

Peer Review

Review of: "Impact of Carrier Leakage on NavIC Signal Performance"

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Review Comments

1. Methodological Limitations:

- The paper assumes ideal conditions for some analyses (e.g., coherent demodulation in the receiver model). Real-world scenarios, such as multipath effects or non-linearities in amplifiers, could further degrade performance and should be discussed.
- The impact of carrier leakage on other GNSS signals (e.g., GPS or Galileo) is not explored, limiting the broader applicability of the findings.

2. Lack of Experimental Validation:

- While the theoretical analysis is robust, the paper would benefit from experimental or simulation-based validation of the proposed models. For instance, hardware-in-the-loop testing or software-defined radio (SDR) experiments could strengthen the claims.
- Real-world data from NavIC satellites (if available) could provide empirical evidence for the theoretical predictions.

3. Over-Simplification of Some Scenarios:

- The analysis focuses primarily on intrasystem interference. Intersystem interference, especially with other GNSS constellations sharing the same frequency bands, is not thoroughly explored.
- The assumption that all satellites in a constellation exhibit similar levels of carrier leakage may not hold in practice due to manufacturing variations or aging effects.

4. Presentation and Clarity Issues:

- Some equations (e.g., Equation 7 and Equation 8) could be better explained in the text to aid readability.

- The figures (e.g., Figure 5 and Figure 6) lack detailed captions, making it difficult to interpret the results without referring to the text.

5. Conclusion and Future Work:

- The conclusion reiterates the findings but does not explicitly outline future research directions. Suggestions for mitigating carrier leakage (e.g., advanced mixer designs, adaptive filtering techniques) or extending the analysis to other GNSS systems would enhance the paper's impact.

6. Typos and Formatting:

- Some typographical errors exist (e.g., "Principal" instead of "Principle" in Section 4).
- References could be formatted more consistently (e.g., spacing issues in Reference 4).

6. Repetition:

- The discussion of SSC values in Sections 4 and 5 is somewhat repetitive. A more concise presentation would improve flow.

Declarations

Potential competing interests: No potential competing interests to declare.