Rejection of Tanh Models for the Global 21-cm Signal from Simulated Data: PART 3 Sliding Window Approach *(ongoing work)*

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This document describes the continuation of the simulation analyses presented in Reports #80 and #82 (`loco.lab.asu.edu/memos/`).

This time the data are modeled within a frequency window of a certain width, and using a certain number of foreground polynomial terms. The reference redshift (z_r) of the Tanh model is *nominally* assigned as the center frequency of the window. However, this is not possible at the extremes of the spectrum since, to keep the desired width of the window, its location has to remain static, with one of its borders aligned with the start or end frequency value of the spectrum. Thus, in these cases, z_r is shifted, channel by channel, to the extreme frequency while the window is kept static.

The 95% rejection conditions are the same as those described in Report #82.

Briefly, from the following figures it is concluded that even with a sliding window approach, it is difficult to combine results from different window widths and polynomial terms when the figure of merit is the best-fit amplitude and error bar of the Tanh template (A_{21}).

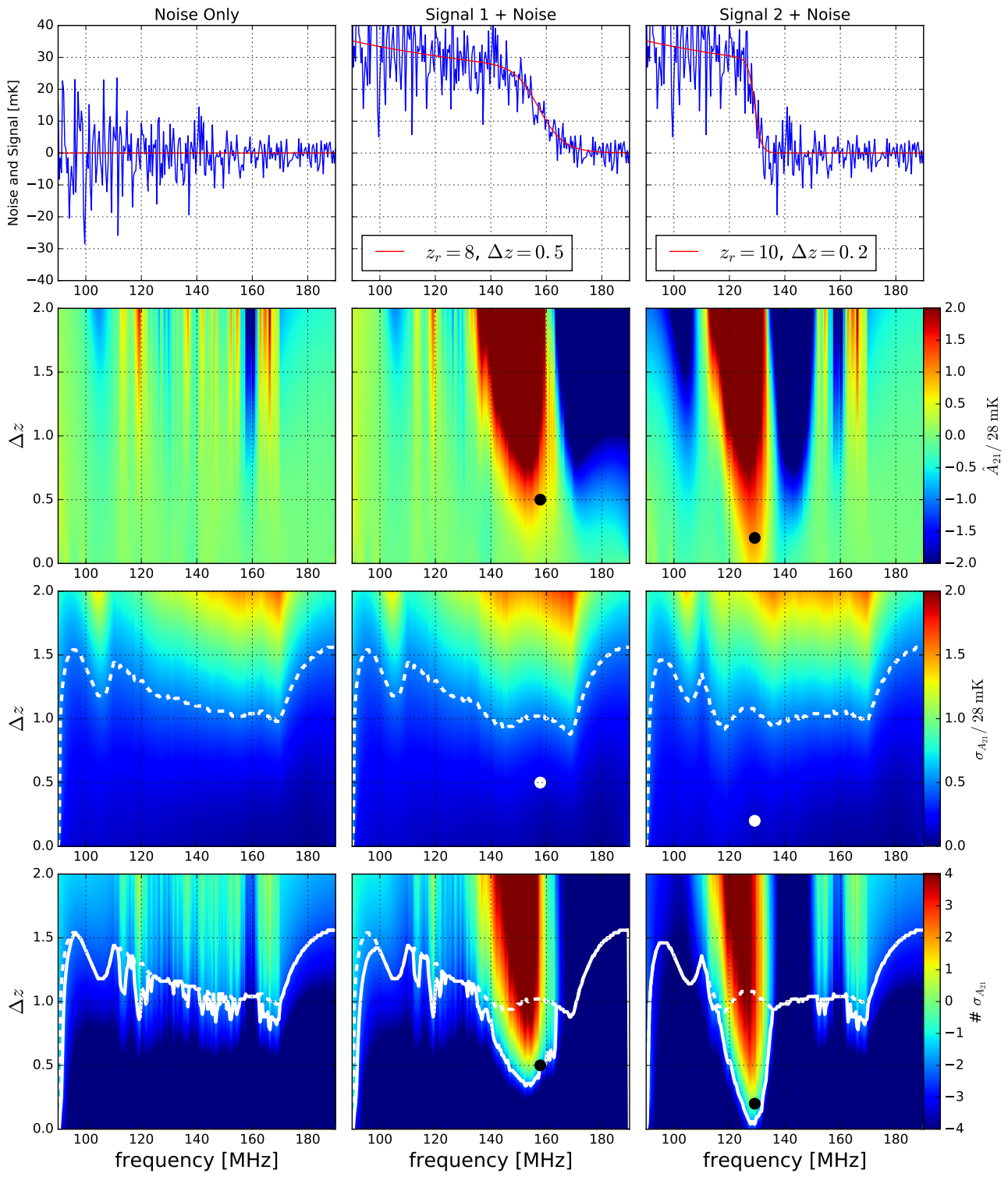

Figure 1: Summary of rejections for a measurement containing (LEFT) only noise, (CENTER) noise plus signal 1, and (RIGHT) noise plus signal 2. This rejection exercise was conducted with a window width of 40 MHz, modeled with 2 polynomial terms for the foregrounds. The dashed white line corresponds to the 95% rejection limits imposed by the error bars of the estimated Tanh amplitude ($\sigma_{A_{21}}$). The solid white line corresponds to the rejection limit imposed by both, the error bar and the best-fit value of A_{21}.

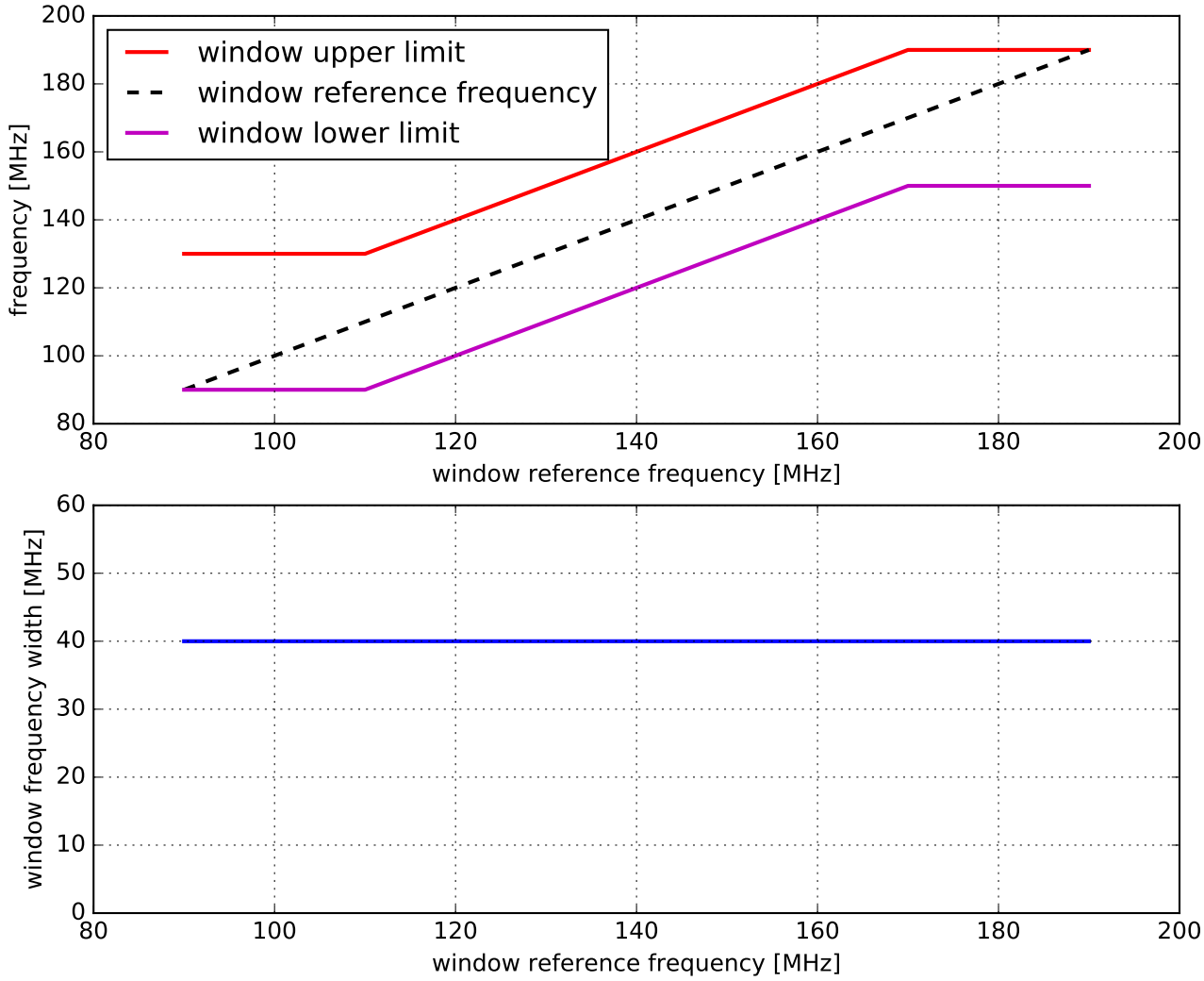

Figure 2: TOP: Extremes of the sliding window, as a function of reference frequency of the Tanh model. BOTTOM: Width of the sliding window.

