Invitation for manuscript AP2101-0007

From: Transactions on Antennas and Propagation (onbehalfof@manuscriptcentral.com)

To: tptambusai@yahoo.com; pteedy2@live.utm.my

Date: Saturday, January 16, 2021, 03:22 PM GMT+7

16-Jan-2021

Re: AP2101-0007 Increasing the Gain of Beam-Tilted Circularly Polarized High-Gain Radial-Line Slot Array Antennas

Dear Mr. Teddy Purnamirza,

This is a reminder that your response to the invitation to review the above mentioned manuscript, is requested.

Please click the appropriate link below to automatically record your response. If you are unable to review at this time, it would be helpful if you can recommend another expert reviewer.

Your help in accomplishing our goal of an expedited review process would be greatly appreciated. Please do not hesitate to contact me if I can be of any assistance.

The abstract for the manuscript entitled 'Increasing the Gain of Beam-Tilted Circularly Polarized High-Gain Radial-Line Slot Array Antennas' follows:

This paper presents a new type of beam-tilted circularly polarized (CP) radial line slot array (RLSA) antenna. When the conventional beam tilting method is applied to CP-RLSA antennas, the aperture efficiency of the antenna degrades significantly due to very sparse slots in some parts of the antenna. A new method is presented to increase the gain and aperture efficiency from the same area. The key to the new method is an aggressively biased truncation of the slot layout that leaves out sparse slots. Consequently, the feed point moves closer to an edge of the TEM waveguide; a reflecting wall is introduced to prevent leakage from this edge. It is shown that the gain of RLSAs with beams tilted to 25 degrees and 45 degrees can be increased by 5.5 dB (from 20.5 dB to 26 dB) using the new method as opposed to the conventional method. The measured results confirmed a higher gain of 26.2 dBic, an aperture efficiency of 30%, the overall efficiency of 93.2%, and sidelobe levels less than -25 dB at 18 GHz. The measured 10dB return loss bandwidth of the antenna is greater than 63.7%, 3dB axial-ratio bandwidth is 13.3%, and 3dB gain bandwidth is 6.7%.

Sincerely,

Prof. Zhongxiang Shen
Associate Editor, IEEE Transactions on Antennas and Propagation
ezxshen@ntu.edu.sg

*** PLEASE NOTE: This is a two-step process. After clicking on the link, you will be directed to a webpage to confirm. ***

Agreed: https://mc.manuscriptcentral.com/tap-ieee?URL_MASK=024e76c7438c4f09bfdb29219db21df1

Declined: https://mc.manuscriptcentral.com/tap-ieee?URL_MASK=628c27e9e05a4036ae4b124efa33fb68

Unavailable: https://mc.manuscriptcentral.com/tap-ieee?URL_MASK=15947c9d4e114783adfc55c82b0221de

Decision on Manuscript AP2101-0007

From: Transactions on Antennas and Propagation (onbehalfof@manuscriptcentral.com)

To: ezxshen@ntu.edu.sg

Date: Tuesday, February 23, 2021, 7:17 PM GMT+7

Dear Reviewer,

Thanks very much for your review of the above manuscript, entitled Increasing the Gain of Beam-Tilted Circularly Polarized High-Gain Radial-Line Slot Array Antennas. The decision letter for the current manuscript is copied below my signature.

Your contribution to the Transactions on Antennas & Propagation is greatly appreciated.

Regards,
Prof. Zhongxiang Shen

Associate Editor
IEEE Transactions on Antennas & Propagation

==========

COPY OF DECISION LETTER TO AUTHOR(S) - Manuscript AP2101-0007

23-Feb-2021

Ms. Mst Nishat Yasmin Koli
G04, Ground level, 44 Waterloo Road, Macquarie park-2113.
Sydney
New South Wales
Australia
2109

Paper No.: AP2101-0007
Paper Title: Increasing the Gain of Beam-Tilted Circularly Polarized High-Gain Radial-Line Slot Array Antennas

Dear Ms. Koli,

The Editorial Board has completed its evaluation of your manuscript. It has concluded that your paper is not suitable for publication in the Transactions in its present form, but may be acceptable if revised according to the reviewers' comments as indicated below or in any attached files. This message and any attachments can also be viewed in the Author Dashboard of Manuscript Central.

If you wish to revise your paper and resubmit it for further review, please follow these instructions carefully:

1. Revise the document taking into account each comment/request from each reviewer, the Associate Editor, and the Editor-in-Chief. Please highlight all changes other than minor editorial revisions using color, italic, or boldface text or color highlighting. Format the paper in two columns with single spacing and the figures inserted at their appropriate locations within the text.

