

Corrigendum to “Active Antenna Design for Lunar-Based Detection of Global 21cm-signals from the Dark Ages”

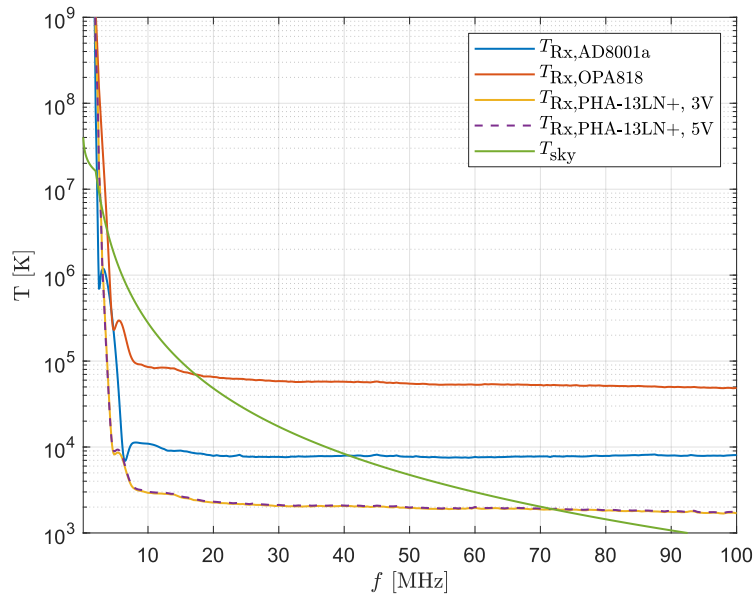
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After publication of the paper, an error has been discovered in one of the figures. This document aims to correct this error and explain the impact on the presented conclusions. As IEEE Xplore does not allow post-publication adjustments to conference papers, authors wanting to cite the work are requested to use the version available through the TU/e Research Portal which includes this corrigendum.

Sec. III “Active Antenna Design Parameters” introduces the equivalent isotropic sky noise temperature T_{sky} in (1) as a reference for the equivalent receiver noise temperature T_{Rx} (i.e. $T_{\text{Rx}} < T_{\text{sky}}$) with T_{sky} defined in [12] as

$$T_{\text{sky}} = \begin{cases} 16.3 \cdot 10^6 \left(\frac{f}{2 \cdot 10^6}\right)^{-2.53} & \text{if } f > 2 \text{ MHz,} \\ 16.3 \cdot 10^6 \left(\frac{f}{2 \cdot 10^6}\right)^{-0.3} & \text{if } f \leq 2 \text{ MHz,} \end{cases}$$

where f is the frequency of interest. However, an error in a processing script made T_{sky} of Fig. 8 as shown in Sec. VI “Combined Active Antenna Performance” a factor 10 larger than it should be. The corrected version of Fig. 8 is shown below.



CORRECTED VERSION: The equivalent isotropic sky noise temperature and the calculated equivalent isotropic noise temperature of the active antenna combining the log-spiral antenna and an amplifier of Tab. IV from 0.1 to 100 MHz.

From the figure, it can be concluded that the downward shift of T_{sky} by a factor 10 means the range of frequencies for which the systems satisfy (1) significantly decreases. As a result, the AD8001a amplifier does not meet the design criteria anymore and the observation that the PHA-13LN+ amplifier stays below 10% of T_{sky} for the full design frequency range (e.g. 10-70 MHz) does not hold. Instead, the antenna system with the PHA-13LN+ amplifier satisfies (1) up until 71.7 MHz. This it still meets the design criteria, but with less margin than previously presented. On the lower frequency end, T_{Rx} with the PHA-13LN+ drops below T_{sky} at a slightly higher frequency of 2.7 MHz. This means the concluding sentence in Sec. VII “Conclusion” should be corrected to:

“The simulated equivalent isotropic noise temperature of the active antenna remains below the sky noise from 2.7 MHz up to 71.7 MHz which contains the full design frequency range (10-70 MHz).”