

04/07/16

## Number of documents: 15

<a href="#">WO200381718</a>	Variable beam antenna device, transmitter-receiver and network notebook AIRGAIN EAGEIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM
<a href="#">WO200339028</a>	Information transmission method for a wireless local network AIRGAIN Obshchestvo s ogranichennoj otvetstvennost'ju "Algoritm"
<a href="#">WO200451798</a>	Steerable-beam antenna device and a planar directional antenna AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM
<a href="#">WO2005114789</a>	Switched multi-beam antenna AIRGAIN
<a href="#">US20150004916</a>	Method and system AIRGAIN
<a href="#">WO200339026</a>	Radio communication method for a wireless local network, a wireless local network and a transceiving device AIRGAIN OOO ALG ORITM
<a href="#">WO200339027</a>	Radio communication method for a wireless local network and a transceiving device AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM
<a href="#">WO200877113</a>	Optimized directional mimo antenna system AIRGAIN
<a href="#">WO200790062</a>	Dual band antenna AIRGAIN
<a href="#">US20070176836</a>	U-antenna AIRGAIN
<a href="#">US20070042715</a>	Optimized directional antenna system AIRGAIN
<a href="#">WO200541440</a>	Radio communications method in a wireless local network AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM
<a href="#">US20060292991</a>	Dynamically optimized smart antenna system AIRGAIN
<a href="#">US20070040760</a>	Directional antenna system with multi-use elements AIRGAIN
<a href="#">US20050157755</a>	Method for data transmission in the hybrid network and hybrid network router AIRGAIN

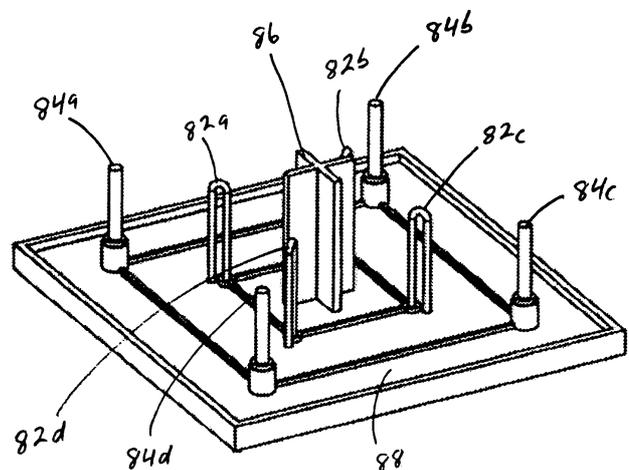
## Variable beam antenna device, transmitter-receiver and network notebook WO200381718

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN EAGEIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM</li> <li>• <b>Inventor</b> ABRAMOV OLEG JURIEVICH KASHKAROV ALEKSANDR GERMANOVIC NAGAEV FARID IBRAGIMOVICH</li> <li>• <b>International Patent Classification</b> G06F-001/16 H01Q-001/08 H01Q-001/22 H01Q-001/24 H01Q-001/38 H01Q-003/24 H01Q-009/24 H01Q-009/32 H01Q-009/42 H01Q-013/10 H01Q-019/10 H01Q-019/30 H01Q-021/28 H01Q-021/29 H01Q-025/00 H04B-007/04 H04B-007/06 H04B-007/08</li> <li>• <b>US Patent Classification</b> PCLO=343818000 PCLO=343834000 PCLX=343819000 PCLX=343846000 PCLX=343853000</li> <li>• <b>CPC Code</b> G06F-001/16/16; G06F-001/16/98; H01Q-001/08/4; H01Q-001/22/58; H01Q-001/22/66; H01Q-001/22; H01Q-001/24; H01Q-001/38; H01Q-003/24/2; H01Q-003/24; H01Q-009/32; H01Q-009/42; H01Q-013/10/6; H01Q-019/10 H01Q-019/10/6; H01Q-019/30; H01Q-021/28; H01Q-025/00</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO03081718 A1 2003-10-02 [WO200381718]</li> <li>• <b>Priority Details</b> 2002RU-0108661 2002-03-27 2003US-10510157 2003-03-24 2003WO-RU00119 2003-03-24 2004US-60562097 2004-04-12 2005US-11104291 2005-04-12</li> </ul>																																																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 30%;">WO03081718</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2003-10-02</td> <td style="width: 40%;">[WO200381718]</td> </tr> <tr> <td>CA2494982</td> <td>A1</td> <td>2003-10-02</td> <td>[CA2494982]</td> </tr> <tr> <td>AU2003227399</td> <td>A1</td> <td>2003-10-08</td> <td>[AU2003227399]</td> </tr> <tr> <td>RU2231874</td> <td>C2</td> <td>2004-06-27</td> <td>[RU2231874]</td> </tr> <tr> <td>WO03081718</td> <td>A9</td> <td>2004-11-18</td> <td>[WO200381718]</td> </tr> <tr> <td>EP1517398</td> <td>A1</td> <td>2005-03-23</td> <td>[EP1517398]</td> </tr> <tr> <td>JP2005521314</td> <td>A</td> <td>2005-07-14</td> <td>[JP2005521314]</td> </tr> <tr> <td>CN1656646</td> <td>A</td> <td>2005-08-17</td> <td>[CN1656646]</td> </tr> <tr> <td>EP1517398</td> <td>A4</td> <td>2005-09-21</td> <td>[EP1517398]</td> </tr> <tr> <td>US2005237258</td> <td>A1</td> <td>2005-10-27</td> <td>[US20050237258]</td> </tr> <tr> <td>IL164255</td> <td>A</td> <td>2005-12-18</td> <td>[IL-164255]</td> </tr> <tr> <td>US7215296</td> <td>B2</td> <td>2007-05-08</td> <td>[US7215296]</td> </tr> <tr> <td>US2007103377</td> <td>A1</td> <td>2007-05-10</td> <td>[US20070103377]</td> </tr> </tbody> </table> </li> </ul>		WO03081718	A1	2003-10-02	[WO200381718]	CA2494982	A1	2003-10-02	[CA2494982]	AU2003227399	A1	2003-10-08	[AU2003227399]	RU2231874	C2	2004-06-27	[RU2231874]	WO03081718	A9	2004-11-18	[WO200381718]	EP1517398	A1	2005-03-23	[EP1517398]	JP2005521314	A	2005-07-14	[JP2005521314]	CN1656646	A	2005-08-17	[CN1656646]	EP1517398	A4	2005-09-21	[EP1517398]	US2005237258	A1	2005-10-27	[US20050237258]	IL164255	A	2005-12-18	[IL-164255]	US7215296	B2	2007-05-08	[US7215296]	US2007103377	A1	2007-05-10	[US20070103377]
WO03081718	A1	2003-10-02	[WO200381718]																																																		
CA2494982	A1	2003-10-02	[CA2494982]																																																		
AU2003227399	A1	2003-10-08	[AU2003227399]																																																		
RU2231874	C2	2004-06-27	[RU2231874]																																																		
WO03081718	A9	2004-11-18	[WO200381718]																																																		
EP1517398	A1	2005-03-23	[EP1517398]																																																		
JP2005521314	A	2005-07-14	[JP2005521314]																																																		
CN1656646	A	2005-08-17	[CN1656646]																																																		
EP1517398	A4	2005-09-21	[EP1517398]																																																		
US2005237258	A1	2005-10-27	[US20050237258]																																																		
IL164255	A	2005-12-18	[IL-164255]																																																		
US7215296	B2	2007-05-08	[US7215296]																																																		
US2007103377	A1	2007-05-10	[US20070103377]																																																		

