

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT4390708

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
TROPIAN, INC	04/03/2006
RECEIVING PARTY DATA	
Name:	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
Street Address:	1006, OAZA KADOMA, KADOMA-SHI
City:	OSAKA
State/Country:	JAPAN
Postal Code:	571-8501
PROPERTY NUMBERS Total: 3	
Property Type	Number
Patent Number:	7042958
Patent Number:	7206553
Patent Number:	7227909
CORRESPONDENCE DATA	
Fax Number:	(425)679-0580
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Email:	ivrecording@intven.com
Correspondent Name:	INTELLECTUAL VENTURES MANAGEMENT- IP LEGAL
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Address Line 2:	BUILDING 4, FLOOR 3
Address Line 4:	BELLEVUE, WASHINGTON 98005
NAME OF SUBMITTER:	JANICE GOEBEL
SIGNATURE:	/Janice Goebel/
DATE SIGNED:	04/28/2017
Total Attachments: 20	
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ASSIGNMENT OF INTELLECTUAL PROPERTY

THIS ASSIGNMENT OF INTELLECTUAL PROPERTY (this "Assignment"), dated as of April 6, 2006 ("Effective Date"), is made by and between Tropic, Inc., a California corporation ("Assignor"), and Matsushita Electric Industrial Co., Ltd., a corporation organized under the laws of Japan ("Assignee").

RECITALS

WHEREAS, Assignor is a party to that certain Asset Purchase Agreement (the "Purchase Agreement"), dated as of March 27, 2006, pursuant to which, among other things, Assignor has agreed to sell to Assignee certain assets including its Intellectual Property (as defined below); and

WHEREAS, Assignor desires to assign to Assignee all of Assignor's right, title and interest in and to the Intellectual Property.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises, mutual representations, warranties, covenants and agreements hereinafter set forth and in the Purchase Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. Subject to the terms and conditions of this Assignment, Assignor hereby assigns, transfers, sells and conveys to Assignee, as of the Effective Date, all of its right, title, and interest in and to the following intellectual property (collectively, "Intellectual Property"):

(a) all patents and patent applications (respectively issued or filed throughout the world) owned by Assignor, as well as any reexaminations, extensions and reissues thereof and any divisionals, continuations, continuation-in-parts and any other applications or patents that claim priority from such patents and applications, including, without limitation, any foreign applications or patents, or certificates of invention corresponding thereto and those patents and patent applications listed on Attachment 1 to the Patent Assignment attached as Exhibit A hereto, and all rights, claims and privileges pertaining thereto, including, without limitation, rights to the underlying inventions, the right to prosecute and maintain such patents and patent applications, and the right to sue and recover damages for past, present and future infringement of such patents;

(b) all trade names, trademarks, service marks, trade dresses, logos, designs and slogans, whether in word mark, stylized or design format, registered and unregistered, throughout the world, owned by Assignor, including, without limitation, those registrations and applications listed on Attachment 1 to the Trademark Assignment attached as Exhibit B hereto (the "Marks"), together with the goodwill of the business associated with and symbolized by the Marks and all rights, claims and privileges pertaining to such Marks, including, without limitation, the right to prosecute and maintain trademark applications and

registrations for such Marks, and the right to sue and recover damages for past, present and future infringement of such Marks;

(c) all copyrights, registered and unregistered, owned by Assignor, and all rights, claims and privileges pertaining thereto, including, without limitation, the right to prosecute and maintain copyright applications and registrations for such copyrights, and the right to sue and recover damages for past, present and future infringement of such copyrights; and

(d) all other intellectual property and other proprietary rights owned by Assignor, including, without limitation, know-how, trade secrets, inventions (whether or not patentable), formulas, processes, invention disclosures, technology, technical data or information, software and documentation therefor, object code, source code (including all programmers' notes), procedures, methods, works of authorship, and other documentation, data and information, Internet domain name registrations, including, without limitation, those registrations listed on Attachment 1 to the Domain Name Assignment attached as Exhibit C hereto, and all rights, claims and privileges pertaining thereto, including, without limitation, the right to sue and recover damages for past, present and future infringement of such intellectual property and proprietary rights.

2. Assignor shall take all actions reasonably requested by Assignee (at Assignee's expense), and shall execute any documents as may be reasonably requested by Assignee, from time to time to fully vest or perfect in Assignee all right, title and interest in and to the Intellectual Property. Such actions shall include, without limitation, execution of the assignments attached hereto as Exhibits A, B and C and providing documents and information useful or necessary for Assignee or its affiliates, designees or agents to prosecute or maintain any registration or application for any Intellectual Property, or pursue or defend any administrative, court, or other legal proceeding involving any of the Intellectual Property.

3. This Assignment shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

4. This Assignment shall be governed by and construed in accordance with the laws of the State of California, excluding the choice-of-law provisions thereof.

5. This Assignment may be executed in multiple counterparts, each of which shall be an original and all of which, taken together, shall be deemed to be one and the same instrument.

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IN WITNESS WHEREOF, Assignor and Assignee have caused this Assignment to be signed as of the date set forth below.

ASSIGNOR:

TROPIAN, INC.

