Peer review of group 751

Overall assessment:

Seems unfinished, and not following the IMRAD structure which was a requirement. The measurements are nice, but they could be used better. Problems with the path loss models (especially TRPL), which resonate through the rest of the paper. The proposed model is based on it, and many conclusions are made because of it, which we claim are wrong. We did not comment a lot on all sections. What we did not comment on means it's good. It seems to us like the work behind the paper is well thought out, but the paper is rushed.

General comments

- Good things:
  - Nice results, nice measurements. A setup diagram could be nice
  - Good usage of MSE to evaluate models
  - Good that focus is on results, and there are many good findings
- Bad things
  - Does not follow IMRAD structure very well
  - Reader lacks information about for example antennas, some statements made without explanation
  - Hard to read. Language problems (danish mixed with english). long sentences. weird comas etc.
  - Layout problems (holes)
  - Some problems with the PL models
  - Try to find references of references. Reference 4 is no good
  - Equations lack units!!
  - page numbers!!

Specific comments

- Abstract:
  - Starts in present tense, ends in past
  - weird commas
  - Many keywords. less could do it (2 to 5)
- Introduction
  - Talking about articles used? Maybe belongs in methods. It is ok to explain current state of research in this field and expose problems in that research, and how your research fixes it. But this does not do that…
  - Subsection about path loss??
    - What is this section? Review of previous research? Does not belong here.
    - How much of this is used in the project? Seems a bit much if it is just to explain the current models imperfections..

- Path loss models
    - Eq. 2:
        - We assume your antennas are isotropic. Otherwise the gain for the direct wave and reflected wave will not be the same, and can thus not be taken out of the parentheses. What about the antenna gain on the surface wave? also the same? What antennas are used here?
        - Same distance on direct wave and reflected?? Reflected is always longer, so why is it the same d for the whole thing?
    - Eq. 7
        - A bit of mixing of calculating received power and calculating PL. The FSPL calculates FSPL and not free space received power :) The same for all the “PL” formulas.
    - Eq. 8:
        - This is not the two ray path loss model. This is an approximation of it where the complex term has been removed using taylor series and the phase is approximated using hr and ht etc. There is also no reflection coefficient. You should not call it TRPL but explain the approximation and call it ATRPL. Your source does not mention this, and thus seems dubious. Consider another source or the sources of your source
        - With this approximation you get zero power at hr = 0. But that's because you approximate the phase difference using (4*pi*hr*ht)/(wavelength*d). What if you didn't use that approximation?
        - You mention that you get power in the GWPL model because it introduces the surface wave. What if only one antenna is at 0 height? Then (8) will be still zero, but i doubt that would be the case IRL. And that is not because of the surface wave.
- Methods:
    - “the first is to assume no knowledge of existing models”... why?
    - Table: What antennas were used??
    - Monopole antenna: What wavelength?
    - Patch antenna: What kind?? There are so many kinds :)
    - How where the antennas measured?
    - Footnote 2: This assumption depends if the antennas are the same.
    - Figure 1 and 2. Consider also showing the test setup (diagram would be best). That is more important than these pictures.
        - Also the measurement procedure is only vaguely explained. Need a step by step
    - “parameters that have little to no statistical influence”. What parameters are those, and why are they insignificant?
    - “Lastly the models will be used to predict the PL, which will be matched with”. Are you comparing to them or fitting the data? What does matched mean?
- Results
    - Mention under the pictures what we see… What are the tendencies? Explain what it does when varying this and that. That is what is supposed to be in results. Figure 4 and 5 is under-explained! These are very interesting results!

The beginning of the section could be split up and put under each corresponding figure.

- Results are in appendix? In results the results are supposed to be, along with text about what is in the results, what tendencies they show etc. Maybe this should not be in appendix? Of Course the comparisons are the results as well, but still
- Figure 6: Missing point covered by legend box?
- Page 4 top: It is not the models that are predicted…
- Page 4 layout issues
- You claim the relative permittivity is the culprit for GWPL and NSPL not fitting well on fig 6. Why is this? How do you know this? Could it be that there was more gain or loss than expected elsewhere? Is the relative permittivity between 3 and 20?
- "predictions from TRPL is underestimating the path loss which is because (9) is false."
    - If you were to use the real TRPL, would it fit better? because it doesn't have this approximation...I think it would…
    - If you used the real TRPL it would make more sense to compare it to GWPL, which is basically the real 2 ray (without individual gains and distances!!), but with an added term.
- Table 2: What is covarage? :)
    - Coverage area… WIth the real TRPL it would also cover 100%
        - Maybe show with color lines which parts they cover. It matters which 35% we are talking about. Maybe dotted line outside the coverage area and then full line inside?
    - MSE. Good to compare, but it would be nice to know how much they are off in terms of dB on average… It is hard to relate MSE to anything other than comparing
- Summary (which might belong in discussion)
    - "It can be further seem from Tab. 2, … … decreases for the simplified PL models."
        - well… simplified in the sense that they do not take into account the specifics of your scenario. However the FSPL for example is not "simplified", it just assumes free space, in which case it doesn't fit your scenario.
        - You mention again that the relative permittivity is the reason why NSPL is no good. How do you know this is the case? It could be something else?
    - "TRPL has the highest valid region … but has a rather high MSE, this is due to its lack of ability to account for the surface wave, as seen from (8) when the heights go to zero so does the power received."
        - What about the fact that you use the approximated version which has hr and ht terms it it. Of course it becomes zero then! That approximation is not applicable at hr or ht = 0. What about the reflection coefficient of the ground, which is also not in this formula (8).

        - “This paper will now propose a model that accounts for some of these weak points.”
            - IMRAD structure?
- Discussion
    - Seems like more results. IMRAD structure? Discussion is supposed to summarize main findings (allowing the reader to skip to the beginning of the discussion). Connect findings to other research, discuss flaws in study, suggest additional research, state implications etc.
    - More methods stuff (eq 13, 14 etc.). Doesn't belong here really
        - You use the approximated TRPL to make the new model. This means it has the same limitations. Why not use the unapproximated?
    - Guesstimated? Do you mean fitted to data or what?
        - “average of z” → was that the guesstimation?
        - Did you measure relative permittivity? How? Why do you not describe this?
    - “The MSE is found to 87.66…”. Those are results…
    - “The model does still not perform as well as the GWPL, however that could not be expected.”
        - Why not? Maybe because of the TRPL approximation used
    - Figure 9: Seems like proposed model is worse than just NSPL (if only by a tiny amount). Here we can see the extra data point that was missing in the previous model :)
    - Figure 10: Guess TRPL is hiding under the proposed model?
- Conclusion
    - The IMRADC structure? Didn't hear about it before :)
    - “PL of antennas”
        - I didn't know antennas could have path loss
- Appendix
    - Table 5: Does not seem insignificant, Seems like this belongs in results.