

Transactions on Microwave Theory and Techniques

Decision Letter (TMTT-2022-09-1432)

From: eic.tmtt@gdut.edu.cn
To: eko@eng.ui.ac.id
CC: vittorio.camarchia@polito.it, eic.tmtt@gdut.edu.cn
Subject: Transactions on Microwave Theory and Techniques - MAJOR REVISION Decision on Manuscript ID TMTT-2022-09-1432
Body: 18-Nov-2022

Dear Prof. Rahardjo:

Your manuscript ID TMTT-2022-09-1432 entitled "Orthogonal Resonators for Circularly Polarized Filtering Antenna Using A Single Feedline" has been reviewed and I am happy to inform you that it has been found interesting by the TMTT Editorial Board. The Editorial Board, however, feels that the paper requires major revisions before it may be published. Please find the comments made by the Associate Editor (Dr. Vittorio Camarchia) and the reviewers at the bottom of this letter. Based on the comments, please revise your manuscript accordingly. Apart from addressing technical issues, please refer to the IEEE Editorial Style Manual (<https://journals.ieeeauthorcenter.ieee.org/your-role-in-article-production/ieee-editorial-style-manual/>) to correct all the format errors. Your paper will be REJECTED IMMEDIATELY without review if the IEEE style is not adhered to.

Once you have prepared your revision, you MUST follow the Revised/Resubmitted Manuscript Checklist EXACTLY (<https://www.mtt.org/author-information-transactions>) to prepare ALL the required documents and follow the instructions to submit them:

- 1) Revised manuscript with no highlights, to be submitted as the main document.
- 2) Revised manuscript with changes highlighted in colored text (blue or red preferred), to be submitted as a supplementary file. Do not use the track changes mode in MS Word.
- 3) Document "reply to reviewers" listing all reviewers' comments and a detailed response to each comment, to be submitted as a supplementary file.

Note that your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to the Transactions on Microwave Theory and Techniques, your revised manuscript is due on 11:59 PM ET, 18-Dec-2022 and should be uploaded before it is due. If it is not possible for you to submit your revision in time, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to the Transactions on Microwave Theory and Techniques and I look forward to receiving your revision. I also take this opportunity to thank the reviewers for their timely and thoughtful comments, and Dr. Vittorio Camarchia for handling the review.

Yours sincerely,

Prof. Jianguo Ma
Editor-in-Chief, IEEE Transactions on Microwave Theory and Techniques
eic.tmtt@gdut.edu.cn

Associate Editor

Comments to the Author:

The paper has been judged interesting by the Reviewers. However, some points must be better addressed and clarified. I strongly encourage the Authors to fully address all the reviewers' comments in the revised version of the paper

Reviewers' Comments to Author:

Reviewer: 1

Specific and Thorough Comments to the Author

This presented manuscript "Orthogonal Resonators for Circularly Polarized Filtering Antenna Using A Single Feedline"

1. A more robust scientific methodology is expected, the shape of the Filtering Antenna is based on what equations for example? On what theoretical basis is the size and position of the slot chosen?

2. The theoretical background is also required, well known equations 1 to 6 are not sufficient.
3. Slot length and height variation are an optimization way for improving the Filtering Antenna characteristics, there is no theoretical and mathematical evidence to prove the validity of these kinds of methods. Please provide a solid background to justify the variation in slot length and height as shown in Fig. 2(a).
4. The authors should include radiation efficiency Vs Frequency.
5. How the gap spacing between the rectangular radiator and $\lambda/4$ resonator determined the phase delay? A theoretical background is also required.

Reviewer: 2

Specific and Thorough Comments to the Author

This paper presents a single feed filtering antenna having circular polarization. In this regard there are some points:

1. What is the effect of filter specification to the antenna performance. For example, a second order Chebyshev filter of 4.7% fractional bandwidth is designed. Why 4.7% and what will be happened when it is changed?
2. In connection with antennas I and II, a third antenna is suggested which has a half wavelength transmission line instead of quarter wavelength one.
3. The comparisons in Table 1, should be enhanced with more references.