By: 

Name: TIM UNGER
Title: PRESIDENT / CEO
Date: APRIL 3, 2006

ASSIGNEE:

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.

By: _____

Name:
Title:
Date:

[SIGNATURE PAGE TO ASSIGNMENT OF INTELLECTUAL PROPERTY]

IN WITNESS WHEREOF, Assignor and Assignee have caused this Assignment to be signed as of the date set forth below.

ASSIGNOR:

TROPIAN, INC.

By: _____

Name:

Title:

Date:

ASSIGNEE:

**MATSUSHITA ELECTRIC INDUSTRIAL
CO., LTD.**

By: *Susumu Koike*

Name: *Susumu Koike*

Title: *Vice President, Member of the Board*

Date: *April 4, 2006*

[SIGNATURE PAGE TO ASSIGNMENT OF INTELLECTUAL PROPERTY]

PATENT
REEL: 042181 FRAME: 0628

PATENT ASSIGNMENT

THIS PATENT ASSIGNMENT (this "Patent Assignment") dated as of April 6, 2006 ("Effective Date"), is made by and between Tropian, Inc., a California corporation ("Assignor"), and Matsushita Electric Industrial Co., Ltd., a corporation organized under the laws of Japan ("Assignee").

WHEREAS, Assignor and Assignee have entered into an Assignment of Intellectual Property, executed on even date herewith, pursuant to which Assignor has agreed to assign all of its patent rights to Assignee.

NOW, THEREFORE, for good and valuable consideration, including the promises and covenants set forth in the Assignment of Intellectual Property, the parties agree as follows:

1. Patents.

"Patents" shall mean the patents and patent applications listed on Attachment 1 attached hereto, as well as any reexaminations, extensions and reissues thereof and any divisionals, continuations and continuation-in-parts and any other applications or patents that claim priority therefrom, including, without limitation, any corresponding foreign patents and applications.

2. Assignment.


Assignor hereby assigns, transfers, sells and conveys to Assignee all of its rights, title and interest in and to the Patents, and all rights, claims and privileges pertaining to the Patents, including, without limitation, rights to the underlying inventions, the right to sue and recover damages for past, present and future infringement thereof, and the right to prosecute and maintain the Patents.

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IN WITNESS WHEREOF, the parties have caused this Patent Assignment to be executed as of the date set forth below.

ASSIGNOR:

TROPIAN, INC.

By: 
Name: T M UNGAR
Title: PRESIDENT + CEO
Date: APRIL 3, 2006

ASSIGNEE:

MATSUSHITA ELECTRIC INDUSTRIAL
CO., LTD.

By: _____
Name:
Title:
Date:

[SIGNATURE PAGE TO PATENT ASSIGNMENT]

IN WITNESS WHEREOF, the parties have caused this Patent Assignment to be executed as of the date set forth below.

ASSIGNOR:

TROPIAN, INC.

By: _____

Name:

Title:

Date:

ASSIGNEE:

MATSUSHITA ELECTRIC INDUSTRIAL
CO., LTD.

By: *Susumu Koike*

Name: *Susumu Koike*

Title: *Vice President, Member of the Board*

Date: *April 4, 2006*

[SIGNATURE PAGE TO PATENT ASSIGNMENT]

PATENT
REEL: 042181 FRAME: 0631

ATTACHMENT 1

U.S. PATENTS					
Patent Title	Inventor	Patent Registration No.	Registration Date	Application Serial No.	Application Filing Date
Digital time alignment in a polar modulator	Biedka, T Lee, W Do, G.			11/244,010	10/4/05
Power distribution and biasing in RF switch-mode power amplifiers	Meck, R.	6,995,613	2/7/06		
Method and apparatus for impedance matching in an amplifier using lumped and distributed inductance	Meck, R.			11/194,047	7/28/05
High-quality power ramping in a communications transmitter	Schell, S.			11/172,387	6/29/05
Power supply processing for power amplifiers	Cioffi, K. Tolson, N. McCune, E.	6,924,695	8/2/05		
Power supply processing for power amplifiers	Cioffi, K. Tolson, N. McCune, E.	6,781,452	8/24/04		
Power supply processing for power amplifiers	Cioffi, K. Tolson, N. McCune, E.			11/175,752	7/6/05
High quality power ramping in a communications transmitter	Schell, S.	6,983,025	1/3/06		
Direct phase and frequency demodulation	McCune, E.	6,969,984	11/29/05		
Power control and modulation of switched-mode power amplifiers with one or more stages	Schell, S. Sander, W. Meck, R. Bayruns, R.	6,844,776	1/18/05		
Power control and modulation of switched-mode power amplifiers with one or more stages	Schell, S. Sander, W. Meck, R. Bayruns, R.	6,734,724	5/11/04		
Power control and modulation of switched-mode power amplifiers with one or more stages	Schell, S. Sander, W. Meck, R. Bayruns, R.			11/039,633	1/14/05
Switch mode power supply and driving method for efficient RF amplification	Silic, B.	6,867,574	3/15/05		
High-efficiency amplifier output level and burst control	McCune, E. Sander, W.	6,864,668	3/8/05		
Power distribution and biasing in RF switch-mode power amplifiers	Meck, R.	6,995,613	2/7/06		
Method and apparatus for reception quality indication in wireless communication	McCune, E.	6,850,736	2/1/05		

