCT

(10) International Publication Number
WO 2007/136309 A1

(51) International Patent Classification:

H04K 3/00 (2006.01) **H04Q 7/38** (2006.01)
H04Q 7/30 (2006.01)

(21) International Application Number:

PCT/SE2006/000594

(22) International Filing Date: 22 May 2006 (22.05.2006)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): **TELEFONAKTIEBOLAGET LM ERICSSON** [SE/SE];
S-164 83 Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **LAGERMAN, Mikael** [SE/SE]; Snäckvägen 17, S-414 75 Göteborg (SE).

(74) Agent: **ALBIHNS GÖTEBORG AB**; Box 142, S-401 22 Göteborg (SE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

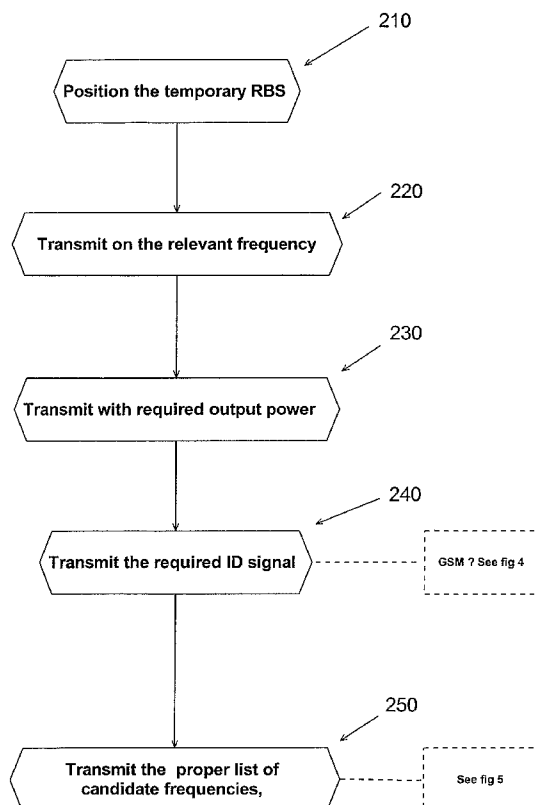
— of inventorship (Rule 4.17(iv))

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD AND A DEVICE FOR GAINING AND MAINTAINING CONTROL OF THE TRAFFIC FROM A RADIO BASE STATION IN A CELLULAR TELEPHONY SYSTEM.



(57) Abstract: A method for letting a temporary radio base station (RBS, 140) gain and maintain control of the traffic of a targeted RBS (120) in a system (100), where RBS's transmit an identity signal and a list of candidate frequencies for use by user terminals when switching RBS. The temporary RBS (140) is positioned in or adjacent to the targeted RBS (120), and transmits on a frequency in the candidate list of the targeted RBS (120). The transmissions are at such a power level that the traffic of the targeted RBS (120) is transferred to the temporary RBS (140). The temporary RBS transmits the identity signal the RBS whose frequency the temporary RBS transmits on, and transmits a list of candidate frequencies such that user terminals whose traffic has been transferred to the temporary RBS cannot find signals with sufficient strength on any of the candidate frequencies.

TITLE

A method and a device for gaining and maintaining control of the traffic from a radio base station in a cellular telephony system.

5 TECHNICAL FIELD

The present invention relates to a method and a device for letting a temporary radio base station gain and maintain control of traffic to and from a targeted radio base station in a wireless cellular telecommunications system. In the system in question, there are a number of radio base stations for
10 controlling and routing traffic to and from user terminals in the system, and each radio base station routes and controls the traffic to and from a certain cell within the system.

BACKGROUND

15 Many situations can be envisioned in which it is desirable for government bodies such as law enforcement agencies to prevent the use of cellular telephones within a certain geographical area. For example, during a situation of civil unrest such as riots, it may be desirable for the police or other similar government bodies to prevent the function of cellular telephones
20 within a certain section of a city.

Other cases where it may also be desirable to prevent the function of cellular networks in a defined geographical area might be, for example, before a police raid on a building. Another example of a problem area which could be
25 addressed by area-selective prevention of cellular telephony is cellular telephones which have been smuggled into prisons, which is beginning to constitute a major problem.

Traditionally, the prevention of cellular telephony within an area has been
30 approached much in the same manner as traditional electronic warfare. This means that traditional solutions have been used which are mainly aimed at transmitting a jamming signal, usually noise, on the relevant frequencies, so

as to "drown" the information in noise, and to thus create a signal-to-noise ratio which prevents the user terminals in the targeted area from detecting the "payload" signal.

- 5 A problem with the technique described above, i.e. so called "brute force" jamming, is that this is a method which consumes a great deal of energy, thus making the equipment heavy and not very portable. In addition, since noise signals are transmitted with a relatively high output power at well known frequencies, it can be quite easy for a skilled user to detect that the
- 10 system is being tampered with.

Document FR 2 858 742 describes a procedure and a device for tampering with cellular communications which addresses some of the problems described above. However, the device appears to need a great deal of

15 processor power, since it relies on a rather complex algorithm, and tries to identify certain signals on a more or less constant basis.

