





(12) **United States Patent**  
**Tamaki**

(10) **Patent No.:** **US 7,471,716 B2**  
(45) **Date of Patent:** **Dec. 30, 2008**

(54) **SPREAD SPECTRUM SYSTEM COMMUNICATION UNIT AND ITS METHOD FOR ESTABLISHING HIGH SPEED SYNCHRONIZATION**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 395 days.

(Continued)

(21) Appl. No.: **10/509,857**

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(22) PCT Filed: **Feb. 3, 2003**

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(86) PCT No.: **PCT/JP03/01054**

§ 371 (c)(1),  
(2), (4) Date: **Mar. 29, 2005**

(Continued)

(87) PCT Pub. No.: **WO2004/070967**

PCT Pub. Date: **Aug. 19, 2004**

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(65) **Prior Publication Data**

US 2005/0180489 A1 Aug. 18, 2005

(57) **ABSTRACT**

(51) **Int. Cl.**  
**H04B 1/00** (2006.01)

(52) **U.S. Cl.** ..... **375/150; 375/149; 375/130; 375/140**

(58) **Field of Classification Search** ..... 375/146–147, 375/135, 238–239, 259, 219, 289, 295, 130, 375/140, 149, 150, 152; 342/350, 352, 357.01, 342/357.06, 357.15

See application file for complete search history.

A device for spread spectrum communication is provided which enables synchronization at a high-speed even if the carrier frequency and the phase are not known precisely on the receiving end. The device for spread spectrum communication includes a toggle detecting unit and a demodulating unit. The toggle detecting unit detects a candidate of a toggle point existing in a carrier of a received signal, and the demodulating unit demodulates the received signal by multiplying the received signal by a spread code which is shifted according to a shift amount calculated based on the detected candidate.

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**10 Claims, 12 Drawing Sheets**