- **Abstract:**

(EP1517398)

The invention is related to antenna systems and transceiving equipment for network portable computers. The antenna system comprises a flat substrate (2), carrying at least two directional flat antennas oriented in a fan-like fashion (3), and a commutation switch (6) to control the directional pattern of the antenna system. The commutation switch is made so as to make it possible to switch on to one or two or more antennas simultaneously. The transceiving device comprises the antenna system (1), a reception/transmission switch (12), a transmitter (14), a receiver (16), an antenna system operation control unit (18) to control the operation of the antenna system in omnidirectional mode, directional scanning mode or stationary directional mode, and a controller (17). It can also be supplemented with a signal quality evaluation unit (20) and a signal identification unit (21). The network portable computer incorporates the transceiving device, the antenna system for



which is fixed to the computer case by a hinge. <IMAGE>

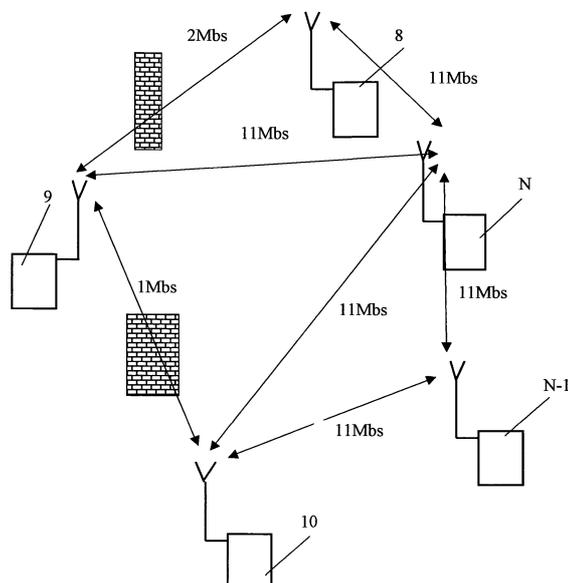
## Information transmission method for a wireless local network WO200339028

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN Obshchestvo s ogranichennoj otvetstvenost'ju "Algoritm"</li> <li>• <b>Inventor</b> KHITRIK SEMEN ALEKSANDROVICH KIRDIN ALEKSANDR NIKOLAEVICH SUKHARNIKOV JURY PAVLOVICH</li> <li>• <b>International Patent Classification</b> H04B-007/00 H04L-012/28 H04L-012/56 H04W-008/22 H04W-024/00 H04W-040/12 H04W-040/24 H04W-040/30 H04W-084/12 H04W-092/18</li> <li>• <b>US Patent Classification</b> PCLO=455452200 PCLO=455452200 PCLX=455001000 PCLX=455009000 PCLX=455015000 PCLX=455041200 PCLX=455065000 PCLX=455067110 PCLX=455067130 PCLX=455067140 PCLX=455067160 PCLX=455432300 PCLX=455435300 PCLX=455447000 PCLX=455450000 PCLX=455451000 PCLX=455452100 PCLX=455453000 PCLX=455454000 PCLX=455456600 PCLX=455525000</li> <li>• <b>CPC Code</b> H04L-012/28; H04W-008/22; H04W-024/00; H04W-040/12; H04W-040/24/8; H04W-040/30; H04W-084/12; H04W-092/18</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO03039028 A1 2003-05-08 [WO200339028]</li> <li>• <b>Priority Details</b> 2001RU-0130431 2001-11-01 2002WO-RU00490 2002-10-31 2004US-10494103 2004-09-02 2006US-11371537 2006-03-08</li> </ul>																																
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 30%;">WO03039028</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2003-05-08</td> <td style="width: 40%;">[WO200339028]</td> </tr> <tr> <td>RU2221335</td> <td>C2</td> <td>2004-01-10</td> <td>[RU2221335]</td> </tr> <tr> <td>EP1447921</td> <td>A1</td> <td>2004-08-18</td> <td>[EP1447921]</td> </tr> <tr> <td>US2005003826</td> <td>A1</td> <td>2005-01-06</td> <td>[US20050003826]</td> </tr> <tr> <td>US7043252</td> <td>B2</td> <td>2006-05-09</td> <td>[US7043252]</td> </tr> <tr> <td>US2006154673</td> <td>A1</td> <td>2006-07-13</td> <td>[US20060154673]</td> </tr> <tr> <td>US7336959</td> <td>B2</td> <td>2008-02-26</td> <td>[US7336959]</td> </tr> <tr> <td>EP1447921</td> <td>A4</td> <td>2010-06-09</td> <td>[EP1447921]</td> </tr> </table> </li> </ul>		WO03039028	A1	2003-05-08	[WO200339028]	RU2221335	C2	2004-01-10	[RU2221335]	EP1447921	A1	2004-08-18	[EP1447921]	US2005003826	A1	2005-01-06	[US20050003826]	US7043252	B2	2006-05-09	[US7043252]	US2006154673	A1	2006-07-13	[US20060154673]	US7336959	B2	2008-02-26	[US7336959]	EP1447921	A4	2010-06-09	[EP1447921]
WO03039028	A1	2003-05-08	[WO200339028]																														
RU2221335	C2	2004-01-10	[RU2221335]																														
EP1447921	A1	2004-08-18	[EP1447921]																														
US2005003826	A1	2005-01-06	[US20050003826]																														
US7043252	B2	2006-05-09	[US7043252]																														
US2006154673	A1	2006-07-13	[US20060154673]																														
US7336959	B2	2008-02-26	[US7336959]																														
EP1447921	A4	2010-06-09	[EP1447921]																														

- **Abstract:**

(EP1447921)

Method for data transmission in a wireless local area network refers to wireless local area networks (WLAN) consisting of a multitude of transceivers capable of establishing communication with one another (i.e. operating in a peer-to-peer mode). Implies the determination of the quality of communication between all transceivers and storage of communication quality data by each of the transceivers. Based on stored data on communication quality, a transceiver operating in the transmission mode transmits information to an addressee by a transmission route that provides for the quality of communication, which is equal to or better than a specified threshold value of communication quality. Stored data are updated periodically. The method improves the quality and reliability of communication for WLAN users (including mobile users) thus increasing the data transmission rate. <IMAGE>