SUMMARY

There is thus a need for a method and a device by means of which control

20 can be gained of the cellular traffic in a certain area, without creating a large need for processor capacity and transmitter power. In addition, control of the traffic must not only be gained, but also maintained. The traffic which it is desired to gain and maintain control of is that between the user terminals in a certain area and the radio base station (RBS) or stations which their traffic is

25 controlled by and routed via.

This need is met by the present invention in that it provides a method for letting a temporary radio base station gain and maintain control of the traffic to and from a targeted radio base station in a wireless cellular

30 telecommunications system, where the system comprises a number of radio base station for routing traffic to and from user terminals in the system.

Each radio base station in such a system controls the traffic to and from a certain cell within the system, and at least a number of the radio base stations in the system each transmits an identity signal and a list of candidate frequencies for use by user terminals when switching to another radio base station.

The phrase "switching to another base station" refers to the fact that the user terminals in a cellular system will have their traffic controlled by and routed via a radio base station which fulfils certain criteria, among them signal strength. When the signal strength from the current radio base station falls below a certain pre-defined level for a certain pre-defined amount of time, a transfer of the traffic is made to another radio base station from which a clearer signal is received by the user terminal.

According to the invention, control of the traffic to and from the targeted radio base station is gained by positioning the temporary radio base station in or adjacent to the cell of the targeted radio base station, and programming the temporary radio base station to transmit on one of the frequencies in the candidate list broadcast by the targeted radio base station.

Suitably but not necessarily, the frequency on which the temporary RBS is programmed to transmit on is a frequency used by an RBS which is not immediately adjacent to the cell of the targeted RBS.

Thus, the temporary radio base station is made to transmit on a frequency which is monitored by the user terminals in the area in question, and with a power level which ensures transfer of the user terminal (-s) to the temporary radio base station from the targeted radio base station. In addition, the temporary radio base station is made to transmit as its identity signal a signal which is the same as the identity signal of the radio base station on whose frequency the temporary radio base station transmits on. Hence, control of

the traffic of the targeted radio base station will be acquired by the temporary radio base station.

5 In order to let the temporary radio base station not only gain but also maintain control of the traffic of the targeted radio base station, the temporary radio base station is programmed to transmit a list of candidate frequencies, but with the list being such that the user terminals cannot find signals with sufficient strength on any of the candidate frequencies in the vicinity of the take-over area. Accordingly, control of traffic which has been transferred to
10 the temporary radio base station will also be maintained by it.

In a preferred embodiment of the invention, the list of candidate frequencies is made empty, which will mean that the candidate frequencies cannot be found by the radio base stations of which control has been gained, since the
15 user terminals will in fact not look for candidate frequencies.

The method of the invention can be applied to a number of cellular telephony systems, among which can be mentioned TDMA systems such as the GSM system, or to CDMA systems.

20

If the invention is applied to a GSM system, the identity signal which will be used is the so called CGI-signal, or the BSIC signal (BSIC: Base Station Identity Code), and the list of candidate frequencies will be the so called BA list. (BA: BCCH Allocation, where BCCH stands for Broadcast Control
25 Channel.)

Also, as opposed to prior art, no advanced algorithms or large amounts of processor power are needed in order to obtain the goals of the invention. In addition, the temporary base station of the invention can achieve the desired
30 objectives in a much more energy efficient manner, which makes it possible to design a smaller and more compact device than previously, which can conceivably be battery powered. Also, as opposed to traditional jammers,

which have used the "brute force" approach, the device of the invention does not cause as much interfering noise in the system.

BRIEF DESCRIPTION OF THE DRAWINGS

- 5 The invention will be described in more detail in the following, with reference to the appended drawings, in which

Fig 1 shows a part of a cellular system in which the invention may be applied, and

- 10 Fig 2 shows a flowchart outlining some major steps of a method according to the invention, and

Figs 3 and 4 show alternative steps for the flowchart of fig 2, and

Fig 5 shows a system in which the invention is applied.

15 DETAILED DESCRIPTION

- In the following, the invention will be described in closer detail, and use will be made of some examples of a cellular system in order to illustrate the inventive concept. The examples will mainly show the invention applied to a generic GSM system, in other words a system which is based on the TDMA principle, Time Division Multiple Access. However, it should be pointed out, and will be realized by those skilled in the art, that the invention can equally well be applied to cellular systems which are based on other principles, such as, for example, CDMA, Code Division Multiple Access.

- 25 Before the inventive concept is described, a brief description needs to be made of some functions in a cellular telephony system:

- Fig 1 shows the general layout of a wireless cellular system 100, or at least a part of such a system. As indicated in fig 1, the system comprises a plurality of separate and neighbouring geographical areas, so called "cells", exemplified by the cell denoted as 110. Within each cell there is usually one radio base station ("RBS") 120 which controls all traffic to and from user

terminals 130 in the cell, and via which all traffic to and from the user terminals 130 in the cell 120 is routed. The user terminals in the system continuously monitor the quality of the received signal from the RBS which routes and controls their traffic, in order to determine when their traffic should
5 instead be controlled by and routed via another RBS, in other words if a so called "hand-over" to another RBS should be performed.