Digital time alignment in a polar modulator	Biedka, T. Lee, W. Do, G.			10/454,906	6/4/03
High-efficiency modulating RF amplifier	Sander, W. Meck, R. McCune, E.	6,816,016	11/9/04		
High-efficiency modulating RF amplifier	Sander, W. Meck, R. McCune, E.	6,636,112	10/21/03		
Extremely high-speed switchmode DC-DC converters	McCune, E.			10/394,949	3/21/03
Method and apparatus for combining two AC waveforms	Noori, B.	6,760,572	7/6/04		
Method and system of amplitude modulation using dual/split channel unequal amplification	Schell, S. Sander, W. McCune, E.	6,751,265	6/15/04		
High efficiency line driver for high crest-factor signals such as DMT/ADSL signals	Do, G. McCune, E. Sander, W.	6,724,830	4/20/04		
High efficiency line driver for high crest-factor signals such as DMT/ADSL signals	McCune, E. Sander, W.	6,567,491	5/20/03		
Method and apparatus for accurate measurement of communications signals	Schell, S.	6,724,177	4/20/04		
Efficient, precise RF modulation using multiple amplifier stages	Sander, W.	6,690,233	2/10/04		
Sigma-delta-based frequency synthesis	McCune, E. Sander, W.	6,690,215	2/10/04		
Direct digital frequency synthesis enabling spur elimination	Sander, W. Sander, B.	6,094,101	7/25/00		
Ring VCO based on RC timing	Dufour, Y.	6,686,806	2/3/04		
Differential rf/microwave power amplifier using independent synchronized polar modulators	Sevic, J. Sander, W. Schell, S.	6,653,896	11/25/03		
Quadrature modulation with reduced phase-error distortion	Booth, R.	6,650,711	11/18/03		
Driving circuits for switch mode RF power amplifiers	McCune, E.	6,198,347	3/6/01		
Waveform preshaping for efficiency improvements in DC to RF conversion	Sevic, J. Salam, K.	6,624,695	9/23/03		
Image reject circuit using a sigma-delta conversion	Smith, G.			10/023,309	12/15/01
Twin-T dual notch filter	Tolson, N.			10/040,535	12/28/01
Frequency synthesizer for dual mode receiver	Tolson, N.			10/040,534	12/28/01
Notch filter and method	Meck, R. McCune, E. Twitchell, E.	6,587,018	7/1/03		

PLL bandwidth switching	Sander, W.	6,580,329	6/17/03		
Saturation prevention and amplifier distortion reduction	Sander, W.	6,528,975	3/4/03		
Boost doubler circuit	Sander, W.	6,522,192	2/18/03		
Oscillator circuit having reduced phase noise	Lee, J.	6,462,627	10/8/02		
High-efficiency modulation RF amplifier	McCune, E.	6,377,784	4/23/02		
High-efficiency power modulators	McCune, E. Sander, W.	6,366,177	4/2/02		
Multi-band amplifier having multi-tap RF choke	Judkins, J.	6,356,155	3/12/02		
Digital phase discriminations based on frequency sampling	Sander, W.	6,269,135	7/31/01		
Digital frequency sampling and discrimination	Sander, W.	6,219,394	4/17/01		
Constant impedance for switchable amplifier with power	Meck, R. McCune, E. Burns, L.	6,215,355	4/10/01		
Phase lock loop enabling smooth loop bandwidth stitching	Sander, B.	6,140,882	10/31/00		
Quadrature-free RF receiver for directly receiving angle modulated signal	McCune, E.	6,112,071	8/29/00		
Direct digital synthesis of precise, stable angle modulated RF signal	McCune, E. Sander, W.	5,952,895	9/14/99		
Variable bias control for switch mode RF amplifier	McCune, E.	6,323,731	11/27/01		

CANADIAN PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Digital Phase Discrimination Based on Frequency Sampling			98810984.0	12/12/03	PCT/US98/21377	1286854	03/07/01	OA
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal	ZL99804405.9	08/27/03	99804405.9	02/23/99	PCT/US99/03285	1119854	05/09/01	Granted
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal	ZL99804393.1	06/16/04	99804393.1	02/23/99	PCT/US99/03286	1297619	05/30/01	Granted
Phase Lock Loop Enabling Smooth Loop Bandwidth Switching	ZL99804324.9	06/16/04	99804324.9	10/21/99	PCT/US99/24466	1294785	05/09/01	Granted
Direct Digital Frequency Synthesis Enabling Spur Elimination	ZL00806326.5	07/20/05	806326.5	08/22/03	PCT/US00/06757	1347588	05/01/02	Allowance
Driving Circuits for Switch Mode RF Power Amplifiers	ZL00812057.9	08/04/04	812057.9	07/31/00	PCT/US00/20750	1371546	09/25/02	Granted
High-Efficiency Modulating RF Amplifier	ZL00812058.7		812058.7	07/31/00	PCT/US00/20841	1371545	09/25/02	Allowance
Variable Bias Control for Switch Mode RF Amplifier			01816983.X	04/07/03	PCT/US01/31573	1470101	01/21/04	OA
High Efficiency Power Modulators			1806019.6	02/02/01	PCT/US01/03393	1423857	06/11/03	OA
RF Power Amplifier Having High Power-Added Efficiency	ZL 01812177.2	05/11/05	1812177.2	05/02/01	PCT/US01/14258	1440589	09/03/03	Granted
RF Power Amplifier Having High Power-Added Efficiency			200510055750.X	05/02/01	200510055750.X	CN1702959A	11/30/05	R4Exam
PLL Noise Smoothing Using Dual-Modulus Interleaving	ZL00812059.9	06/22/05	812059.5	09/17/04	PCT/US00/20749	1371549	09/25/02	Granted
PLL Noise Smoothing Using Dual-Modulus Interleaving			200510066982.5	07/31/00	PCT/US00/20749	CN1667955A	9/14/2005	PreOA
Power Control and Modulation of Switched-Mode Power Amplifiers with One or More Stages			1816984.8	04/07/03	PCT/US01/31523	1470102	01/21/04	OA