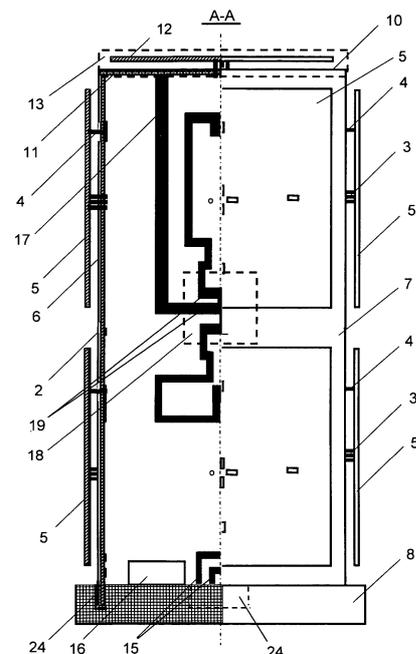
## Steerable-beam antenna device and a planar directional antenna WO200451798

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM</li> <li>• <b>Inventor</b> ABRAMOV OLEG JURIEVICH KASHKAROV ALEKSANDR GERMANOVIC NAGAEV FARID IBRAGIMOVICH</li> <li>• <b>International Patent Classification</b> H01Q-001/12 H01Q-001/24 H01Q-001/36 H01Q-001/38 H01Q-003/24 H01Q-009/04 H01Q-019/10 H01Q-021/20</li> <li>• <b>US Patent Classification</b> PCLO=343878000 PCLO=343700000MS PCLX=343700000MS PCLX=343876000 PCLX=343893000</li> <li>• <b>CPC Code</b> H01Q-003/24/2; H01Q-009/04/07 H01Q-021/20/5;</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO2004051798 A1 2004-06-17 [WO200451798]</li> <li>• <b>Priority Details</b> 2002RU-0132846 2002-12-02 2003WO-RU00542 2003-12-02 2007US-12536547 2007-01-22 2009US-12498635 2009-07-07</li> </ul>																																
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">WO2004051798</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2004-06-17</td> <td style="width: 40%;">[WO200451798]</td> </tr> <tr> <td>AU2003296032</td> <td>A1</td> <td>2004-06-23</td> <td>[AU2003296032]</td> </tr> <tr> <td>RU2233017</td> <td>C1</td> <td>2004-07-20</td> <td>[RU2233017]</td> </tr> <tr> <td>EP1598900</td> <td>A1</td> <td>2005-11-23</td> <td>[EP1598900]</td> </tr> <tr> <td>US2007103378</td> <td>A1</td> <td>2007-05-10</td> <td>[US20070103378]</td> </tr> <tr> <td>EP1598900</td> <td>A4</td> <td>2008-05-21</td> <td>[EP1598900]</td> </tr> <tr> <td>US7570215</td> <td>B2</td> <td>2009-08-04</td> <td>[US7570215]</td> </tr> <tr> <td>US2009267861</td> <td>A1</td> <td>2009-10-29</td> <td>[US20090267861]</td> </tr> </table> </li> </ul>		WO2004051798	A1	2004-06-17	[WO200451798]	AU2003296032	A1	2004-06-23	[AU2003296032]	RU2233017	C1	2004-07-20	[RU2233017]	EP1598900	A1	2005-11-23	[EP1598900]	US2007103378	A1	2007-05-10	[US20070103378]	EP1598900	A4	2008-05-21	[EP1598900]	US7570215	B2	2009-08-04	[US7570215]	US2009267861	A1	2009-10-29	[US20090267861]
WO2004051798	A1	2004-06-17	[WO200451798]																														
AU2003296032	A1	2004-06-23	[AU2003296032]																														
RU2233017	C1	2004-07-20	[RU2233017]																														
EP1598900	A1	2005-11-23	[EP1598900]																														
US2007103378	A1	2007-05-10	[US20070103378]																														
EP1598900	A4	2008-05-21	[EP1598900]																														
US7570215	B2	2009-08-04	[US7570215]																														
US2009267861	A1	2009-10-29	[US20090267861]																														

- **Abstract:**

(EP1598900)

The invention relates to antenna systems used in local wireless communications networks. The antenna system includes planar directional antennas (1), each of which is made as a dielectric plate (2), with an active element (5) of the antenna (1) mounted on the said plate. The surface of the plate (2) that faces the active element is metallized and serves as a reflector (6) of the antenna (1). The plates (2) are interconnected along their edges in such a way as to form lateral facets of a hollow frame (9) of the antenna system. The end face (10) is made as a dielectric plate (11) with the external surface metallized and can also comprise an active element (12) of the antenna (13). An antenna switch (14) connected to a switch control unit (16) and to active elements (5) of the antennas (1) is mounted on the inner surface of the end face (10) of the frame (9). Active element (5) is mounted on said plate by means of pins cut in the body of the active element (5) and bent during mounting. This invention permits to manufacture structurally simple and inexpensive antennas and antenna systems based on printed circuits and to exclude manual operations from the manufacturing and assembly of said antennas and antenna systems. <IMAGE>