The signal quality as well as certain other predefined parameters are used when deciding if a hand-over should be made. The decision of making a
10 hand-over can be made either by the user terminal 130 or by a so called Base Station Controller (BSC) at system level. Usually, the decision is made by a control function or control means in the user terminal if the user terminal is not engaged in an active session, i.e. when the terminal is in the so called "idle mode", and by the BSC if the user terminal is in the so called "active
15 mode", i.e. there is a voice or data session in progress. In the latter case, i.e. during active mode, the user terminal reports the relevant data to the BSC, which will then decide if and when a hand-over should be made.

Each cell in the system 100 has a globally unique identity within the system,
20 in some systems such as GSM referred to as the CGI, the Cell Global Identity, which usually consists of 15 to 18 bytes. Since the CGI comprises such a rather large number of bits, a shorter identity is often used by the radio base station in the cell, the shorter identity being referred to as the BSIC, Base Station Identity Code.

25

The BSIC or the CGI are broadcast at frequent intervals by the radio base station 120 in the cell 110, so that the cell and its radio base station may be identified by the user terminals 130. The BSIC and/or the CGI are broadcast by the radio base stations on a special channel, usually a special logical
30 channel. Also included in this broadcast is the so called BA list, which is a list of frequencies used by radio base stations in the neighbourhood of the broadcasting radio base station.

With reference to fig 1 and the cell 110, the BA list is thus used by the user terminals 130 in the cell 110 in order to know which other frequencies should be monitored for signal quality and possibly used in hand-over.

5

In the case of the "passive mode", a hand-over will roughly take place as follows: a user terminal 130 in the cell 110 will listen to the broadcast message from the radio base station in the cell 110, and will monitor the frequencies in the BA list to see if they provide a better signal quality than the radio base station in the cell 110. If the answer is affirmative, and certain other criteria are fulfilled, such as for example the duration of the signal quality, the user terminal 130 switches its traffic to the radio base station with the better quality, and then starts to monitor the BA list of that radio base station.

15

With reference to fig 1 and also to the flowchart in fig 2, an example of a method according to the invention will be shown. Imagine an area in which it is desired that no cellular telephony should be able to take place, for example a known hideout for criminals, which the police have decided to raid. It would be highly valuable to the police if no cellular calls could be made to or from the vicinity of the building prior to and during the raid. Control of all cellular telephony in the area in question is carried out by a regular RBS in the system, which RBS will thus be "targeted" for takeover of its traffic.

25 In short, which will be elaborated upon later in this text, a method according to the invention utilizes an extra RBS, from now on referred to as a temporary RBS, in order to gain control of the traffic of the targeted RBS.

In order to utilize the invention optimally, it is necessary to determine which frequencies that are in the candidate list, i.e. in a GSM system the BA list, of the targeted radio base station. This information can be obtained in a variety of ways, for example from the operator or operators of the cellular systems in

30

that area, or by measurements carried out in the area in which it is desired to gain and maintain control of the traffic.

5 In addition to this, it is necessary to obtain the identity code of the station whose frequency the temporary radio base station will transmit on. This information can also be obtained either by measurements in the field, or from the operator of the system.

10 It is also suitable to find out what the signal level is for the user terminals in the area in question, since it is desired for the temporary RBS to transmit with an output power level that makes the user terminals in the area to want to switch their traffic to the temporary RBS, but as an alternative this can be done by simply transmitting with an output level which it is a priori known that the targeted RBS cannot match.

15

When the information which was described above has been obtained, it is used in the temporary RBS in the following way:

- 20 • The temporary RBS is positioned in the cell of the targeted RBS, or adjacent to said cell, see block 210 of fig 2.
- The temporary RBS is made to transmit on one of the frequencies in the candidate list of the targeted RBS, said frequency being used by an RBS which is suitably not immediately adjacent to the cell of the targeted RBS, see block 220 of fig 2.
- 25 • The transmissions on said control frequency are made with such an output power level that user terminals within a certain area will perceive the signal from the temporary RBS as a signal of better quality than the targeted RBS, and will accordingly want to switch their traffic to the temporary RBS, see block 230 of fig 2.

- The temporary RBS transmits on its control channel an identity which is the same as that of the RBS whose control frequency is used, see block 240 of fig 2.

5 Thus, by means of the steps outlined above, user terminals within a certain area will perceive a signal which is stronger than that of the targeted RBS, and since the received signal is one of those on the candidate list of the targeted RBS, they will perceive it as a regular "competing" signal, and will switch their traffic to the temporary RBS. When and if the BSC is notified of
10 the measured signal strength by the user terminals, it will order them to switch their traffic to the temporary RBS for the same reason, i.e. that the temporary RBS will be perceived as an ordinary candidate for "hand-over".

These steps can be applied either to a GSM system, i.e. to a TDMA system,
15 or to a CDMA system. As an example, if applied to a GSM system, the identity signal which is transmitted can be the so called CGI (Cell Global Identity) or the BSIC signals. This is outlined in fig 3.

