US009411001B2

(12) **United States Patent**
Dijkstra

(10) **Patent No.: US 9,411,001 B2**
(45) **Date of Patent: Aug. 9, 2016**

(54) **ANTENNA SYSTEM**

(71) Applicants: **L'Avenir d'Or BV**, Montfoort (NL); **Future BV**, Driebruggen (NL)

(72) Inventor: **Patrick Walter Joseph Dijkstra**, Driebruggen (NL)

(73) Assignees: **L'Avenir d'Or B.V.**, Montfoort (NL); **Future B.V.**, Driebruggen (NL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 103 days.

(21) Appl. No.: **13/778,964**

(22) Filed: **Feb. 27, 2013**

(65) **Prior Publication Data**

US 2014/0210486 A1 Jul. 31, 2014

(30) **Foreign Application Priority Data**

Jan. 29, 2013 (NL) 1040028

(51) **Int. Cl.**

G01R 29/08	(2006.01)
H01Q 5/42	(2015.01)
H01Q 5/20	(2015.01)
H01Q 3/30	(2006.01)
H01Q 3/28	(2006.01)
H01Q 25/00	(2006.01)
H01Q 21/06	(2006.01)
H01Q 21/29	(2006.01)
H01Q 23/00	(2006.01)
H01Q 21/30	(2006.01)
H01Q 21/08	(2006.01)

(52) **U.S. Cl.**

CPC ***G01R 29/08*** (2013.01); ***H01Q 3/28*** (2013.01); ***H01Q 3/30*** (2013.01); ***H01Q 5/20*** (2015.01); ***H01Q 5/42*** (2015.01); ***H01Q 21/065*** (2013.01); ***H01Q 21/08*** (2013.01); ***H01Q 21/29*** (2013.01); ***H01Q 21/30*** (2013.01); ***H01Q 23/00*** (2013.01); ***H01Q 25/00*** (2013.01)

(58) **Field of Classification Search**

CPC H01Q 3/28; H01Q 5/0075; H01Q 21/065

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,091,365	A *	7/2000	Derneryd et al.	343/700 MS
2001/0054983	A1*	12/2001	Judd et al.	343/810
2007/0280372	A1*	12/2007	Egri	H04L 27/2637 375/267
2009/0004976	A1*	1/2009	Shanjani	455/82
2010/0103060	A1*	4/2010	Au	343/720
2010/0117917	A1*	5/2010	Kindt	H01Q 13/08 343/843
2011/0109507	A1*	5/2011	Warnick	342/368
2011/0115665	A1	5/2011	Ryu	

FOREIGN PATENT DOCUMENTS

EP 1626550 A2 2/2006

OTHER PUBLICATIONS

International Search Report PCT/ISA/210 and Written Opinion PCT/ISA/237 for International Application No. PCT/NL2014/050026 Dated Jul. 11, 2014.

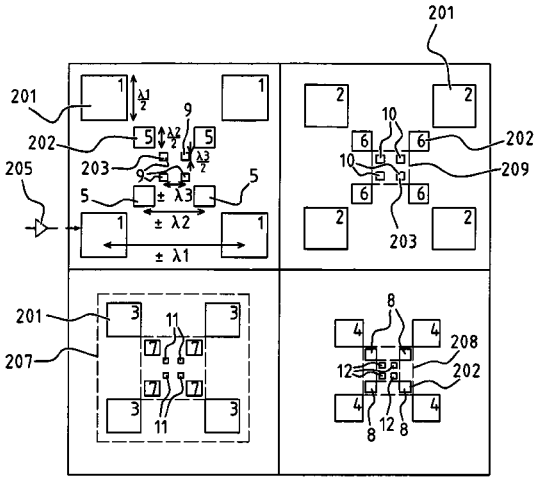
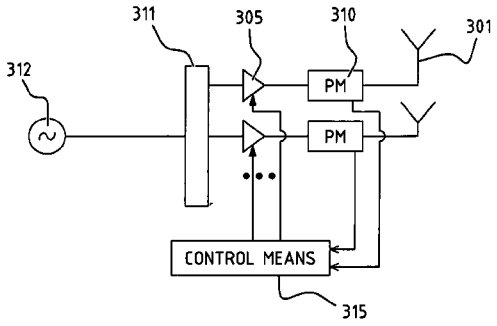
Search Report and Written Opinion for Dutch Patent Application No. 1040028 dated Mar. 31, 2014 with English Translation.

* cited by examiner

Primary Examiner — Robert Karacsony

(74) *Attorney, Agent, or Firm* — Harness, Dickey & Pierce

(57) **ABSTRACT**

Broadband antenna system comprising a plurality of antenna elements and a plurality of amplifiers; wherein every antenna element of said plurality of antenna elements is configured for operating in a predetermined frequency range and is associated with an amplifier of said plurality of amplifiers which is configured for said predetermined frequency range; said plurality of antenna elements covering a broadband range.

22 Claims, 8 Drawing Sheets