Digital Time Alignment in a Polar Modulator					PCT/US04/014218			PreOA
Power Distribution and Biasing in RF Switch-Mode Power Amplifiers					PCT/US04/23878			PreOA

WORLD INTELLECTUAL PROPERTY ORGANIZATION PATENTS

Patent Title	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Digital Phase Discrimination Based on Frequency Sampling	PCT/US98/21 377	10/08/98	08/947,027 09/006,938	WO 99/18691	04/15/09	Expired
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal	PCT/US99/03 285	02/23/99	09/027,954	WO 99/43080	08/26/99	Expired
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal	PCT/US99/03 286	02/23/99	09/027,742	WO 99/43090	08/26/99	Expired
Phase Lock Loop Enabling Smooth Loop Bandwidth Switching	PCT/US99/24 466	10/21/99	09/197,523	WO 00/31874	06/02/00	Expired
Direct Digital Frequency Synthesis Enabling Spur Elimination	PCT/US00/06 757	03/16/00	09/268,731	WO 00/55973	09/21/00	Expired
Sigma-Delta-Based Frequency Synthesis	PCT/US02/27 661	08/29/02	09/942,449	WO 03/021787	03/13/03	Abandon
Driving Circuits for Switch Mode RF Power Amplifiers	PCT/US00/20 750	07/31/00	09/362,880	WO 01/10015	02/08/01	Expired
High-Efficiency Modulating RF Amplifier	PCT/US00/20 841	07/31/00	09/362,880 09/564,548	WO 01/10013	02/08/01	Expired
Constant Impedance for Switchable Amplifier with Power Control	PCT/US00/41 129	10/10/00	09/416,865	WO 01/28087	04/19/01	Expired
Variable Bias Control for Switch Mode RF Amplifier	PCT/US01/31 573	10/09/01	09/684,496	WO 02/29970	04/11/02	Expired
High-Efficiency Power Modulators	PCT/US01/03 393	02/02/01	09/495,891	WO 01/58012	08/09/01	Expired
Multi-Band Amplifier Having Multi-Tap RF Choke	PCT/US02/11 783	04/11/02	09/834,056	WO 02/084861	10/24/02	Abandon
High-Efficiency Modulating RF Amplifier	PCT/US00/03 350	02/09/00	09/247,095	WO 00/48307	08/17/00	Expired
High-Efficiency Amplifier Output Level and Burst Control	PCT/US00/03 384	02/09/00	09/247,097	WO 00/48306	08/17/00	Expired
RF Power Amplifier Having High Power-Added Efficiency	PCT/US01/14 258	05/02/01	09/564,548	WO 01/84704	11/08/01	Expired
Oscillator Circuit Having Reduced Phase Noise	PCT/US01/26 508	08/27/01	09/648,914	WO 02/17476	02/28/02	Expired
PLL Noise Smoothing Using Dual-Modulus Interleaving	PCT/US00/20 749	03/11/03	09/362,670	WO 01/10028	02/08/01	Abandon
PLL Noise Smoothing Using Dual-Modulus Interleaving	PCT/US03/07 696	03/11/03	10/095,738	WO 03/079551	09/25/03	Abandon
Analogue Front End with Multilevel Sigma-Delta Modulator for ADSL	PCT/US00/04 154	02/18/00	09/419,707	WO 01/28177	04/19/01	Expired
Sigma-Delta Modulation in a Discrete Multitone System	PCT/US02/05 943	02/26/02	09/794,542	WO 03/034675	04/24/03	Abandon
Boost Doubler Circuit	PCT/US01/31 571	10/09/01	09/688,269	WO 02/39568	05/16/02	Expired