Thus, control has been gained of some or all of the traffic of the targeted
20 RBS, depending on the output power which is used for the transmissions by the temporary RBS. The next issue is to ensure that control is also maintained by the temporary RBS, which can be done in the following way: the user terminals whose traffic has been transferred to the temporary RBS will, as explained previously, listen to frequencies comprised in the candidate
25 list of their current RBS, i.e. in this case the temporary RBS.

In order to maintain control of these user terminals the temporary RBS is, according to the invention, programmed to transmit a list of candidate frequencies, with the list being such that user terminals whose traffic has
30 been transferred to the temporary RBS cannot find signals on any of the candidate frequencies in the vicinity of the cell of the targeted RBS, at least not with such a signal strength that they will appear as "attractive" candidates

for a hand-over. Thus, there will be no "competing" frequencies to listen to, or at least to switch over to.

One way of achieving such a candidate list is to make the candidate list empty, or, as an alternative, the candidate list can comprise frequencies of RBS's which are known to be so distant that they cannot compete with the temporary RBS. These two alternatives are shown in fig 4.

This step of the invention can also be applied equally well to TDMA systems or CDMA systems. If applied to a GSM system, the candidate list will usually be the so called BA list.

Thus, by means of the invention, control of traffic to and from a targeted RBS has been gained by the temporary RBS and will be maintained by it, which was the object of the invention.

Returning now to the positioning of the temporary RBS and to its programming regarding the frequency it will transmit on to gain control of traffic from the targeted RBS, and also to its candidate list, reference is made to fig 5.

In fig 5, the wireless cellular telecommunications system of fig 1 is shown again, with the targeted RBS denoted as 120, and the cell it controls being denoted as 110. The temporary RBS of the invention has been given the reference number 140.

As mentioned previously, the frequency which the temporary RBS 140 is made to transmit on is chosen from the candidate list of the targeted RBS 120. However, the frequency should not be chosen from one of those used by neighbouring cells or base stations, for examples the base station of the cell denoted as 157-159 in fig 5, since those base stations might provide the user terminals of the targeted RBS 120 with a strong signal.

Instead, the temporary RBS 140 should be programmed to transmit on a frequency which is in the candidate list of the targeted RBS 120, but which belongs to an RBS which is as remote as possible from the targeted RBS 120 while still being in the candidate list of the targeted RBS 120. The word "remote" in this context can be taken to mean either geographically or as an indicator of the strength of the signal from that RBS in the cell 110. One example of a suitable such radio base stations is the one denoted by 151 in fig 5. However, if made necessary, by for example, frequency planning and reuse, the temporary base station might have to "borrow" frequency and identity from a neighbouring RBS 157-159.

The invention is not limited to the examples of embodiments shown in the drawings and described above, but may freely be varied within the scope of the appended claims.

CLAIMS

1. A method for letting a temporary radio base station (RBS, 140) gain and maintain control of traffic to and from a targeted radio base station (120) in a wireless cellular telecommunications system (100), said system (100) comprising a plurality of RBS's for routing traffic to and from user terminals (130) in the system, each RBS (120) controlling the traffic to and from a certain cell (110) within the system (100), where at least a number of said plurality of RBS's in the system each transmits an identity signal and a list of candidate frequencies for use by user terminals when switching RBS, the method being characterized in that it comprises the following:
- positioning said temporary RBS (140) in or adjacent to the cell of the targeted RBS (120),
 - programming the temporary RBS (140) to transmit on one of the frequencies in the candidate list broadcast by the targeted RBS (120),
 - making the transmissions of the temporary RBS (140) with such a power level that traffic to and from user terminals in the cell of the targeted RBS (120) will be transferred to the temporary RBS (140),
 - programming the temporary RBS (140) to transmit an identity signal which is the same as that of the RBS (151) whose frequency the temporary RBS transmits on,
 - programming said temporary RBS (140) to transmit a list of candidate frequencies, the list being such that user terminals (130) whose traffic has been transferred to the temporary RBS (140) cannot find signals with sufficient strength on any of the candidate frequencies in the vicinity of the cell of the targeted RBS (120).
2. The method of claim 1, according to which the frequency on which the temporary RBS (140) is programmed to transmit on is a frequency used by an RBS (151) which is not immediately adjacent to the cell of the targeted RBS (120).

3. The method of claim 1 or 2, according to which the list of candidate frequencies is empty, by virtue of which the candidate frequencies cannot be found.

5

4. The method of any of claims 1-3, applied to a TDMA system.

5. The method of any of claims 1-3, applied to a CDMA system.

10 6. The method of claim 4, applied to a GSM system.

