**Response to Reviewers (2nd round)**

1. Figure 1A - The in-text version (but not the version added to the end of the manuscript) has an incorrect legend, with Control and THC labels swapped for green and blue legend lines.  
 **RESPONSE: this has been corrected**

2. Line 287-288. The reviewer concurs that Lee et al (and others) have not proven connections from pyramidal cells to CCK+ basket cells do not exist. They may very well exist. However, while evidence has been published of many other connections from pyramidal cells to other interneuron types, this reviewer has not seen any for direct monosynaptic connections from pyramidal cells to CCK+ basket cells, and it does not appear to be for lack of trying (across many articles, not just the small study of Lee). This reviewer hopes to be proven wrong, and if so, please include the citation in this paragraph (that includes line 287-288). But if the authors are not aware of any experiments either, they should consider stating such or removing the word "basket" to say "We hypothesize that this is due to reduced feedback inhibition from CA1 cholecystokinin (CCK)-containing cells" or be prepared to receive this criticism from readers after publication.

**RESPONSE: This is a good point and the reviewer’s suggestion was adopted: the word ‘basket’ was removed. Thanks!**

3. [Minor] The word "amount" is still sometimes used for countable quantities in this text, where it would be clearer to say "number"  
 **RESPONSE: this has been corrected 4 times in the text. Thank you for pointing this out**

Reviewer #3: This paper nicely describes the effects of cannabinoids on the systems-level of network information transfer between rat CA3 and CA1 and the association with a measure of impaired memory encoding under the drug. The approach is fairly novel based on strong expertise of the authors using statistical modeling of spike input-output relationships. Their findings are interesting in finding no significant differences in firing rates in CA3 and CA1 under drug and more importantly, finding significant excitatory and inhibitory principle components that correlate with memory impairment. Some further considerations….  
1. In fig. 1a, I see the 12% decrease in correct choices. If you consider 50% as chance, then it seems more like a 24% impairment. Does this better match your 20% loss of inhibition in your model?

**RESPONSE: This is a good point. We have modified lines 90-91 to read: “On the behavioral level, it was found that THC reduced rodent-performance on the DNMS task by about 12.2+-.6% (Fig. 1a).
This corresponds to a 24.4% impairment relative to baseline performance at 50%.”**

2. In Fig 1e, is it worth noting that the peak of the difference is at a lower frequency that the peaks of the power spectrum?

**RESPONSE: This is a good point. The following sentence has been added to the text: “Interestingly, in both cases, the significant reduction of theta power occurred at 5-6Hz, which is lower than the observed theta peak. ”**  
The authors have reasonably responded to the prior reviewers' comments.  
  
Very minor points  
Fig 1c, \*\*\* is not defined.

**RESPONSE: This has now been defined in the caption (\*\*\*=P<.001)**

In Methods, line 301, who made the electrode array and what are it’s characteristics? Number of shanks, spacing, electrodes/shank, spacing.

**RESPONSE: This information is in the supplemental information under surgery: “Craniotomies (5mm-diameter) were performed bilaterally over the dorsal hippocampus to provide for implantation of 2 identical array electrodes (Neurolinc,New York, NY), each consisting of two rows of 8 stainless steel wires (diameter:20 µm) positioned such that the geometric center of each electrode array was centered at co-ordinates 3.4 mm posterior to Bregma and 3.0 mm lateral (right or left) to midline [66]. The array was designed such that the distance between two adjacent electrodes within a row was 200 µm and between rows was 400 µm to conform to the locations of the respective CA3 and CA1 cell layers.”**