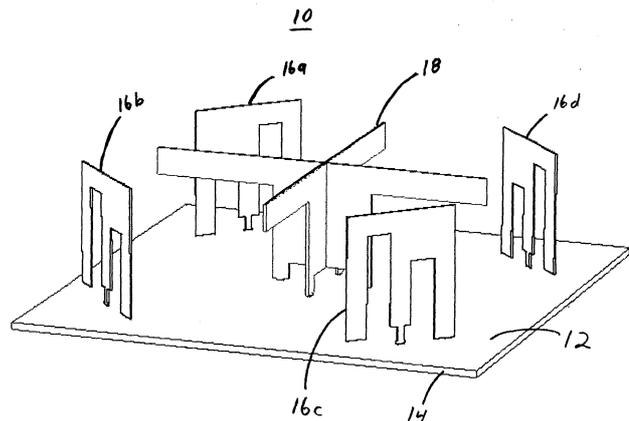


## Switched multi-beam antenna WO2005114789

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> ABRAMOV OLEG J ROBISON DAVID B SHAMBLIN JEFFREY NAGAEV FARID I VISURI PERTTI</li> <li>• <b>International Patent Classification</b> H01Q H01Q-001/38 H01Q-003/08 H01Q-003/24 H01Q-009/24 H01Q-009/32 H01Q-009/42 H01Q-019/10 H01Q-021/28 H01Q-021/29</li> <li>• <b>CPC Code</b> H01Q-003/24/2; H01Q-003/24; H01Q-009/32; H01Q-009/42; H01Q-019/10 H01Q-019/10/6;</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO2005114789 A2 2005-12-01 [WO2005114789]</li> <li>• <b>Priority Details</b> 2004US-60562097 2004-04-12 2005US-11104291 2005-04-12 2005WO-US12333 2005-04-12</li> </ul>																																												
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">WO2005114789</td> <td style="width: 10%;">A2</td> <td style="width: 20%;">2005-12-01</td> <td style="width: 40%;">[WO2005114789]</td> </tr> <tr> <td>CA2562479</td> <td>A1</td> <td>2005-12-01</td> <td>[CA2562479]</td> </tr> <tr> <td>AU2005246674</td> <td>A1</td> <td>2005-12-01</td> <td>[AU2005246674]</td> </tr> <tr> <td>TW200603485</td> <td>A</td> <td>2006-01-16</td> <td>[TW200603485]</td> </tr> <tr> <td>WO2005114789</td> <td>A3</td> <td>2006-11-02</td> <td>[WO2005114789]</td> </tr> <tr> <td>IL178540</td> <td>A</td> <td>2007-02-11</td> <td>[IL-178540]</td> </tr> <tr> <td>EP1756914</td> <td>A2</td> <td>2007-02-28</td> <td>[EP1756914]</td> </tr> <tr> <td>CN1957506</td> <td>A</td> <td>2007-05-02</td> <td>[CN1957506]</td> </tr> <tr> <td>IN2904/KOLNP/2006</td> <td>A</td> <td>2007-06-08</td> <td>[IN2006KN02904]</td> </tr> <tr> <td>EP1756914</td> <td>A4</td> <td>2008-04-02</td> <td>[EP1756914]</td> </tr> <tr> <td>CN1957506</td> <td>B</td> <td>2014-04-02</td> <td>[CN1957506B]</td> </tr> </table> </li> </ul>		WO2005114789	A2	2005-12-01	[WO2005114789]	CA2562479	A1	2005-12-01	[CA2562479]	AU2005246674	A1	2005-12-01	[AU2005246674]	TW200603485	A	2006-01-16	[TW200603485]	WO2005114789	A3	2006-11-02	[WO2005114789]	IL178540	A	2007-02-11	[IL-178540]	EP1756914	A2	2007-02-28	[EP1756914]	CN1957506	A	2007-05-02	[CN1957506]	IN2904/KOLNP/2006	A	2007-06-08	[IN2006KN02904]	EP1756914	A4	2008-04-02	[EP1756914]	CN1957506	B	2014-04-02	[CN1957506B]
WO2005114789	A2	2005-12-01	[WO2005114789]																																										
CA2562479	A1	2005-12-01	[CA2562479]																																										
AU2005246674	A1	2005-12-01	[AU2005246674]																																										
TW200603485	A	2006-01-16	[TW200603485]																																										
WO2005114789	A3	2006-11-02	[WO2005114789]																																										
IL178540	A	2007-02-11	[IL-178540]																																										
EP1756914	A2	2007-02-28	[EP1756914]																																										
CN1957506	A	2007-05-02	[CN1957506]																																										
IN2904/KOLNP/2006	A	2007-06-08	[IN2006KN02904]																																										
EP1756914	A4	2008-04-02	[EP1756914]																																										
CN1957506	B	2014-04-02	[CN1957506B]																																										

- **Abstract:**  
(EP1756914)

An antenna assembly includes a common reflector and multiple monopole type antenna elements positioned on a ground plane and fed with a switch assembly. The switch assembly is capable of feeding individual antennas as well as combining multiple antennas for improved radiation pattern coverage. Multiple antenna elements are placed around the common reflector to cover sectors of space around the antenna assembly to provide transmission and reception of radio frequency (RF) signals for mobile communication devices in a wireless network. The ground plane can be grounded or capacitively coupled to an existing circuit board or metal surface, allowing for reduced ground plane dimensions. (From US7215296 B2)







# Radio communication method for a wireless local network and a transceiving device

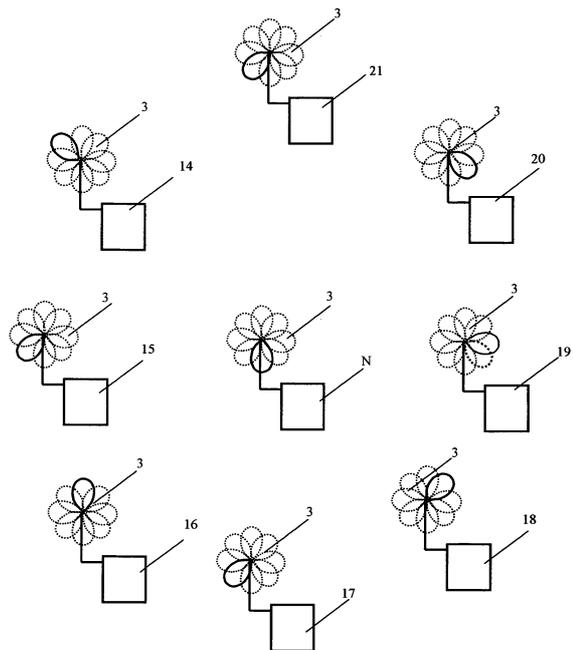
## WO200339027

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM</li> <li>• <b>Inventor</b> ABRAMOV OLEG JURIEVICH KIRDIN ALEKSANDR NIKOLAEVICH SUKHARNIKOV JURY PAVLOVICH</li> <li>• <b>International Patent Classification</b> H01Q-001/24 H01Q-003/24 H01Q-003/26 H01Q-021/20 H01Q-025/00 H04B-001/00 H04B-007/00 H04B-007/06 H04L-012/28 H04L-012/56</li> <li>• <b>US Patent Classification</b> PCLO=455562100 PCLX=370330000 PCLX=370350000</li> <li>• <b>CPC Code</b> H01Q-001/24/6; H01Q-003/24/2; H01Q-003/26/7; H01Q-021/20/5; H01Q-025/00/2; H04B-007/06/02; H04W-016/28; H04W-024/00; H04W-084/12</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO03039027 A1 2003-05-08 [WO200339027]</li> <li>• <b>Priority Details</b> 2001RU-0130430 2001-11-01 2002WO-RU00489 2002-10-31</li> </ul>																								
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">WO03039027</td> <td style="width: 33%;">A1</td> <td style="width: 33%;">2003-05-08</td> <td style="width: 33%;">[WO200339027]</td> </tr> <tr> <td>RU2221334</td> <td>C2</td> <td>2004-01-10</td> <td>[RU2221334]</td> </tr> <tr> <td>EP1447920</td> <td>A1</td> <td>2004-08-18</td> <td>[EP1447920]</td> </tr> <tr> <td>EP1447920</td> <td>A4</td> <td>2010-11-17</td> <td>[EP1447920]</td> </tr> <tr> <td>US2011096757</td> <td>A1</td> <td>2011-04-28</td> <td>[US20110096757]</td> </tr> <tr> <td>US8423084</td> <td>B2</td> <td>2013-04-16</td> <td>[US8423084]</td> </tr> </table> </li> </ul>		WO03039027	A1	2003-05-08	[WO200339027]	RU2221334	C2	2004-01-10	[RU2221334]	EP1447920	A1	2004-08-18	[EP1447920]	EP1447920	A4	2010-11-17	[EP1447920]	US2011096757	A1	2011-04-28	[US20110096757]	US8423084	B2	2013-04-16	[US8423084]
WO03039027	A1	2003-05-08	[WO200339027]																						
RU2221334	C2	2004-01-10	[RU2221334]																						
EP1447920	A1	2004-08-18	[EP1447920]																						
EP1447920	A4	2010-11-17	[EP1447920]																						
US2011096757	A1	2011-04-28	[US20110096757]																						
US8423084	B2	2013-04-16	[US8423084]																						

- **Abstract:**

(EP1447920)

Method for radio communication in a wireless local area network and transceiving device refers to wireless local area networks (WLAN) consisting of a multitude of transceiving devices of users (14, 15, 16...N). Implies simultaneous scanning by their antenna beams in different directions by transceiving devices (with said transceiving devices being in reception mode) and transmission of an omnidirectional signal in the form of calibration signal and data package by one of the transceiving devices of said network (with said transceiving device being in transmission mode), reception of the signal by transceiving devices operating in reception mode and subsequent orientation of their antenna beams in the direction of signal source. Said recognition and orientation is performed during the period of reception of said calibration signal. The method increases the range of a WLAN, reduces the transmission time and improves quality and reliability of communication. Each transceiving device (1) includes at least one directional antenna (3) featuring a controllable directional pattern, switched-over by unit (4), reception/transmission mode switch (5), receiver (8), transmitter (10) and controller (11). Additionally a unit for signal detection (13) is incorporated in the device.