7. The method of claim 6, according to which the identity signal is the CGI.

8. The method of claim 6, according to which the identity signal is the BSIC.

15

9. The method of any of claims 6-8, according to which the list of candidate frequencies is the BA-list.

20

10. A temporary radio base station (RBS, 140) which can gain and maintain control of the traffic to and from a targeted radio base station (120) in a wireless cellular telecommunications system (100), said system comprising a plurality of RBS's for routing traffic to and from user terminals (130) in the system, each RBS controlling the traffic to and from a certain cell (110) within the system (100), where at least a number of said plurality of RBS's in the system each transmits an identity signal and a list of candidate frequencies for use by user terminals when switching RBS, the temporary RBS (140) being characterized in that :

25

- it can be programmed to transmit on one of the frequencies in the candidate list broadcast by the targeted RBS (120),
- 30 - it can transmit with such a power level that traffic to and from users in the cell of the targeted RBS (120) will be transferred to the temporary RBS (140),

- it can be programmed to transmit an identity signal which is the same as that of the RBS (151) whose frequency the temporary RBS (140) transmits on,
 - it can be programmed to transmit a list of candidate frequencies, the list being such that user terminals (130) whose traffic has been transferred to the temporary RBS (140) cannot find signals with sufficient strength on any of the candidate frequencies in the vicinity of the cell of the targeted RBS (120).
- 10 11. The RBS (140) of claim 10, in which the list of candidate frequencies can be made empty, by virtue of which the candidate frequencies cannot be found.
- 15 12. The RBS (140) of claim 10 or 11, being an RBS for use in a TDMA system.
13. The RBS (140) of claim 10 or 11, being an RBS for use in a CDMA system.
- 20 14. The RBS (140) of claim 12, being an RBS for use in a GSM system.
15. The RBS (140) of claim 14, according to which the identity signal is the CGI.
- 25 16. The RBS (140) of claim 14, according to which the identity signal is the BSIC.
17. The RBS (140) of any of claims 14-16, according to which the list of candidate frequencies is the BA-list.
- 30

