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(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier applications:

US	13/175,045 (CON)
Filed on	1 July 2011 (01.07.2011)
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Filed on	12 July 2010 (12.07.2010)
US	61/380,917 (CON)
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Declarations under Rule 4.17:

[Continued on next page]

(54) Title: PILOT STRUCTURE FOR COHERENT MODULATION

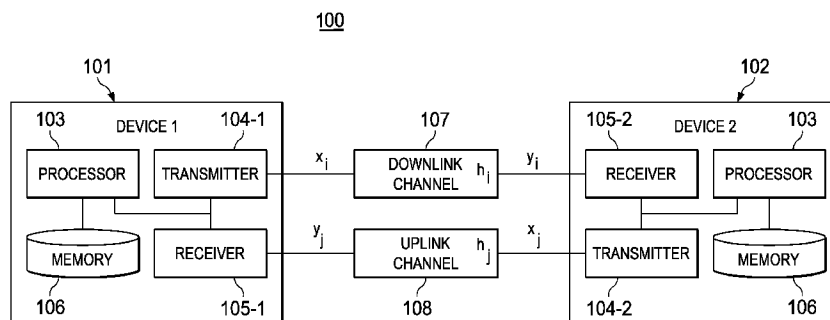


FIG. 1

(57) Abstract: A system and method for communicating in a power line communications (PLC) network (100) using Orthogonal Frequency-Division Multiplexing (OFDM) symbols. Pilot tones are carried by the OFDM symbols according to a predetermined pattern. A receiving device (105-1, 105-2) identifies pilot tones on each frequency. A group of previously received pilot tones on a selected frequency are filtered to generate a channel estimate for a tone on the selected frequency in a new symbol. The channel estimates on two different frequencies within an OFDM symbol may be interpolated to determine a channel estimate for a third frequency with the OFDM symbol.



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- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))* — *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/043725**A. CLASSIFICATION OF SUBJECT MATTER****H04L 27/26(2006.01)i, H04B 3/54(2006.01)i**

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)

H04L 27/26; H04L 23/02; H04B 7/02; H04J 11/00; H04L 27/28

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: OFDM,pilot, interpolate, estimation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010-0008443 A1 (CASAMAJOU YANN) 14 January 2010 See abstract; paragraphs [12],[37-42]; claim 1 and figures 3, 5.	1-17
A	US 2008-0240265 A1 (FECHTEL STEFAN) 02 October 2008 See abstract; paragraphs [38],[39]; claims 1, 16 and figures 2, 3.	1-17
A	US 2009-0268709 A1 (YU XIAOYONG) 29 October 2009 See abstract; paragraphs [43-47]; claims 1, 3, 15, 16 and figures 4-6.	1-17
A	US 2009-0185630 A1 (YANG SHUN-AN) 23 July 2009 See abstract; paragraphs [25],[30]; claims 1, 17 and figures 3, 11, 13.	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

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"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0008443 A1	14.01.2010	CN 101589590 A EP 2109974 A1 WO 2008-093253 A1	25.11.2009 21.10.2009 07.08.2008
US 2008-0240265 A1	02.10.2008	DE 102008010126 A1 US 7940848 B2	09.10.2008 10.05.2011
US 2009-0268709 A1	29.10.2009	None	
US 2009-0185630 A1	23.07.2009	CN 101494631 A TW 200934189 A	29.07.2009 01.08.2009