Ring VCO Based on RC Timing	PCT/US01/48 377	12/13/01	09/738,094	WO 02/056469	07/18/02	Abandon
Saturation Prevention and Amplifier Distortion Reduction	PCT/US01/48 308	12/13/01	09/738,691	WO 02/49206	06/20/02	Expired
Quadrature Modulation with Reduced Phase-Error Distortion	PCT/US01/17 813	06/01/01	09/585,591	WO 01/95477	12/13/01	Expired
Power Control and Modulation of Switched-Mode Power Amplifiers with One or More Stages	PCT/US01/31 523	10/09/01	09/684,497	WO 02/29969	04/11/02	Expired
Method and Apparatus for Reception Quality Indication in Wireless Communication	PCT/US01/50 100	12/21/01	09/746,257	WO 02/51046	06/27/02	Abandon
Method and Apparatus for Accurate Measurement of Communication Signals	PCT/US01/48 214	12/13/01	09/738,114	WO 02/48719	06/20/02	Abandon
Efficient, Precise RF Modulation Using Multiple Amplifier Stages	PCT/US01/50 605	12/21/01	09/746,530	WO 02/50995	06/27/02	Abandon
Direct Phase and Frequency Demodulation	PCT/US01/50 101	12/21/01	09/746,249	WO 02/51088	06/27/02	Abandon
Communications Signal Amplifiers Having Independent Power Control and Amplitude Modulation	PCT/US02/11 776	04/11/02	09/834,024	WO 02/084864	10/24/02	Expired
High Quality Power Ramping in a Communications Transmitter	PCT/US02/11 477	04/11/02	09/833,967	WO 02/084897	10/24/02	Expired
PLL Bandwidth Switching	PCT/US02/11 773	04/11/02	09/834,247	WO 02/099973	12/12/02	Abandon
Data Sampler for Digital Frequency/Phase Determination	PCT/US02/14 053	05/04/02	09/852,818	WO 03/023951	03/20/03	Abandon
Quadrature Alignment in Communications Receivers	PCT/US02/14 051	05/06/02	09/865,409	WO 02/098004	12/05/02	Expired
Method and Apparatus for Impedance Matching in an Amplifier Using Lumped and Distributed Inductance	PCT/US02/27 558	08/29/02	09/942,448	WO 03/021775	03/13/03	Expired
Power Supply Processing for Power Amplifiers	PCT/US02/27 919	08/29/02	09/942,484	WO 03/021766	03/13/03	Expired
Reduction of Average-to-Minimum Power Ratio in Communications Signals	PCT/US02/33 779	10/22/02	10/037,870	WO 03/036894	05/01/03	Expired
Multi-Mode Communications Transmitter	PCT/US02/33 774	10/22/02	10/045,199	WO 03/036896	05/01/03	Expired
Switch Mode Power Supply and Driving Method for Efficient RF Amplification	PCT/US02/38 923	11/21/02	09/992,049	WO 03/047103	06/05/03	Expired
Image Reject Circuit Using Sigma-Delta Conversion	PCT/US02/39 976	12/16/02	10/023,309	WO 03/052923	06/26/03	Expired
Method and Apparatus for Combining Two AC Waveforms	PCT/US03/09 779	03/31/03	10/115,298	WO 03/085848	10/16/03	Expired
Digital Time Alignment in a Polar Modulator	PCT/US04/01 4218	05/07/04	10/454,906	WO 2004/110008	12/16/04	Expired
Power Distribution and Biasing in RF Switch-Mode Power Amplifiers	PCT/US04/23 878	07/23/04	10/631,931	WO 2005/013477	02/10/05	Expired
Extremely High-Speed Switchmode DC-DC Converters	PCT/US2004/ 006353	03/01/04	10/394,949	WO 2004/086598	10/07/04	Expired

EUROPEAN PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Digital Phase Discrimination Based on Frequency Sampling			98951028.4	10/08/98	PCT/US98/21377	1021885	04/15/99	OA
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal			99909493.1	02/23/99	PCT/US99/03285	1057252	08/26/99	OA
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal			99908178.9	02/23/99	PCT/US99/03286	1058968	08/26/99	OA
Phase Lock Loop Enabling Smooth Loop Bandwidth Switching			99955059.3	10/21/99	PCT/US99/24466	1057265	06/02/00	Abandon
Direct Digital Frequency Synthesis Enabling Spur Elimination	1214790	10/26/05	00919409.3	03/16/00	PCT/US00/06757	1214790	09/21/00	Granted
Direct Digital Frequency Synthesis Enabling Spur Elimination			05107961.4	03/16/00	PCT/US00/06757			PreOA
Driving Circuits for Switch Mode RF Power Amplifiers			00952307.7	07/31/00	PCT/US00/20750	1201025	02/08/01	OA
High-Efficiency Modulating RF Amplifier			00953760.6	07/31/00	PCT/US00/20841	1201024	02/08/01	Pending
Variable Bias Control for Switch Mode RF Amplifier			01979626.7	10/09/01	PCT/US01/31573	1362416	04/11/02	Pending
High Efficiency Power Modulators			01905353.7	02/02/01	PCT/US01/03393	1262018	08/09/01	Pending
RF Power Amplifier Having High Power-Added Efficiency			01932924.2	05/02/01	PCT/US01/14258	1282939	08/11/01	Pending
Oscillator Circuit Having Reduced Phase Noise			01964413.7	08/27/01	PCT/US01/26508	1316141	02/08/02	Pending
Analogue Front End with Multilevel Sigma-Delta Modulator for ADSL			00907309.9	02/18/00	PCT/US00/04154	1230771	04/19/01	OA
Boost Doubler Circuit			01983111.4	10/09/01	PCT/US01/31571	1342308	05/16/02	Pending
Saturation Prevention and Amplifier Distortion Reduction			01991079.3	12/13/01	PCT/US01/48308	1378057	06/20/02	OA
Power Control of Switched-Mode Power Amplifiers with One or More Stages			01977635.0	10/09/01	PCT/US01/31523	1362415	04/11/02	OA
Communications Signal Amplifiers Having Independent Power Control and Amplitude Modulation			02739147.3	04/11/02	PCT/US02/11776	1415394	10/24/02	Pending
High Quality Power Ramping in a Communications Transmitter			02731336.0	04/11/02	PCT/US02/11477	1386405	10/24/02	OA
High Quality Power Ramping in a Communications Transmitter			04106195.3	04/11/02	02731336.0 (EP)	1517452	03/23/05	OA
Quadrature Alignment in Communications Receivers			02734172.6	05/06/02	PCT/US02/14051	1393455	05/12/02	Pending