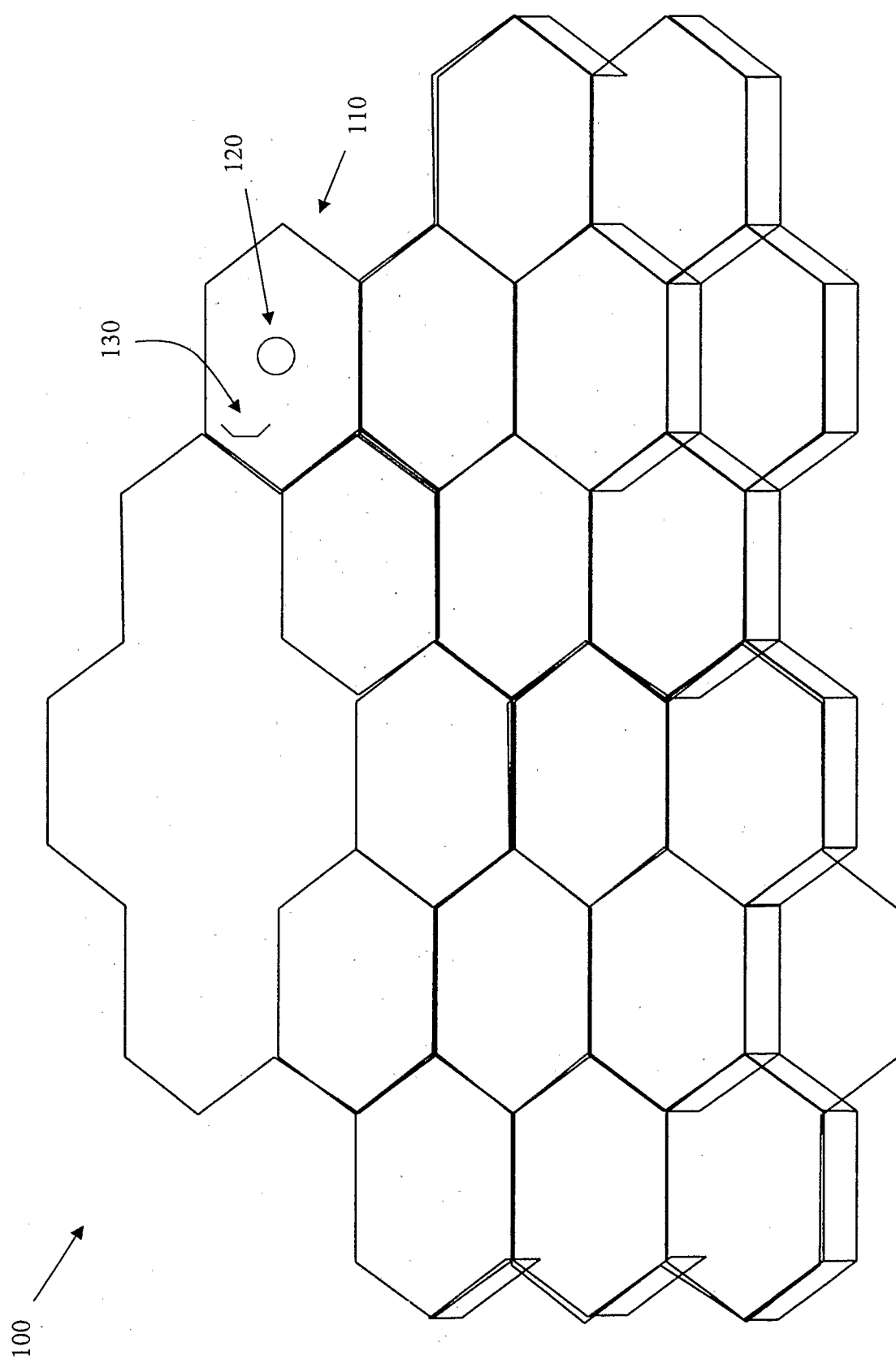


Fig 1

