Title (en)

WIDE-ANGLE IMPEDANCE MATCHING DEVICE FOR AN ARRAY ANTENNA WITH RADIATING ELEMENTS AND METHOD FOR DESIGNING SUCH A DEVICE

Title (de)

WEITWINKEL-IMPEDANZANPASSUNGSVORRICHTUNG FÜR EINE GRUPPENANTENNE MIT STRAHLUNGSELEMENTEN UND VERFAHREN ZUM ENTWURF EINER SOLCHEN VORRICHTUNG

Title (fr)

DISPOSITIF D'ADAPTATION D'IMPEDANCE A GRAND ANGLE POUR ANTENNE RESEAU A ELEMENTS RAYONNANTS ET PROCEDE DE CONCEPTION D'UN TEL DISPOSITIF

Publication

EP 4391232 A1 20240626 (FR)

Application

EP 23217070 A 20231215

Priority

FR 2214203 A 20221222

Abstract (en)

[origin: CA3223986A1] Wide-angle impedance-matching device (102) for a radiating-element array antenna, comprising: - a transmission screen (103) having a first surface intended to be positioned facing the radiating-element array parallel to the radiating aperture of the antenna and being configured to match the impedance of the antenna for an H-plane scan, - and a set of metal pins (104) placed orthogonally, on at least one surface of the transmission screen (103), at the intersection of at least some of the respective anti-symmetry planes of the electric field radiated by the antenna for an H-plane scan, for two linear polarizations in two orthogonal directions, said set of metal pins (104) being configured to match the impedance of the antenna for an E-plane scan.

Abstract (fr)

Dispositif d'adaptation d'impédance (102) à grand angle pour antenne réseau à éléments rayonnants, comprenant :- un écran de transmission (103) ayant une première surface destinée à être positionnée en vis-à-vis du réseau d'éléments rayonnants parallèlement à l'ouverture rayonnante de l'antenne et étant configuré pour adapter l'impédance de l'antenne pour un balayage dans le plan H,- et un ensemble de pointes métalliques (104) disposées orthogonalement sur au moins une surface de l'écran de transmission (103), à l'intersection d'au moins une partie des plans d'antisymétrie respectifs du champ électrique rayonné par l'antenne pour un balayage dans le plan H, pour deux polarisations linéaires selon deux directions orthogonales, ledit ensemble de pointes métalliques (104) étant configuré pour adapter l'impédance de l'antenne pour un balayage dans le plan E.

IPC 8 full level

H01Q 15/00 (2006.01); H01Q 1/28 (2006.01)

CPC (source: EP US)

H01Q 1/50 (2013.01 - US); **H01Q 5/335** (2013.01 - US); **H01Q 15/0013** (2013.01 - EP); **H01Q 15/0026** (2013.01 - EP); H01Q 1/28 (2013.01 - EP)

Citation (applicant)

- FR 3095303 A1 20201023 - THALES SA [FR], et al
- E. MAGILLH. WHEELER: "Wide-angle impédance matching of a planar array antenna by a dielectric sheet", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, vol. 14, no. 1, January 1966 (1966-01-01), pages 49 - 53, XP055019127, DOI: 10.1109/TAP.1966.1138622
- S. SAJUYIGBEM. ROSSP. GERENS. CUMMERM. TANIELIAND. SMITH: "Wide angle impédance matching metamaterials for waveguide-fed phased-array antennas", IET MICROWAVES, ANTENNAS & PROPAGATION, vol. 4, no. 8, 2010, pages 1063
- G. OLIVERIM. SALUCCN. ANSELMIA. MASSA: "Multiscale system-by-design synthesis of printed WAIMs for waveguide array enhancement", IEEE JOURNAL ON MULTISCALE AND MULTIPHYSICS COMPUTATIONAL TECHNIQUES, vol. 2, 2017, pages 84 - 96, XP011653896, DOI: 10.1109/JMMCT.2017.2701833
- G. OLIVERI ET AL.: "Wide-Angle impédance Matching Layer-Enhanced Dual-Polarization sub-6 GHz Wide-Scan Array for Next-Generation Base Stations", IEEE TRANS. ANTENNAS PROPAG., vol. 70, no. 7, July 2022 (2022-07-01), pages 5506 5520
- W. H. SYEDD. CAVALLOH. THIPPUR SHIVAMURTHYA. NETO: "Wideband, widescan planar array of connected slots loaded with artificial dielectric superstrates", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, vol. 64, no. 2, February 2016 (2016-02-01), pages 543 - 553, XP011597795, DOI: 10.1109/TAP.2015.2507167
- B. SUNR. LOISONR. GILLARDE. ESTEBEC. RENARD: "15th European Conférence on Antennas and Propagation (EuCAP", 2021, IEEE, article "3d wide-angle impédance matching for x-band phased array"
- Y. ZHANGA. R. VILENSKIYM. V. IVASHINA: "Mutual Coupling Analysis of Open-Ended Ridge and Ridge Gap Waveguide Radiating Elements in an Infinite Array Environmen", 52ND EUROPEAN MICROWAVE CONFÉRENCE (EUMC, 2022, pages 696 - 699, XP034217208, DOI: 10.23919/EuMC54642.2022.9924388
- X. LIANGZ. ZHANGJ. ZENGF. GUANX. LIUJ. ZI: "Scan Blindness Free Design of Wideband Wide-Scanning Open-Ended Waveguide Phased Array", IEEE ACCESS, vol. 9, 2021, pages 68127 - 68138, XP011854184, DOI: 10.1109/ACCESS.2021.3074867

Citation (search report)

- [XAI] CN 104934700 A 20150923 - 724TH RES INST CN SHIPBUILDING
- [A] EP 3726642 A1 20201021 - THALES SA [FR], et al
- [XAI] LIANG XIUYE ET AL: "Scan Blindness Free Design of Wideband Wide-Scanning Open-Ended Waveguide Phased Array", IEEE ACCESS, IEEE, USA, vol. 9, 22 April 2021 (2021-04-22), pages 68127 - 68138, XP011854184, DOI: 10.1109/ACCESS.2021.3074867
- [XAI] QI ZHANG ET AL: "Metamaterial-based linear phased array antenna with improved wide-angle scanning bandwidth by parasitic metal strips", IET MICROWAVES, ANTENNAS & PROPAGATION, THE INSTITUTION OF ENGINEERING AND TECHNOLOGY, UNITED KINGDOM, vol. 15, no. 13, 10 September 2021 (2021-09-10), pages 1699 - 1709, XP006112776, ISSN: 1751-8725, DOI: 10.1049/MIA2.12187
- [A] BERMÚDEZ-MARTÍN DIEGO ET AL: "Methodology for Improving Scanning Performance Loading an Array Element with a 3D All-Metal WAIM", ELECTRONICS, vol. 11, no. 18, 9 September 2022 (2022-09-09), Basel, Switzerland, pages 2 - 11, XP093023510, ISSN: 2079-9292, DOI: 10.3390/electronics11182848

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA

Designated validation state (EPC)
KH MA MD TN

DOCDB simple family (publication)
EP 4391232 A1 20240626; CA 3223986 A1 20240622; FR 3144427 A1 20240628; US 2024213664 A1 20240627

DOCDB simple family (application)
EP 23217070 A 20231215; CA 3223986 A 20231220; FR 2214203 A 20221222; US 202318544164 A 20231218