2. Prepare a response letter that lists each comment/request from each reviewer and editor. Following each comment, indicate carefully the changes made in the manuscript to address the concern or provide a rebuttal if you disagree with the comment. It is helpful if you format the letter so that comments from the reviewers and editors are shown in bold or italic font while your responses are in regular font.

3. To upload your revised manuscript, please visit the Manuscript Central website given below. Under the Author Center, click on 'Manuscripts with Decisions', locate your paper, and click on 'create a revision'. You can then proceed with the revision, making changes as appropriate and being sure to delete old versions of the manuscript files to avoid confusion during review. While the system allows several options for providing your response letter, we ask that you upload your letter as a 'Supporting Document' on the same screen where you upload the revised manuscript. Note that if you come back later to complete the revision, the paper will be listed under 'Revised Manuscripts in Draft'.

Once you complete the submission, these materials will be reviewed, and you will be informed of our final decision. While I realize that complying with the suggestions indicated requires substantial work, the IEEE aims to limit the time between original submission and publication to two years, and therefore I must request that you deal with this promptly. As a result, your revision must be submitted within 120 days of the date of this email, a deadline that is strictly enforced by the submission system.

Thank you for your willingness to make these changes, and I hope that you will engage in a constructive process that leads to a high-quality contribution to the Transactions.

Kind regards,

Editorial Office
IEEE Transactions on Antennas & Propagation

TAP Website: http://ieeeaps.org/aps_trans/index.htm
TAP Manuscript Central Website: https://mc.manuscriptcentral.com/tap-ieee

==========
REVIEWERS' COMMENTS:

Reviewer: 1

Comments for Transmittal to Author
In revewer opinion and knowledge, there is no problem about utilization of the physical aperture and gain in the Circular Polarized (CP) –RLSA antennas. CP-RLSAs and Linear Polarized (LP)-RLSAs without beamtilting already have good utilization of physical aperture. However, in LP-RLSA, the problem is high reflection due to the lamda/2 distance between slots, which then overcome by squinting the beam about 200 from broadside direction, which then slightly disturb the uniformly and the utilization of physical aperture. Unlike LP –RLSA antennas, there is no problem of high reflection in CP-RLSA, since the distance between slots is already lamda/4 which lead to low reflection. This basic theory is well known and mentioned in several basic RLSA paper, (see article of Paul Davis and Marek Bialkowski “Beam shaping Radial Line Slot Array Antennas”or Paul Davis Phd thesis). Hence, the beamsquint is the technique that implemented as special case for LP-RLSA and not for CP-RLSA.
So, we think the authours misundertand this concept. This missunderstanding is a fatal mistakes since the idea of the research-which is raised from this missundertanding – automatically become mistake as well.
Moreover, it’s the pity that the research result become not significant anymore since the proposed problem is not the real problem. The utilization of aperture in CP-RLSA without beamsquint is already good, so no need to use beamsquint technique. The use of beamsquint in CP-RLSA even raise a new problem which is not the real problem. It is this fabricated problem which then the authors try to propose and solve.
However, the technique of shift the feeder, and the used of the tight slots in the left - as proposed in this paper- will probably become a good technique if it is implemented in LP-RLSA as new option to overcome the problem of low reflection and increase the gain and aperture utilization, but not for CP-RLSA.

Reviewer: 2

Comments for Transmittal to Author
In this manuscript, the authors present an interesting design of a beam-tilted circularly polarized radial line slot array antenna. A new design method is proposed to improve the antenna gain and aperture efficiency by eliminating sparse slots, moving the feed point to the edge and introducing a reflecting wall. Moreover, a comparison with the conventional method shows that the antenna gain has been increased by 5.5 dB using the new method.
The paper has been properly written and the results seems to be promising above all the guidance through the design of the structure. However, there are several clarifications that have to be conducted prior to being considered

for publication.

1. The slot arrangement of the new structure should be clarified, and its design process needs to be discussed in detail, which is essential to the proposed antenna. Is the slot arrangement obtained by direct truncation from the traditional one, whose radial spacing (Sρ) is obtained according to equation (1)? The radial spacing (Sρ) of the proposed antenna should be given in Table I.