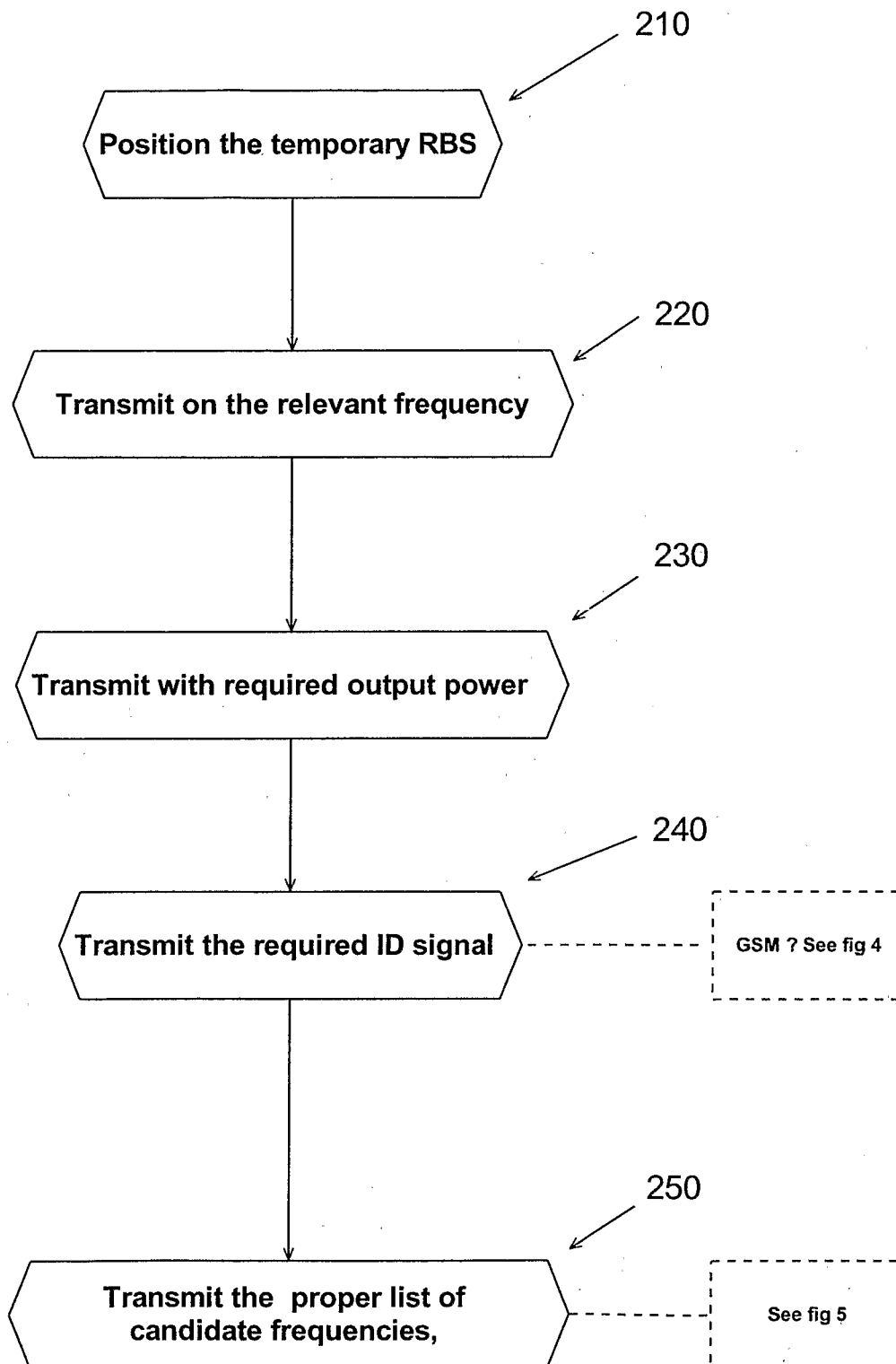
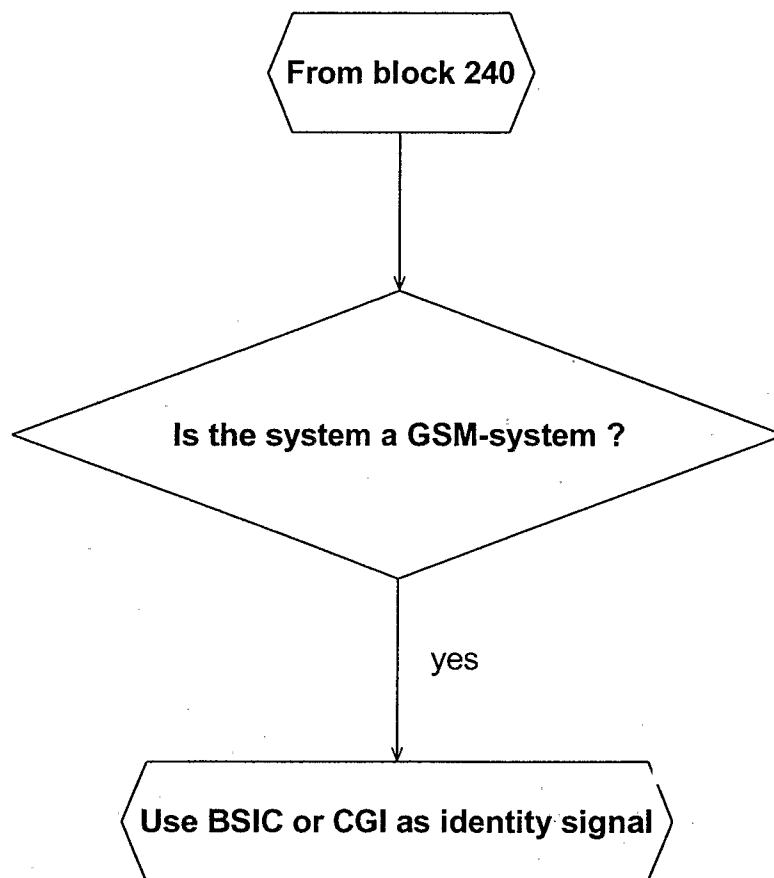