Reviewer: 3

Specific and Thorough Comments to the Author

Authors should provide the clear advantages of the structure presented in the paper over the conventional related structures published in the literature.

Antenna working mechanism should explain well to understand readers.

For circularly polarized antennas, gain unit should be "dBic" in text and figures.

Explain about measurement setup of axial ratio at the boresight.

In Table 1, for fair comparison, authors should add overall antenna volume in terms of wavelength.

Please improve technical English writing of the paper.

Reviewer: 4

Specific and Thorough Comments to the Author

Please compare the method you proposed and the results you obtained with those published in additional papers on circularly polarized filtering antennas as for instance:

Y. Dong et al., "Broadband Circularly Polarized Filtering Antennas," IEEE Access, vol. 6, 2018.

W. -J. Yang, Y. -M. Pan and X. -Y. Zhang, "A Single-Layer Low-Profile Circularly Polarized Filtering Patch Antenna," IEEE Antennas and Wireless Propag. Letters, vol. 20, no. 4, 2021.

S. Ji, Y. Dong, Y. Pan, Y. Zhu and Y. Fan, "Planar Circularly Polarized Antenna with Bandpass Filtering Response Based on Dual-Mode SIW Cavity," IEEE Trans. on Antennas and Propag., vol. 69, no. 6, 2021.

Ref. [18] is wrong D. A. Cahyasiwi, F. Y. Zulkifli and E. T. Rahardjo, "Stacked Interdigital Filtering Antenna with Slant Polarization," 2019 IEEE Conf. on Antenna Measurements & Applications (CAMA), Kuta, Bali, Indonesia, 2019, pp. 1-4.

Since part of the method you describe and some results (fig. 4d) reported in the manuscript was already introduced in [19], even if for design of a different filtering antenna, you can refer to it.

A deep review of the written English is recommended to improve the clearness of the manuscript.

Please modify the legend of the figures, since in some of them the lines used for the different curves seem to be the same.

Reviewer: 5

Specific and Thorough Comments to the Author

The work describes an interesting technique to model and design a circularly-polarized antenna with integrated filtering function.

The idea is based on a square patch excited by a resonator, so that the two radiated linear modes have proper relative phase and amplitude.

The design approach, in this reviewer's opinion, is interesting, as it tries to bridge the gap between filter synthesis and antenna design.

However, I think the either the model needs a bit of rethinking, or the explanation provided is misleading to the reader. Fig. 1 shows an equivalent circuit with 2 resonators, where the first one is associated to the first mode (horizontal) and the second to the second linear mode (vertical). This is also remarked by the picture showing the simulated currents and by what the text describes.

However, the simulated response shows an unexpected response, with a clear single matching peak

(one reflection zero at the center of the passband), whereas the "conventional" antenna shows two peaks (two reflection zeros). While this behavior is not "unacceptable" in itself, I think that the explanation given actually neglects that the shown simulated response is instead a third order, which is only slightly visible by the weird slope of S11 toward the edges, suggesting that two complex reflection zeros are closeby.


Indeed, I think that the authors should consider a third order model as starting point (although not all degrees of freedom may be controllable): the horizontal $\lambda/4$ resonator is a first resonator coupled to the input, but then it is directly coupled to two resonators (these both with a radiation resistance and uncoupled from each other) representing the two orthogonal modes of the nearly-square patch.

To make the manuscript didactically more relevant, thus, this model should be discussed, as it would be the expected one. If this 3-rd order model is instead incorrect, the Authors should discuss why. This model, if more accurate instead of the proposed second-order one, might also make the paper technically more robust.