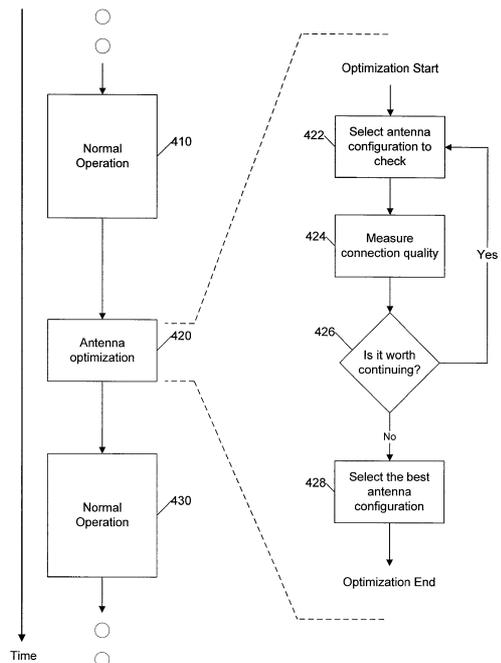
## Optimized directional mimo antenna system WO200877113

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> ABRAMOV OLEG Y VISURI PERTTI SALO RANDY YANG XIAO PING</li> <li>• <b>International Patent Classification</b> H04B-007/04 H04B-007/06 H04B-007/08 H04B-007/10 H04J-099/00 H04L-012/16 H04M-001/00</li> <li>• <b>US Patent Classification</b> PCLO=370260000 PCLX=455562100</li> <li>• <b>CPC Code</b> H04B-007/04/52; H04B-007/06/17; H04B-007/06/89; H04B-007/06/97; H04B-007/08/14; H04B-007/08/42; H04B-007/08/71</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO2008077113 A1 2008-06-26 [WO200877113]</li> <li>• <b>Priority Details</b> 2006US-60870818 2006-12-19 2007US-11960370 2007-12-19 2007WO-US88183 2007-12-19</li> </ul>																																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">WO2008077113</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2008-06-26</td> <td style="width: 40%;">[WO200877113]</td> </tr> <tr> <td>US2008152030</td> <td>A1</td> <td>2008-06-26</td> <td>[US20080152030]</td> </tr> <tr> <td>EP2095538</td> <td>A1</td> <td>2009-09-02</td> <td>[EP2095538]</td> </tr> <tr> <td>CN101595654</td> <td>A</td> <td>2009-12-02</td> <td>[CN101595654]</td> </tr> <tr> <td>JP2010514383</td> <td>A</td> <td>2010-04-30</td> <td>[JP2010514383]</td> </tr> <tr> <td>US8248970</td> <td>B2</td> <td>2012-08-21</td> <td>[US8248970]</td> </tr> <tr> <td>EP2095538</td> <td>A4</td> <td>2013-01-23</td> <td>[EP2095538]</td> </tr> <tr> <td>JP5461997</td> <td>B2</td> <td>2014-04-02</td> <td>[JP5461997]</td> </tr> <tr> <td>CN101595654</td> <td>B</td> <td>2014-05-07</td> <td>[CN101595654B]</td> </tr> </table> </li> </ul>		WO2008077113	A1	2008-06-26	[WO200877113]	US2008152030	A1	2008-06-26	[US20080152030]	EP2095538	A1	2009-09-02	[EP2095538]	CN101595654	A	2009-12-02	[CN101595654]	JP2010514383	A	2010-04-30	[JP2010514383]	US8248970	B2	2012-08-21	[US8248970]	EP2095538	A4	2013-01-23	[EP2095538]	JP5461997	B2	2014-04-02	[JP5461997]	CN101595654	B	2014-05-07	[CN101595654B]
WO2008077113	A1	2008-06-26	[WO200877113]																																		
US2008152030	A1	2008-06-26	[US20080152030]																																		
EP2095538	A1	2009-09-02	[EP2095538]																																		
CN101595654	A	2009-12-02	[CN101595654]																																		
JP2010514383	A	2010-04-30	[JP2010514383]																																		
US8248970	B2	2012-08-21	[US8248970]																																		
EP2095538	A4	2013-01-23	[EP2095538]																																		
JP5461997	B2	2014-04-02	[JP5461997]																																		
CN101595654	B	2014-05-07	[CN101595654B]																																		

• **Abstract:**

(EP2095538)

A wireless communication device with a plurality of radios and a plurality of configurable antenna systems. Determining a plurality of transmit and receive signal quality metrics for connections between the wireless communication device and a plurality of stations for a plurality of radios and configurable antenna systems in a plurality of configurations. Determining a connection matrix that includes the transmit and receive signal quality. Selecting antenna configurations for the configurable antennas using the connection matrix. (From US8248970 B2)