Fig 2

**Fig 3**

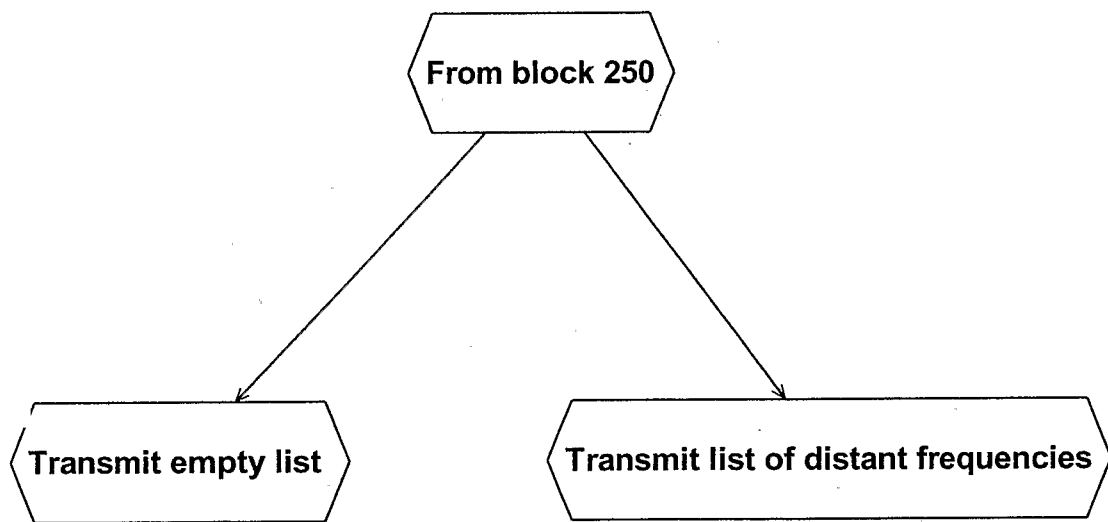


Fig 4

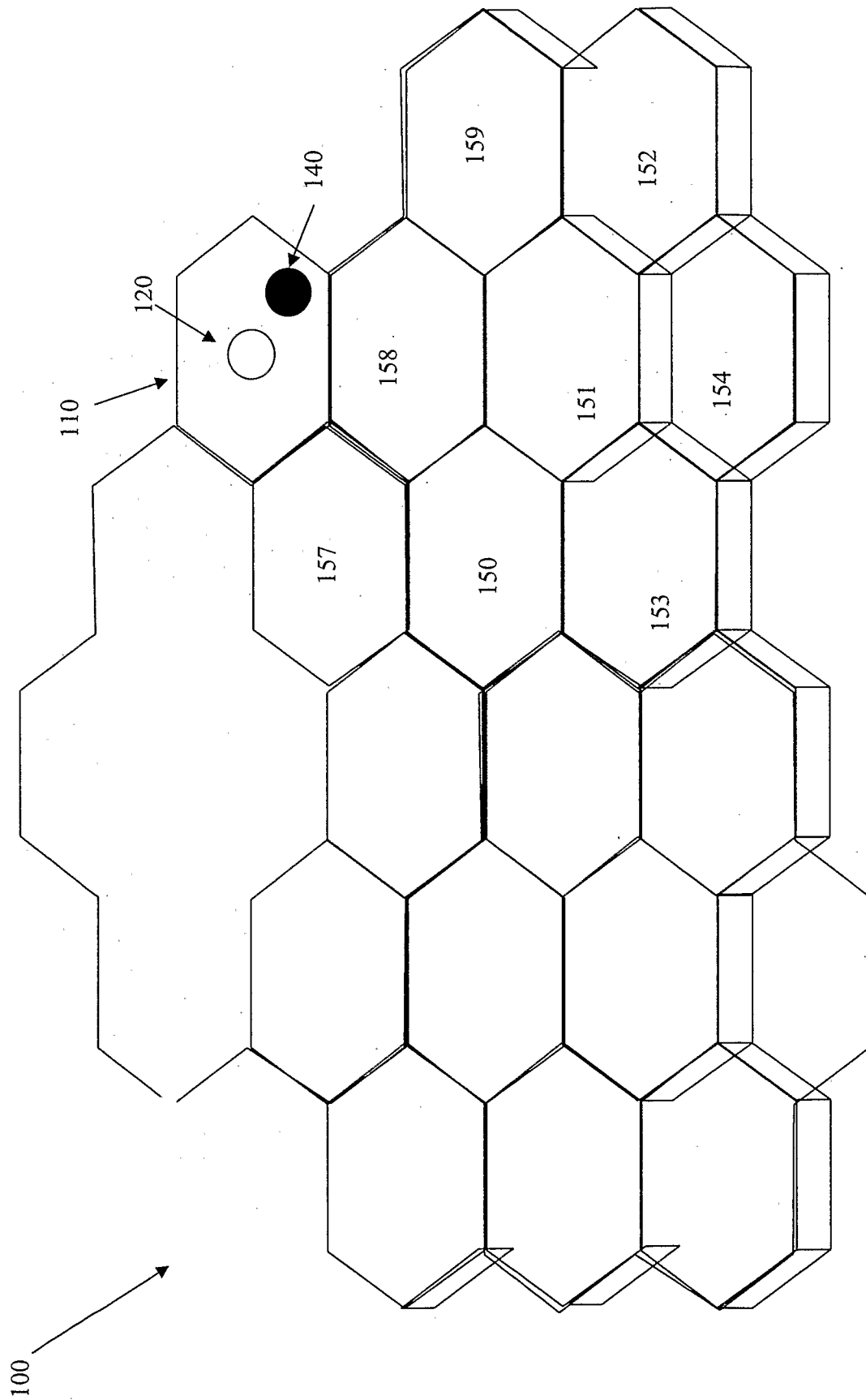


Fig 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2006/000594

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04Q, H04K

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ULRIKE MEYER ET AL ON THE IMPACT OF GSM ENCRYPTION AND MAN-IN-THE-MIDDLE ATTACKS ON THE SECURITY OF INTEROPERATING GSM/UMTS NETWORKS Darmstadt University of Technology, Department of Computer Science. see section IV.B --	1-17
Y	GB 2294181 A (MOTOROLA LIMITED), 17 April 1996 (17.04.1996), page 4, line 25 - page 5, line 5, abstract --	1-17
A	US 20040166857 A1 (EUNSOO SHIM ET AL), 26 August 2004 (26.08.2004), abstract, [0006]-[0007] --	1-17

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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

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

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search

29 March 2007

Date of mailing of the international search report

02-04-2007

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Anders Edlund/MN

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2006/000594

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20030143943 A1 (PAUL. A. KLINE), 31 July 2003 (31.07.2003), abstract -- -----	1-17

International patent classification (IPC)

H04K 3/00 (2006.01)

H04Q 7/30 (2006.01)

H04Q 7/38 (2006.01)

Download your patent documents at www.prv.se

The cited patent documents can be downloaded at www.prv.se by following the links:

- In English/Searches and advisory services/Cited documents (service in English) or
- e-tjänster/anförda dokument (service in Swedish).

Use the application number as username.

The password is **UFIZOUKOKS**.

Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

24/02/2007

International application No.

PCT/SE2006/000594

GB	2294181	A	17/04/1996	AT	184149	T	15/09/1999
				CA	2201757	A,C	11/04/1996
				DE	69511886	D,T	20/04/2000
				DK	784911	T	27/03/2000
				EP	0784911	A,B	23/07/1997
				SE	0784911	T3	
				ES	2136878	T	01/12/1999
				FI	115819	B	15/07/2005
				FI	971430	A	04/04/1997
				GB	9420002	D	00/00/0000
				HK	1002382	A	28/04/2000
				IL	115514	A	06/12/1998
				JP	10509845	T	22/09/1998
				SG	69956	A	25/01/2000
				US	6212382	B	03/04/2001
				WO	9610893	A	11/04/1996
US	20040166857	A1	26/08/2004	CN	1573642	A	02/02/2005
				EP	1482399	A	01/12/2004
				JP	2004362565	A	24/12/2004
				KR	20040104387	A	10/12/2004
				US	7131023	B	31/10/2006
				US	20040243874	A	02/12/2004
US	20030143943	A1	31/07/2003	US	7050755	B	23/05/2006