While the doubt about the validity of the discussed model is my main concern, there are some minor comments as well:

- an overall revision of grammar is advised (several awkward sentences, e.g. "these individual structures is integrated...", "The geometric structure comprise...", "Fig. 7 shows that Ant 1's axial ratio result does not perform CP with its high value", "The proposed method design..."...)
- Fig. 6, the traces shown in the legend of S11 Ant 1 and of S11 Ant 2 are too similar, almost indistinguishable
- the description through Sect II and III suggests that the $\lambda/4$ resonator represents the horizontal currents. I would suggest considering rewriting this text highlighting that the $\lambda/4$ resonator actually induces horizontal currents in the big rectangular patch (if this view is correct). The impression from the manuscript is instead that the Authors claim the $\lambda/4$ resonator is itself a radiator responsible for horizontal polarization. This impression of a wrong claim is then clarified only after Fig.5, which indeed shows the "conventional" filtenna which radiates only in vertical polarization while involving the same horizontal radiator. Therefore the suggestion, to avoid confusion through the readers, is to highlight from the beginning that the horizontal resonator is merely instrumental in generating the second polarization.
- As a curiosity, has a double-layer substrate been necessary only for exploiting a thick dielectric for the patch? Or could the feedline/resonator/patch fit all on the top metal?
- Fig.15 showing a measured gain-vs-frequency response which is much more selective should be discussed more, as there is no apparent reason for an increased selectivity.

Date Sent: 18-Nov-2022

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Decision Letter (TMTT-2022-09-1432.R1)

From: eic.tmtt@gdut.edu.cn
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CC: vittorio.camarchia@polito.it, eic.tmtt@gdut.edu.cn
Subject: Transactions on Microwave Theory and Techniques - ACCEPT Decision on Manuscript ID TMTT-2022-09-1432.R1
Body: 20-Mar-2023

Dear Prof. Rahardjo:

It is a pleasure to accept your manuscript entitled "Orthogonal Resonators for Circularly Polarized Filtering Antenna Using A Single Feedline" for publication in the IEEE Transactions on Microwave Theory and Techniques.

Your paper was handled by Associate Editor Dr. Vittorio Camarchia. Below are the revisions, if any, that must be made when returning your manuscript in its final form.

Please do not make any changes to this accepted version of the manuscript, unless they were requested by the Editorial Board or you found errors/typos to be corrected. If you make any changes, carefully justify each of them and send a separate note highlighting what the changes are. Otherwise, this acceptance decision may have to be rescinded and the manuscript sent back for another review cycle. Subject to format issues, please adhere to the IEEE format style (<https://connect.ieee.org/f00Aa030yk000P3kGUHjb00>, the file is attached to this email).

Please note the attached file (Final Manuscript Checklist.pdf) to prepare the final package, as this package cannot be accepted if any files are missing. More details can be found in the Final Manuscript Checklist (<https://www.mtt.org/author-information-transactions>). If you have not included authors' biographies and photos, this is the last chance to add them to the paper. Once the proof of the final submission is generated for proofreading, IEEE will not be able to process inserted biographies and photos. Please also remember to include the Page Charge Authorization Form.

Thank you for your fine contribution and I look forward to receiving your future submissions. I also take this opportunity to thank the reviewers for their timely and thoughtful comments, and the associate editor for handling the review.

Yours sincerely,

Prof. Jianguo Ma
Editor-in-Chief, IEEE Transactions on Microwave Theory and Techniques
eic.tmtt@gdut.edu.cn

Associate Editor
Comments to the Author:

The paper can be accepted in its present form. I do personally apologize for the very long review time. It is the result of some misunderstanding related to the change of the editorial board. My sincere apologies to the Authors.

Reviewers' Comments to Author:
Reviewer: 1

Specific and Thorough Comments to the Author

The authors have not given satisfactory answers. They have just added more references to justify their work instead of giving solid theoretical backgrounds. So it is very difficult to find any novelty in this work.


Reviewer: 2

Specific and Thorough Comments to the Author
Almost all reviewer's comments have been considered.

Reviewer: 3

Specific and Thorough Comments to the Author
modify the paper's abstract and state clearly main claim

Date Sent: 20-Mar-2023

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