(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 November 2017 (16.11.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/196652 A3

(51) International Patent Classification:
H01P 5/16 (2006.01) *H03H 7/01* (2006.01)
H01P 3/08 (2006.01)

(21) International Application Number:
PCT/US2017/031219

(22) International Filing Date:
05 May 2017 (05.05.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/333,368 09 May 2016 (09.05.2016) US
62/454,971 06 February 2017 (06.02.2017) US

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(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,

(54) Title: SELF-ADJUSTING ELECTROMAGNETIC COUPLER WITH AUTOMATIC FREQUENCY DETECTION

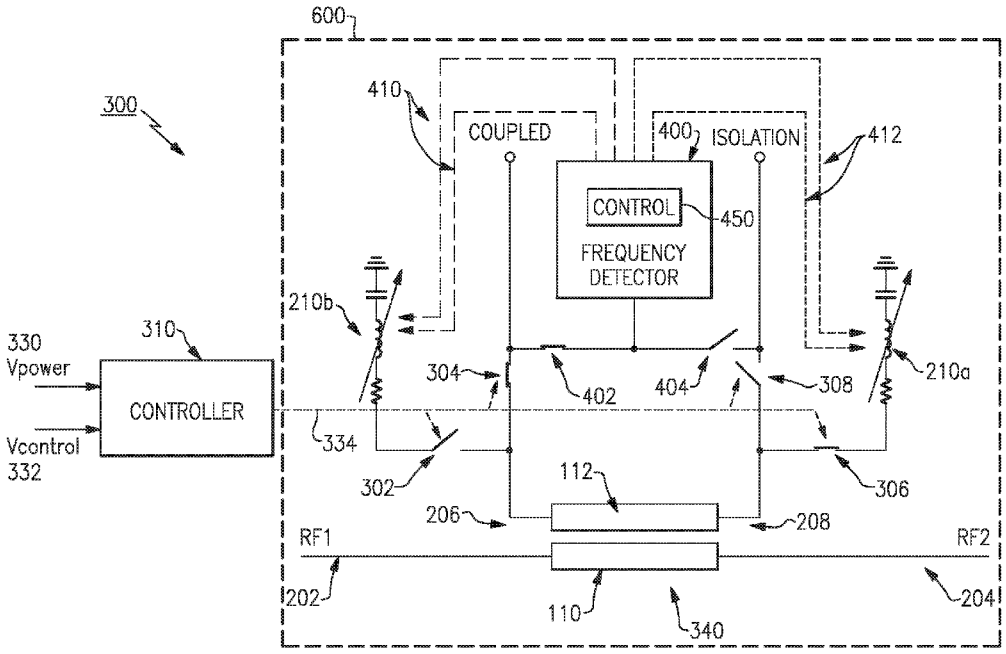

FIG.5

(57) Abstract: Electromagnetic coupler systems including built-in frequency detection, and modules and devices including such. One example of an electromagnetic coupler system include an electromagnetic coupler having an input port, an output port, a coupled port, and an isolation port, the electromagnetic coupler including a main line extending between the input port and the output port, and a coupled line extending between the coupled port and the isolation port, the electromagnetic coupler being configured to produce a coupled signal at the coupled port responsive to receiving an input signal at the input port. An adjustable termination impedance is connected to the isolation port. A frequency detector is connected to the adjustable termination impedance and to the coupled port, and configured to detect a frequency of the coupled signal and provide an impedance control signal to tune the adjustable termination impedance based on the frequency of the coupled signal.

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[Continued on next page]

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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:
26 July 2018 (26.07.2018)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/031219

A. CLASSIFICATION OF SUBJECT MATTER

H01P 5/16(2006.01)i, H01P 3/08(2006.01)i, H03H 7/01(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)
H01P 5/16; H03H 7/46; H01P 5/18; H01F 38/14; H01P 1/15; H04B 1/48; H04B 1/40; H01P 3/08; H03H 7/01

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-adjusting coupler, adjustable impedance, frequency detector, bi-directional, switch

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2016-0065167 A1 (RF MICRO DEVICES, INC.) 03 March 2016 See paragraphs [0015]-[0051] and figures 1-7.	1-60
A	US 2012-0062333 A1 (HILAL EZZEDDINE et al.) 15 March 2012 See paragraphs [0028]-[0034] and figures 1-2.	1-60
A	US 2015-0091668 A1 (INFINEON TECHNOLOGIES AG) 02 April 2015 See paragraph [0029] and figure 3.	1-60
A	US 2016-0079650 A1 (INFINEON TECHNOLOGIES AG) 17 March 2016 See paragraphs [0022]-[0027] and figures 1a-2b.	1-60
A	US 2016-0028147 A1 (SKYWORKS SOLUTIONS, INC.) 28 January 2016 See paragraphs [0041]-[0044] and figure 3.	1-60
A	KR 10-2012-0007790 A (LG INNOTEK CO., LTD.) 25 January 2012 See paragraphs [0013]-[0033] and figures 1-3.	1-60

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"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	Date of mailing of the international search report
20 July 2017 (20.07.2017)	**24 July 2017 (24.07.2017)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2017/031219

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