2. It is mentioned that the arc-shaped metal reflector is used to avoid leakage from the edge of the quasi TEM waveguide. As shown in Fig. 9(a), a lot of power leaks outside the aperture close to the feed point when the reflector length is short. However, Fig. 10 shows that the antenna gain does not vary much with the reflector length. The gain only drops by 0.2 dB even when the reflector length is 1λ0. Please explain this phenomenon. How does the reflector affect the axial ratio, gain and side lobe level?

3. In Section IV- C. the authors claim that “the aperture efficiency can be further improved by optimizing the slot lengths and controlling the power coupling from the inner cavity field to the radiating field”.
In the reviewer’s opinion, the truncation of the tradition CP RLSA and the introduction of the reflector has changed the original cylindrical leaky wave inside the waveguide. As a result, the aperture field uniformity is influenced, which can decrease the antenna aperture efficiency. Is it possible to get higher aperture efficiency by using the existing aperture field synthesis methods, which are based on cylindrical leaky wave mode (such as those mentioned in [R1-R3])? How to consider the influence of reflection and truncation on the leaky wave mode?

[R1] M. Takahashi, J. -. Takada, M. Ando and N. Goto, "A slot design for uniform aperture field distribution in single-layered radial line slot antennas," in IEEE Transactions on Antennas and Propagation, vol. 39, no. 7, pp. 954-959, July 1991.

[R2] M. J. Lopez-Morales, F. R. Varela, D. V. Vazquez and M. S. Castaner, "Efficient Design of Radial Line Slot Antennas Using Currents Synthesis and Optimization," in IEEE Antennas and Wireless Propagation Letters, vol. 19, no. 3, pp. 487-491, March 2020.

[R3] M. Albani, A. Mazzinghi and A. Freni, "Automatic Design of CP-RLSA Antennas," in IEEE Transactions on Antennas and Propagation, vol. 60, no. 12, pp. 5538-5547, Dec. 2012.

Minor comments:
1. In Section I- 2nd and 3rd paragraphs, there are some repeated labeled references. It is mentioned in Section I-3rd paragraph that classic beam-tilted CP RLSAs have poor utilization of the physical aperture, reduced gain, and higher grating lobes. It is better to list a table for performance comparison between classic beam-tilted CP RLSAs and the proposed antenna.
2. It seems that the “λg/4” marked on Fig. 2 is misleading.

Reviewer: 3

Comments for Transmittal to Author
(There are no comments. Please check to see if comments were included as a file attachment with this e-mail or as an attachment in your Author Center.)

NOVELTY: If the manuscript is not sufficiently novel (the score you provided is below 6), please provide at least one publication used as a reference to determine that there is not sufficient advancement:

Reviewer: 1
Novelty text: there is no problem about utilization of the physical aperture and gain in the Circular Polarized (CP) –RLSA antennas. CP-RLSAs and Linear Polarized (LP)-RLSAs without beamtilting already have good utilization of physical aperture. However, in LP-RLSA, the problem is high reflection due to the lamda/2 distance between slots, which then overcome by squinting the beam about 200 from broadside direction, which then slightly disturb the uniformly and the utilization of physical aperture. Unlike LP –RLSA antennas, there is no problem of high reflection in CP-RLSA, since the distance between slots is already lamda/4 which lead to low reflection. This basic theory is well known and mentioned in several basic RLSA paper, (see article of Paul Davis and Marek Bialkowski “Beam shaping Radial Line Slot Array Antennas”or Paul Davis Phd thesis). Hence, the beamsquint is the technique that implemented as special case for LP-RLSA and not for CP-RLSA.
So, we think the authours misundertand this concept. This missunderstanding is a fatal mistakes since the idea of the research-which is raised from this missundertanding – automatically become mistake as well.

ASSOCIATE EDITOR'S COMMENTS:
Associate Editor
Comments to the Author:
Thank you for submitting your paper to the TAP.

The reviewers appreciate the efforts made by the authors to prepare the paper though they have diverging views of the novelty of the work. I suggest that the authors be given an opportunity to revise their manuscript.

TRACK EDITOR'S COMMENTS:
The review results are mixed. The authors are given a chance to rigorously polish the manuscript by addressing all technical and editorial comments raised by the review panel. Particularly, the criticisms from Reviewer 1 should be successfully overcome.

- Figure: avoid using fonts in boldface for non-vector/matrix content.
- Revise journal abbreviations in the reference list in accordance with the following document:

http://ieeeauthorcenter.ieee.org/wp-content/uploads/Journal-Titles-and-Abbreviations.pdf
Please follow the IEEE template.