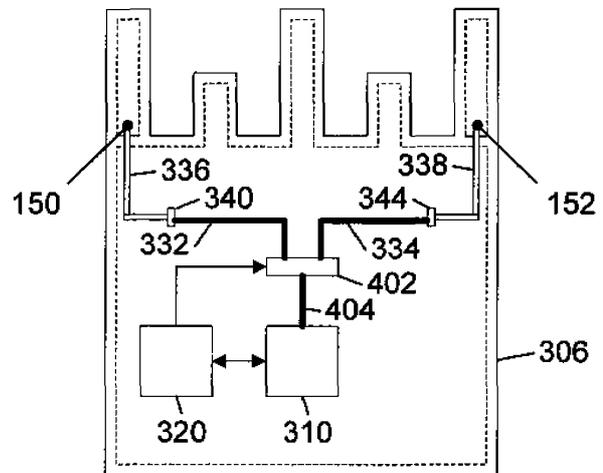
## Dual band antenna WO200790062

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> ABRAMOV OLEG J NAGAEV FARID I SALO RANDY</li> <li>• <b>International Patent Classification</b> H01Q-001/24 H01Q-003/00 H01Q-005/01</li> <li>• <b>US Patent Classification</b> PCLO=343702000 PCLX=343700000MS</li> <li>• <b>CPC Code</b> H01Q-001/52/1; H01Q-005/357; H01Q-009/40; H01Q-021/28</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO2007090062 A2 2007-08-09 [WO200790062]</li> <li>• <b>Priority Details</b> 2006US-60762644 2006-01-27 2007US-11627796 2007-01-26</li> </ul>																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">WO2007090062</td> <td style="width: 33%;">A2</td> <td style="width: 33%;">2007-08-09</td> <td style="width: 33%;">[WO200790062]</td> </tr> <tr> <td>TW200737597</td> <td>A</td> <td>2007-10-01</td> <td>[TW200737597]</td> </tr> <tr> <td>WO2007090062</td> <td>A3</td> <td>2008-02-07</td> <td>[WO200790062]</td> </tr> <tr> <td>US2010328163</td> <td>A1</td> <td>2010-12-30</td> <td>[US20100328163]</td> </tr> <tr> <td>US7965242</td> <td>B2</td> <td>2011-06-21</td> <td>[US7965242]</td> </tr> </table> </li> </ul>		WO2007090062	A2	2007-08-09	[WO200790062]	TW200737597	A	2007-10-01	[TW200737597]	WO2007090062	A3	2008-02-07	[WO200790062]	US2010328163	A1	2010-12-30	[US20100328163]	US7965242	B2	2011-06-21	[US7965242]
WO2007090062	A2	2007-08-09	[WO200790062]																		
TW200737597	A	2007-10-01	[TW200737597]																		
WO2007090062	A3	2008-02-07	[WO200790062]																		
US2010328163	A1	2010-12-30	[US20100328163]																		
US7965242	B2	2011-06-21	[US7965242]																		

- **Abstract:**

(WO200790062)

Systems and methods for a dual-band antenna and methods for manufacturing the same are described. One system and method includes a plurality of antenna elements. Groups of the antenna elements cooperate to form directional antennas at various frequencies. Using an active element, configurable at different frequencies and reflectors tuned to different frequencies, directed transmission or direction of positive gain for the antenna system is achieved. The system can be used for various wireless communication protocols and at various frequency ranges.



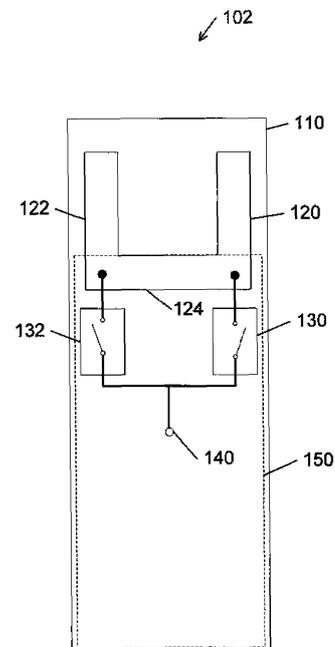
## U-antenna US20070176836

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> ABRAMOV OLEG J NAGAEV FARID I SALO RANDY</li> <li>• <b>International Patent Classification</b> H01Q-001/22 H01Q-001/24 H01Q-001/38 H01Q-003/24 H01Q-021/00 H01Q-021/12</li> <li>• <b>US Patent Classification</b> PCLO=343876000 PCLX=34370000MS PCLX=343702000 PCLX=343853000</li> <li>• <b>CPC Code</b> H01Q-001/22/91; H01Q-001/24; H01Q-001/38; H01Q-003/24; H01Q-009/30; H01Q-025/00; H04B-007/06/02</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> US2007176836 A1 2007-08-02 [US20070176836]</li> <li>• <b>Priority Details</b> 2006US-60763096 2006-01-27 2007US-11627826 2007-01-26</li> </ul>																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 30%;">US2007176836</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2007-08-02</td> <td style="width: 40%;">[US20070176836]</td> </tr> <tr> <td>WO2007090065</td> <td>A2</td> <td>2007-08-09</td> <td>[WO200790065]</td> </tr> <tr> <td>TW200737592</td> <td>A</td> <td>2007-10-01</td> <td>[TW200737592]</td> </tr> <tr> <td>WO2007090065</td> <td>A3</td> <td>2009-04-16</td> <td>[WO200790065]</td> </tr> <tr> <td>US7696948</td> <td>B2</td> <td>2010-04-13</td> <td>[US7696948]</td> </tr> </table> </li> </ul>		US2007176836	A1	2007-08-02	[US20070176836]	WO2007090065	A2	2007-08-09	[WO200790065]	TW200737592	A	2007-10-01	[TW200737592]	WO2007090065	A3	2009-04-16	[WO200790065]	US7696948	B2	2010-04-13	[US7696948]
US2007176836	A1	2007-08-02	[US20070176836]																		
WO2007090065	A2	2007-08-09	[WO200790065]																		
TW200737592	A	2007-10-01	[TW200737592]																		
WO2007090065	A3	2009-04-16	[WO200790065]																		
US7696948	B2	2010-04-13	[US7696948]																		

- **Abstract:**

(WO200790065)

Systems and methods for a directional antenna and methods for manufacturing the same are described. One system and method includes a plurality of antenna elements. Groups of the antenna elements cooperate to form a directional antennas. In one configuration, a first element is configured as a driven element and a second element is configured as a delayed element. The elements are separated by a distance such that an RF signal radiated from the driven element constructively combines with a delayed RF signal radiated by the delay element. In another configuration, the second element can be configured as the driven element and the first element configured as the delayed element.



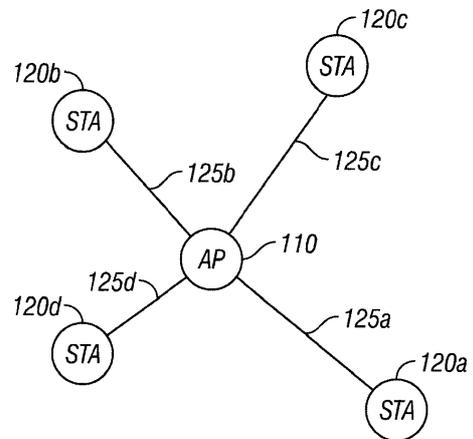
## Optimized directional antenna system US20070042715

