



- (51) **International Patent Classification:**
H04B 7/06 (2006.01) *H04L 25/03* (2006.01)
- (21) **International Application Number:**
PCT/US2012/042148
- (22) **International Filing Date:**
13 June 2012 (13.06.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/496,548 13 June 2011 (13.06.2011) US
- (71) **Applicant (for all designated States except US):** **LGC WIRELESS, LLC** [US/US]; 541 East Trimble Road, San Jose, CA 95131 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **STEWART, Kenneth, A.** [US/US]; LGC Wireless, LLC, 541 East Trimble Rod, San Jose, CA 95131 (US). **FISCHER, Larry, G.** [US/US]; 38069 120th Street, Waseca, MN 56093 (US).
- (74) **Agent:** **POWERS, Jon, M.; FOGG & POWERS LLC**, 5810 W. 78th Street, Suite 100, Minneapolis, MN 55439 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

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

- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- 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))

- (88) **Date of publication of the international search report:**
11 April 2013

(54) **Title:** DISTRIBUTED ANTENNA SYSTEM ARCHITECTURES

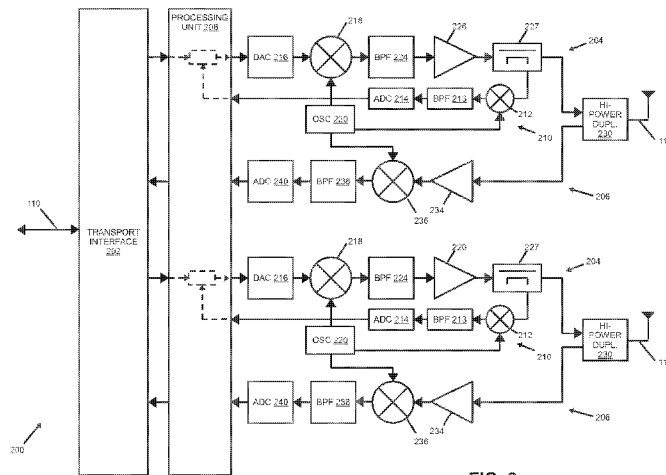


FIG. 2

(57) **Abstract:** One embodiment is directed to a distributed antenna system comprising a host unit and at least one remote antenna unit that is communicatively coupled to the host unit. The host unit is configured to communicate a downstream transport signal from the host unit to the remote antenna unit. The remote antenna unit to which the downstream transport signal is communicated uses the downstream transport signal to generate a downstream radio frequency signal for radiation from an antenna associated with the remote antenna unit. The remote antenna unit is configured to communicate an upstream transport signal from the remote antenna unit to the host unit, wherein the upstream transport signal is generated from a received upstream radio frequency signal received at the remote antenna unit. The remote antenna unit is configured to perform self-interference suppression processing in an upstream signal path using, as an input thereto, a feedback signal derived from the downstream radio frequency signal radiated from the antenna. Other embodiments are disclosed.

WO 2012/174047 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/042148**A. CLASSIFICATION OF SUBJECT MATTER****H04B 7/06(2006.01)i, H04L 25/03(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)

H04B 7/06; H04B 7/00; H04B 10/00; H04L 25/49; H04B 15/00; H04B 1/04

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: self-interference suppression, feedback, upstream, pre-distort, downstream, distributed antenna, MIMO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 2010-0197231 A1 (PETER KENINGTON) 05 August 2010 See paragraphs [14], [19], [39]-[44], [50], [51]; and figs. 1, 5.	1-28 29-32
Y	US 2009-0238573 A1 (DONALD R. BAUMAN) 24 September 2009 See paragraphs [17]-[22], [35]-[41]; and figs. 1, 3.	1-32
Y	US 2010-0166109 A1 (DIRK NEUMANN et al.) 01 July 2010 See paragraphs [28]-[33], [38]-[58], [74]-[88], [101]-[110]; and figs. 1, 4a, 5.	29-32
A	US 2009-0207896 A1 (ARYA REZA BEHZAD) 20 August 2009 See paragraphs [35]-[47], [59], [60], [67]-[70], [110]-[116]; and figs. 2, 4, 5, 17.	1-32
A	US 2009-0232510 A1 (DEEPNARAYAN GUPTA et al.) 17 September 2009 See paragraphs [106]-[109], [119]-[121]; and figs. 2, 4.	1-32

 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 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

31 JANUARY 2013 (31.01.2013)

Date of mailing of the international search report

31 JANUARY 2013 (31.01.2013)

Name and mailing address of the ISA/KR



Facsimile No. 82-42-472-7140

Authorized officer

KANG, HEE GOK

Telephone No. 82-42-481-8264



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/042148

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0197231 A1	05.08.2010	US 8036606 B2	11.10.2011
US 2009-0238573 A1	24.09.2009	AU 2003-298828 A1	23.06.2004
		AU 2003-298828 A8	23.06.2004
		CN 1745590 A	08.03.2006
		CN 1745590 C0	03.09.2008
		EP 1570687 A2	07.09.2005
		EP 1570687 A4	27.01.2010
		KR 10-1030580 B1	21.04.2011
		KR 10-2005-0088300 A	05.09.2005
		US 2004-0203339 A1	14.10.2004
		US 2007-0117592 A1	24.05.2007
		US 7171244 B2	30.01.2007
		US 7546138 B2	09.06.2009
		US 7917177 B2	29.03.2011
		WO 2004-051873 A2	17.06.2004
		WO 2004-051873 A3	13.01.2005
US 2010-0166109 A1	01.07.2010	EP 2204903 A1	07.07.2010
US 2009-0207896 A1	20.08.2009	US 8085869 B2	27.12.2011
US 2009-0232510 A1	17.09.2009	EP 2263332 A2	22.12.2010
		KR 10-2011-0002020 A	06.01.2011
		US 2009-0232191 A1	17.09.2009
		US 2009-0232507 A1	17.09.2009
		US 8260143 B2	04.09.2012
		US 8260144 B2	04.09.2012
		US 8260145 B2	04.09.2012
		WO 2009-114738 A2	17.09.2009
		WO 2009-114738 A3	23.12.2009