Method and Apparatus for Impedance Matching in an Amplifier Using Lumped and Distributed Inductance			02757467.2	08/29/02	PCT/US02/27558	1433253	03/13/03	Pending
Switching Power Supply for RF Power Amplifiers			02797836.0	08/29/02	PCT/US02/27919	1421678	03/13/03	Pending
Reduction of Average-to-Minimum Power Ratio in Communications Signals			02802185.5	10/22/02	PCT/US02/33779	1438816	05/01/03	Pending
Multi-Mode Communications Transmitter			02802184.8	10/22/02	PCT/US02/33774	1438817	05/01/03	Pending
Switch Mode Power Supply and Driving Method for Efficient RF Amplification			02795751.3	11/21/02	PCT/US02/38923	1451931	06/05/03	Pending
Image Reject Circuit Using Sigma-Delta Conversion			02805136.5	12/16/02	PCT/US02/39976	1483829	06/26/03	OA
Method and Apparatus for Combining Two AC Waveforms			03726156.7	03/31/03	PCT/US03/09779	1490978	10/16/03	Pending
Digital Time Alignment in a Polar Modulator			04751560.6		PCT/US04/014218	10/29/61	03/01/06	PreOA
Power Distribution and Biasing in RF Switch-Mode Power Amplifiers			04757265.6		PCT/US04/23878			PreOA
Extremely High-Speed Switchmode DC-DC Converters			04716179.9	09/01/05	PCT/US2004/006353			PreOA

SINGAPORE PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Digital Phase Discrimination Based on Frequency Sampling	72171	06/30/05	200001771-5	10/08/98	PCT/US98/21377	72171		Granted
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal	75309	09/20/02	200004597-1	02/23/99	PCT/US99/03285	75309		Granted
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal	75286	04/29/05	200004566-6	02/23/99	PCT/US99/03286	75286		Granted
Phase Lock Loop Enabling Smooth Loop Bandwidth Switching	76107	04/30/04	200005336-3	10/21/99	PCT/US99/24466	76107		Granted
Direct Digital Frequency Synthesis Enabling Spur Elimination	83587	09/03/03	200105724-9	03/16/00	PCT/US00/06757	83587		Granted
High-Efficiency Modulating RF Amplifier	86644	02/27/04	200200573-4	07/31/00	PCT/US00/20841	86644		Granted

TAIWAN PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Method and Apparatus of Determining the Phase of a First Clock Signal Using a Second Clock Signal and Method and Circuit of Producing a Data Stream Indicative of the Phase of One Clock Signal Using Another Clock Signal	137390	11/19/01	87116730	10/08/98	08/947,027 09/006,938	448669	08/01/01	Granted
Method, apparatus, signal processor and transmitter for multi-mode communication	129115	07/17/01	88102546	02/22/99	09/027,954	428372	04/01/01	Granted
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal	128683	07/09/01	88102547	02/22/99	09/027,742	425778	03/11/01	Granted
Phase Lock Loop Enabling Smooth Loop Bandwidth Switching	-	-	88118572	11/23/99	09/197,523	-	-	Abandon
Direct Digital Frequency Synthesis Enabling Spur Elimination	155129	08/28/02	89104818	03/16/00	09/268,731	486872	05/11/02	Granted
Sigma-Delta-Based Frequency Synthesis	201293	08/31/04	91119665	08/29/02	09/942,449	587317	05/11/04	Granted
Driving Circuits for Switch Mode RF Power Amplifiers	167122	04/02/03	89123483	11/07/00	09/362,880	511331	11/21/02	Granted
Constant Impedance for Switchable Amplifier with Power Control	169194	04/28/03	89121312	10/12/00	09/416,865	516266	01/01/03	Granted
Variable Bias Control for Switch Mode RF Amplifier	176574	08/19/03	90124659	10/05/01	09/684,496	530452	05/01/03	Granted
High Efficiency Power Modulators			90102223	02/02/01	09/495,891			OA
Amplifier Circuit with an On-Chip Inductor	200216	08/06/04	91107299	04/11/02	09/834,056	583826	04/11/04	Granted
High-Efficiency Modulating RF Amplifier	175643	08/07/03	89102103	02/09/00	09/247,095	529241	04/21/03	Granted
High-Efficiency Amplifier Output Level and Burst Control	130828	08/17/01	89102096	02/09/00	09/247,097	432780	05/01/01	Granted
RF Power Amplifier Having High Power-Added Efficiency	166479	03/20/03	90110740	05/04/01	09/564,548	511330	11/21/02	Granted
Oscillator Circuit Having Reduced Phase Noise	-	-	90122612	09/12/01	09/648,914	557621	10/11/03	Abandon
High Efficiency Line Driver for High Crest-Factor Signals Such as DMT/ADSL Signals	152112	07/08/02	89103039	02/22/00	09/419,707	480810	03/21/02	Granted
High Efficiency Line Driver for High Crest-Factor Signals such as DMT/ADSL signals	198882	07/19/04	91102916	02/20/02	09/794,542	579628	03/11/04	Granted
Boost Doubler Circuit	181813	11/12/03	90124821	10/08/01	09/688,269	543269	07/21/03	Granted