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> SALO RANDY W MOORE BRYAN G CLARK RICHARD H ABRAMOV OLEG Y KIRDIN ALEXANDER N BUROV LEV G VISURI PERTTI</li> <li>• <b>International Patent Classification</b> H01Q-021/00 H04B-001/10 H04B-007/06 H04B-015/00 H04B-017/00 H04M-001/00 H04W-016/28 H04W-028/18</li> <li>• <b>US Patent Classification</b> PCLO=455063400 PCLO=455562100 PCLX=455025000 PCLX=455063400 PCLX=455575700</li> <li>• <b>CPC Code</b> H04B-001/10/27; H04B-001/10/81; H04B-007/06/32; H04B-017/309; H04W-016/28; H04W-024/02; H04W-028/18; H04W-088/08</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> US2007042715 A1 2007-02-22 [US20070042715]</li> <li>• <b>Priority Details</b> 2005US-11209358 2005-08-22 2006WO-US32652 2006-08-21 2011US-13014421 2011-01-26</li> </ul>																																								
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">US2007042715</td> <td style="width: 10%;">A1</td> <td style="width: 20%;">2007-02-22</td> <td style="width: 40%;">[US20070042715]</td> </tr> <tr> <td>WO2007024805</td> <td>A2</td> <td>2007-03-01</td> <td>[WO200724805]</td> </tr> <tr> <td>TW200715651</td> <td>A</td> <td>2007-04-16</td> <td>[TW200715651]</td> </tr> <tr> <td>WO2007024805</td> <td>A3</td> <td>2008-02-07</td> <td>[WO200724805]</td> </tr> <tr> <td>EP1917816</td> <td>A2</td> <td>2008-05-07</td> <td>[EP1917816]</td> </tr> <tr> <td>CN101243703</td> <td>A</td> <td>2008-08-13</td> <td>[CN101243703]</td> </tr> <tr> <td>US7907971</td> <td>B2</td> <td>2011-03-15</td> <td>[US7907971]</td> </tr> <tr> <td>US2011117855</td> <td>A1</td> <td>2011-05-19</td> <td>[US20110117855]</td> </tr> <tr> <td>CN101243703</td> <td>B</td> <td>2012-02-15</td> <td>[CN101243703B]</td> </tr> <tr> <td>EP1917816</td> <td>A4</td> <td>2013-05-01</td> <td>[EP1917816]</td> </tr> </table> </li> </ul>		US2007042715	A1	2007-02-22	[US20070042715]	WO2007024805	A2	2007-03-01	[WO200724805]	TW200715651	A	2007-04-16	[TW200715651]	WO2007024805	A3	2008-02-07	[WO200724805]	EP1917816	A2	2008-05-07	[EP1917816]	CN101243703	A	2008-08-13	[CN101243703]	US7907971	B2	2011-03-15	[US7907971]	US2011117855	A1	2011-05-19	[US20110117855]	CN101243703	B	2012-02-15	[CN101243703B]	EP1917816	A4	2013-05-01	[EP1917816]
US2007042715	A1	2007-02-22	[US20070042715]																																						
WO2007024805	A2	2007-03-01	[WO200724805]																																						
TW200715651	A	2007-04-16	[TW200715651]																																						
WO2007024805	A3	2008-02-07	[WO200724805]																																						
EP1917816	A2	2008-05-07	[EP1917816]																																						
CN101243703	A	2008-08-13	[CN101243703]																																						
US7907971	B2	2011-03-15	[US7907971]																																						
US2011117855	A1	2011-05-19	[US20110117855]																																						
CN101243703	B	2012-02-15	[CN101243703B]																																						
EP1917816	A4	2013-05-01	[EP1917816]																																						

• **Abstract:**

(EP1917816)

A method of operating a wireless access point having a configurable antenna system includes determining a transmission signal quality metric for a first station with the configurable antenna system in a first configuration, determining a transmission signal quality metric for a second station with the configurable antenna system in the first configuration, determining a transmission signal quality metric for a first station with the configurable antenna system in a second configuration, determining a transmission signal quality metric for a second station with the configurable antenna system in the second configuration, determining a viable set of antenna configurations for which the signal quality metric of each of the stations meets a minimum criteria and configuring the configurable antenna system to a configuration in the viable set when the wireless access point is not transmitting. (From US2015004916 A1)



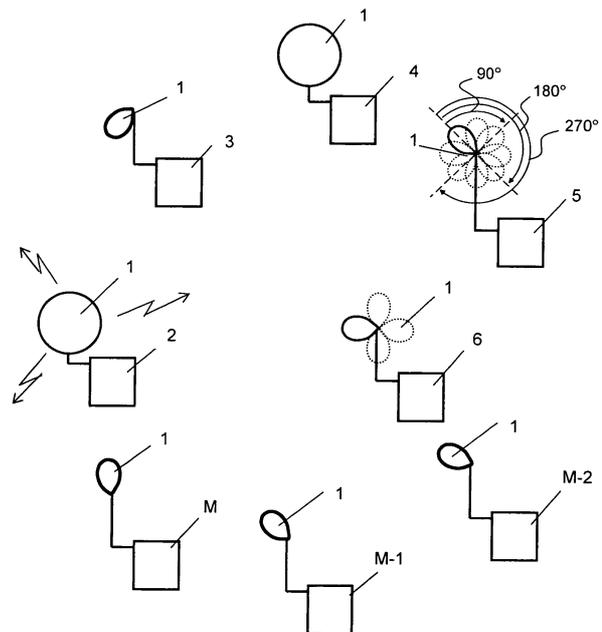
## Radio communications method in a wireless local network WO200541440

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN OBSHCHESTVO S OGRANICHENNOJ OTVETSTVENNOST JU ALGORITM</li> <li>• <b>Inventor</b> ABRAMOV OLEG JURIEVICH BUROV LEV GRIGORIEVICH KIRDIN ALEKSANDR NIKOLAEVICH</li> <li>• <b>International Patent Classification</b> H01Q-003/24 H04B-001/00 H04B-007/00 H04B-007/02 H04B-007/04 H04B-007/06 H04B-015/00</li> <li>• <b>US Patent Classification</b> PCLO=455063400 PCLX=370333000 PCLX=370334000 PCLX=455277100 PCLX=455277200</li> <li>• <b>CPC Code</b> H04B-007/04/08; H04B-007/06/17; H04W-016/28</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> WO2005041440 A1 2005-05-06 [WO200541440]</li> <li>• <b>Priority Details</b> 2003RU-0132289 2003-10-27 2004WO-RU00436 2004-10-27</li> </ul>																																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">WO2005041440</td> <td style="width: 33%;">A1</td> <td style="width: 33%;">2005-05-06</td> <td style="width: 33%;">[WO200541440]</td> </tr> <tr> <td>RU2254682</td> <td>C1</td> <td>2005-06-20</td> <td>[RU2254682]</td> </tr> <tr> <td>EP1679805</td> <td>A1</td> <td>2006-07-12</td> <td>[EP1679805]</td> </tr> <tr> <td>CN1875555</td> <td>A</td> <td>2006-12-06</td> <td>[CN1875555]</td> </tr> <tr> <td>US2007021069</td> <td>A1</td> <td>2007-01-25</td> <td>[US20070021069]</td> </tr> <tr> <td>US7729662</td> <td>B2</td> <td>2010-06-01</td> <td>[US7729662]</td> </tr> <tr> <td>CN1875555</td> <td>B</td> <td>2010-06-16</td> <td>[CN1875555B]</td> </tr> <tr> <td>EP1679805</td> <td>A4</td> <td>2012-01-04</td> <td>[EP1679805]</td> </tr> <tr> <td>EP1679805</td> <td>B1</td> <td>2012-11-21</td> <td>[EP1679805]</td> </tr> </table> </li> </ul>		WO2005041440	A1	2005-05-06	[WO200541440]	RU2254682	C1	2005-06-20	[RU2254682]	EP1679805	A1	2006-07-12	[EP1679805]	CN1875555	A	2006-12-06	[CN1875555]	US2007021069	A1	2007-01-25	[US20070021069]	US7729662	B2	2010-06-01	[US7729662]	CN1875555	B	2010-06-16	[CN1875555B]	EP1679805	A4	2012-01-04	[EP1679805]	EP1679805	B1	2012-11-21	[EP1679805]
WO2005041440	A1	2005-05-06	[WO200541440]																																		
RU2254682	C1	2005-06-20	[RU2254682]																																		
EP1679805	A1	2006-07-12	[EP1679805]																																		
CN1875555	A	2006-12-06	[CN1875555]																																		
US2007021069	A1	2007-01-25	[US20070021069]																																		
US7729662	B2	2010-06-01	[US7729662]																																		
CN1875555	B	2010-06-16	[CN1875555B]																																		
EP1679805	A4	2012-01-04	[EP1679805]																																		
EP1679805	B1	2012-11-21	[EP1679805]																																		