Ring VCO Based on RC Timing	184822	01/05/04	90131065	12/14/01	09/738,094	550879	09/01/03	Granted
Saturation Prevention and Amplifier Distortion Reduction	178715	09/23/03	90131064	12/14/01	09/738,691	535354	06/01/03	Granted
Quadrature Modulation with Reduced Phase-Error Distortion	171037	05/27/03	90113343	06/01/01	09/585,591	518859	01/21/03	Granted
Method and System of Amplitude Modulation Using Dual/Split Channel Unequal Amplification	187838	02/05/04	90122742	09/13/01	09/661,167	557622	10/11/03	Granted
Power Control and Modulation of Switched-Mode Power Amplifiers with One or More Stages			90124677	10/05/01	09/684,497			Pending
Method and Apparatus for Reception Quality Indication in Wireless Communication	182672	11/24/03	90131341	12/18/01	09/746,257	544999	08/01/03	Granted
Method and Apparatus for Accurate Measurement of Communication Signals	175339	07/30/03	90131063	12/14/01	09/738,114	527787	04/11/03	Granted
Method and Apparatus for Measuring the Phase or Frequency of a Periodic Input Signal	181887	11/13/03	90131367	12/18/01	09/746,249	543284	07/21/03	Granted
Communications Signal Amplifiers Having Independent Power Control and Amplitude Modulation	191196	03/19/04	91107193	04/10/02	09/834,024	563295	11/21/03	Granted
Method, Circuitry, Ramp Generator and Ramping Apparatus for Controlling Ramping of a Communication Signal and Method for Improving a Communication Transmitter	1229510	3/11/2005	91107318	04/11/01	09/833,967			Granted
Data Sampler for Digital Frequency/Phase Determination	1223947	11/11/04	91109681	05/09/01	09/852,818	-	-	Granted
Quadrature Alignment in Communications Receivers	199513	07/27/04	91110644	05/21/02	09/865,409	583845	04/11/04	Granted
Method and Apparatus for Impedance Matching in an Amplifier Using Lumped and Distributed Inductance	193146	04/15/04	91119678	08/29/02	09/942,448	569529	01/01/04	Granted
Power Supply Processing for Power Amplifiers	1226156	01/01/05	91119666	08/29/02	09/942,484	-	-	Granted
Reduction of Average-to-Minimum Power Ratio in Communications Signals	200684	08/16/04	91124349	10/22/02	10/037,870	586278	05/01/04	Granted
Method, apparatus, signal processor and transmitter for multi-mode communication	11223927	11/11/04	91124346	10/22/02	10/045,199	-	-	Granted
Switch Mode Power Supply and Driving Method for Efficient RF Amplification			91133842	11/20/02	09/992,049	200409456	06/01/04	R4Exam
Image Reject Circuit Using Sigma-Delta Conversion			91136097	12/13/02	10/023,309	200417244	09/01/04	OA