- **Abstract:**

(WO200541440)

The invention relates to a radio communications method in a wireless local network provided with at least one transmitting-receiving device comprising a variable beam antenna consisting, in addition to pre-setting a communication quality threshold value  $H_0$  corresponding to a specified minimum communication quality, in periodically determining a current communication quality value  $Q_{cur}$  and also in pre-setting a communication quality threshold value  $H_{max}$  corresponding to a specified maximum communication quality. When the current communication quality value  $Q_{cur}$  is equal to or greater than the maximum communication quality threshold value  $H_{max}$ , an information interchange is carried out and when the current communication quality value  $Q_{cur}$  is less than the maximum communication quality threshold value  $H_{max}$  but equal to or greater than the communication quality threshold value  $H_0$ , the information interchange is carried out and the process of optimisation of antenna beam direction is carried out in a specified time interval  $T$ .



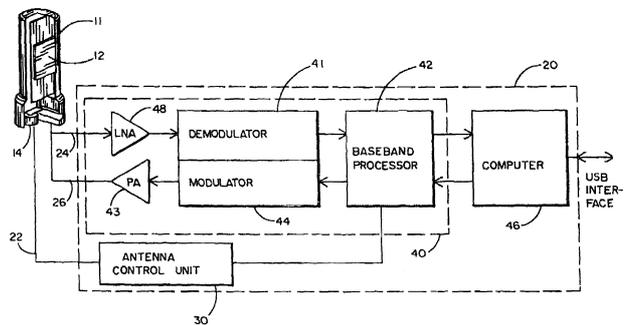
## Dynamically optimized smart antenna system US20060292991

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> ABRAMOV OLEG Y KASHKAROV ALEXANDER G KIRDIN ALEXANDER N</li> <li>• <b>International Patent Classification</b> H01Q-003/00 H04B-001/38 H04B-001/40 H04M-001/00</li> <li>• <b>US Patent Classification</b> PCLO=455562100 PCLO=455277100 PCLX=342368000 PCLX=342383000 PCLX=455272000 PCLX=455277100</li> <li>• <b>CPC Code</b> H01Q-003/04; H01Q-003/24; H01Q-009/04/07</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> US2006292991 A1 2006-12-28 [US20060292991]</li> <li>• <b>Priority Details</b> 2000US-09709758 2000-11-10 2006US-11468610 2006-08-30</li> </ul>												
<ul style="list-style-type: none"> <li>• <b>Fampat family</b></li> </ul> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">US2006292991</td> <td style="width: 15%;">A1</td> <td style="width: 15%;">2006-12-28</td> <td style="width: 40%;">[US20060292991]</td> </tr> <tr> <td>US7162273</td> <td>B1</td> <td>2007-01-09</td> <td>[US7162273]</td> </tr> <tr> <td>US7627300</td> <td>B2</td> <td>2009-12-01</td> <td>[US7627300]</td> </tr> </table>		US2006292991	A1	2006-12-28	[US20060292991]	US7162273	B1	2007-01-09	[US7162273]	US7627300	B2	2009-12-01	[US7627300]
US2006292991	A1	2006-12-28	[US20060292991]										
US7162273	B1	2007-01-09	[US7162273]										
US7627300	B2	2009-12-01	[US7627300]										

• **Abstract:**

(US7162273)

A wireless communications network includes a plurality of wireless devices equipped with direction-agile antenna systems to allow the wireless devices to establish and maintain wireless data links with each other.



## Directional antenna system with multi-use elements

### US20070040760

<ul style="list-style-type: none"> <li>• <b>Patent Assignee</b> AIRGAIN</li> <li>• <b>Inventor</b> NAGAEV FARID I ABRAMOV OLEG Y VISURI PERTTI</li> <li>• <b>International Patent Classification</b> H01Q-019/10 H01Q-021/00 H01Q-021/06</li> <li>• <b>US Patent Classification</b> PCLO=343818000 PCLX=343810000 PCLX=343876000</li> <li>• <b>CPC Code</b> H01Q-003/24/7; H01Q-003/24; H01Q-009/26; H01Q-019/24</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Publication Information</b> US2007040760 A1 2007-02-22 [US20070040760]</li> <li>• <b>Priority Details</b> 2005US-11209352 2005-08-22</li> </ul>																				
<ul style="list-style-type: none"> <li>• <b>Fampat family</b> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 33%;">US2007040760</td> <td style="width: 33%;">A1</td> <td style="width: 33%;">2007-02-22</td> <td style="width: 33%;">[US20070040760]</td> </tr> <tr> <td>WO2007024698</td> <td>A2</td> <td>2007-03-01</td> <td>[WO200724698]</td> </tr> <tr> <td>TW200713699</td> <td>A</td> <td>2007-04-01</td> <td>[TW200713699]</td> </tr> <tr> <td>WO2007024698</td> <td>A3</td> <td>2007-07-12</td> <td>[WO200724698]</td> </tr> <tr> <td>US7292201</td> <td>B2</td> <td>2007-11-06</td> <td>[US7292201]</td> </tr> </table> </li> </ul>		US2007040760	A1	2007-02-22	[US20070040760]	WO2007024698	A2	2007-03-01	[WO200724698]	TW200713699	A	2007-04-01	[TW200713699]	WO2007024698	A3	2007-07-12	[WO200724698]	US7292201	B2	2007-11-06	[US7292201]
US2007040760	A1	2007-02-22	[US20070040760]																		
WO2007024698	A2	2007-03-01	[WO200724698]																		
TW200713699	A	2007-04-01	[TW200713699]																		
WO2007024698	A3	2007-07-12	[WO200724698]																		
US7292201	B2	2007-11-06	[US7292201]																		

- **Abstract:**

(WO200724698)

Systems and methods for a wireless communication device having a switched multi-beam antenna and methods for manufacturing the same are described. One system and method includes a plurality of antenna elements. Groups of the antenna elements cooperate to form active one or more antenna elements while other groups of the antenna elements cooperate to form a reflector for the active antenna elements. This creates a directed transmission or direction of positive gain for the antenna system. The same group of antenna elements can be switched so that other antenna elements cooperate to form the active element while another group forms a reflector for the active elements thereby providing a different direction of positive gain. The system can be used for various wireless communication protocols and at various frequency ranges.