JAPANESE PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Digital Phase Discrimination Based on Frequency Sampling			2000-515355	11/13/03	PCT/US98/21377	2003-523095	07/29/03	OA
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal			2000-532912	02/23/99	PCT/US99/03285	2002-504772	02/12/02	Pending
Quadrature-Free RF Receiver for Directly Receiving Angle Modulated Signal			2000-532920	02/23/99	PCT/US99/03286	2002-504774	02/12/02	Pending
Direct Digital Frequency Synthesis Enabling Spur Elimination			2000-605310	03/16/00	PCT/US00/06757	2002-539705	11/19/02	Pending
Driving Circuits for Switch Mode RF Power Amplifiers			2001-514533	07/31/00	PCT/US00/20750	2003-506943	02/18/03	Pending
High-Efficiency Modulating RF Amplifier			2001-514531	07/31/00	PCT/US00/20841	2003-506941	02/18/03	Pending
Variable Bias Control for Switch Mode RF Amplifier			2002-533470	03/31/03	PCT/US01/31573	2004-511158	04/08/04	PreOA
High Efficiency Power Modulators			2001-557163	02/02/01	PCT/US01/03393	2004-501527	01/15/04	Pending
RF Power Amplifier Having High Power-Added Efficiency			2001-581410	05/02/01	PCT/US01/14258	2004-518311	06/17/04	Pending
Oscillator Circuit Having Reduced Phase Noise			2002-522057	08/27/01	PCT/US01/26508	2004-518314	06/17/04	Pending
PLL Noise Smoothing Using Dual-Modulus Interleaving			2001-513812	07/31/00	PCT/US00/20749	2003-506909	02/18/03	Pending
Saturation Prevention and Amplifier Distortion Reduction			2002-550399	12/13/01	PCT/US01/48308	2004-537873	12/16/04	PreOA
Power Control and Modulation of Switched-Mode Power Amplifiers with One or More Stages			2002-533469	10/09/01	PCT/US01/31523	2004-529514	09/24/04	PreOA
Communications Signal Amplifiers Having Independent Power Control and Amplitude Modulation			2002-581685	12/04/03	PCT/US02/11776	2002-581685	04/07/05	PreOA
High Quality Power Ramping in a Communications Transmitter			2002-582509	04/11/02	PCT/US02/11477	2005-501440	05/01/13	PreOA
Quadrature Alignment in Communications Receivers			2003-501080	01/16/04	PCT/US02/14051	2003-501080	05/19/05	PreOA

Method and Apparatus for Impedance Matching in an Amplifier Using Lumped and Distributed Inductance			2003-525991	04/27/04	PCT/US02/27558	2005-521275	07/14/05	Pending
Power Supply Processing for Power Amplifiers			2003-525982	04/11/02	PCT/US02/27919	2005-502251	01/20/05	Pending
Reduction of Average-to-Minimum Power Ratio in Communications Signals			2003-539259	10/22/02	PCT/US02/33779	2003-539259	04/28/05	Pending
Multi-Mode Communications Transmitter			2003-539261	06/09/04	PCT/US02/33774			Pending
Switch Mode Power Supply and Driving Method for Efficient RF Amplification			2003-548402	07/20/04	PCT/US02/38923			Pending
Image Reject Circuit Using Sigma-Delta Conversion			2003-553704	07/08/04	PCT/US02/39976	2005 536907	12/02/05	Pending
Method and Apparatus for Combining Two AC Waveforms			2003-582919	10/12/04	PCT/US03/09779	2005 522141	07/21/05	Pending
Digital Time Alignment in a Polar Modulator				11/22/05	PCT/US04/014218			PreOA
Power Distribution and Biasing in RF Switch-Mode Power Amplifiers				01/19/06	PCT/US04/23878			PreOA
Extremely High-Speed Switchmode DC-DC Converters				08/31/05	PCT/US2004/00635 3			PreOA

KOREAN PATENTS

Patent Title	Patent No.	Issue Date	Serial No.	File Date	Priority No.	Publication No.	Pub. Date	Status
Direct Digital Synthesis of Precise, Stable Angle Modulated RF Signal			10-2000-7009287	08/23/00	PCT/US99/03285	10-2001-0052181	06/25/01	Pending
Direct Digital Frequency Synthesis Enabling Spur Elimination			10-2001-7011763	09/15/01	PCT/US00/06757	10-2002-0010894	02/06/02	R4Exam
Driving Circuits for Switch Mode RF Power Amplifiers			10-2002-7001157	01/28/02	PCT/US00/20750	10-2002-0059342	07/12/02	R4Exam
High-Efficiency Modulating RF Amplifier			10-2002-7001158	01/28/02	PCT/US00/20841	10-2002-0059343	07/12/02	R4Exam
High-Efficiency Power Modulators			10-2002-7009913	08/01/02	PCT/US01/03393	10-2003-0009348	01/29/03	R4Exam
RF Power Amplifier Having High Power-Added Efficiency			10-2002-7014774	11/04/02	PCT/US01/14258	10-2003-0014213	02/15/03	R4Exam
Oscillator Circuit Having Reduced Phase Noise			10-2003-7002681	02/24/03	PCT/US01/26508	10-2004-0002840	01/07/04	Pending

PLL Noise Smoothing Using Dual-Modulus Interleaving			10-2002-7001156	01/28/02	PCT/US00/20749	10-2002-0019582	03/12/02	R4Exam
Power Control and Modulation of Switched-Mode Power Amplifiers with One or More Stages			10-2003-7004889	04/04/03	PCT/US01/31523	10-2003-0045820	06/11/03	Pending
Reduction of Average-to-Minimum Power Ratio in Communications Signals			10-2004-7005886	04/21/04	PCT/US02/33779	10-2004-0045891	06/02/04	Pending
Multi-Mode Communications Transmitter			10-2004-7005912	04/21/04	PCT/US02/33774	10-2004-0045899	06/02/04	Pending
Image Reject Circuit Using Sigma-Delta Conversion			10-2004-7009211	06/14/04	PCT/US02/039976	10-2004-0066903	07/27/04	Pending
Digital Time Alignment in a Polar Modulator			2005-7022679	11/28/05	PCT/US04/014218			PreOA