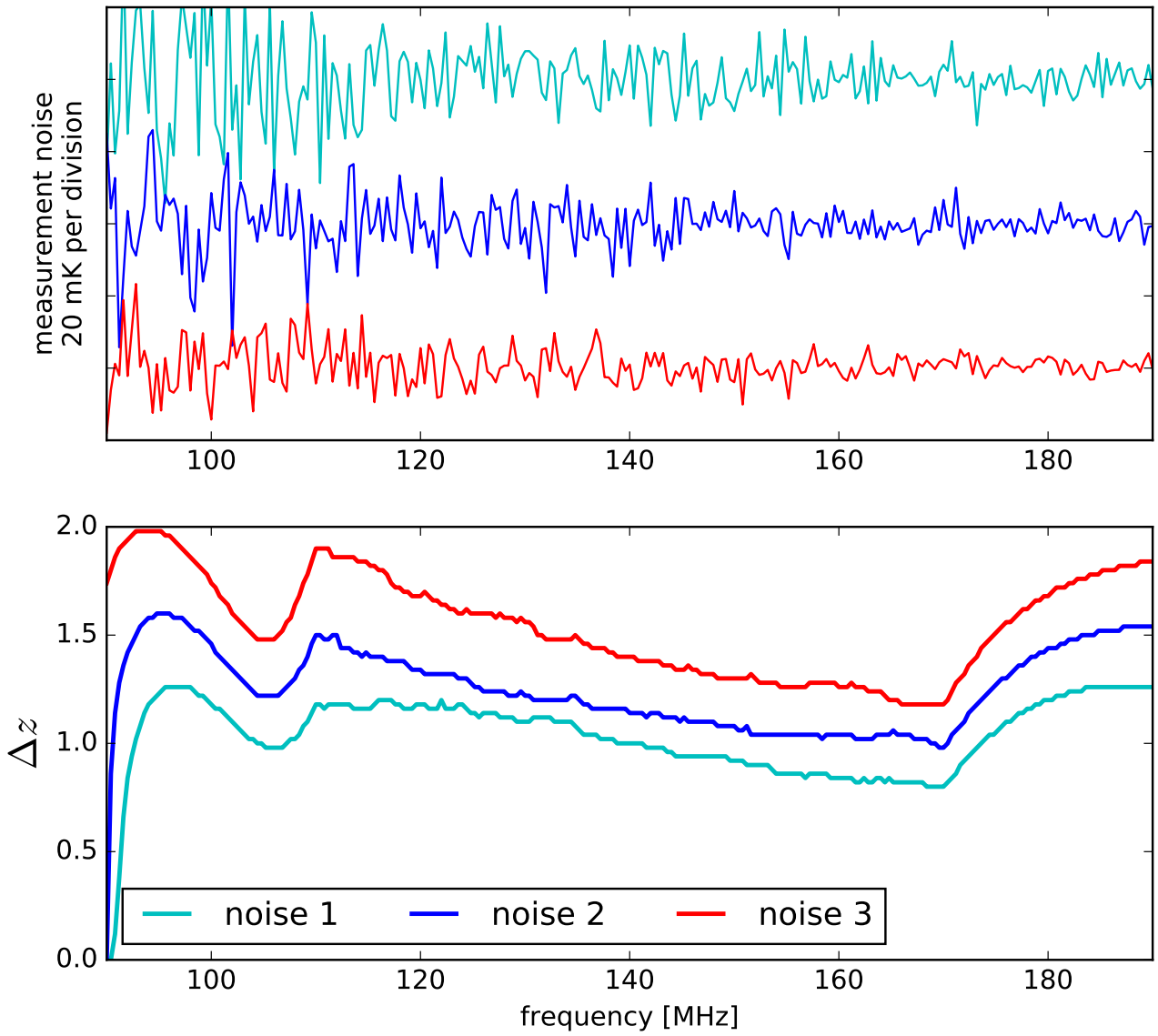

Figure 3: Dependence of the rejection limits from error bars alone (optimistic rejections) for three noise levels. The three cases use the same window width and number of foreground terms.

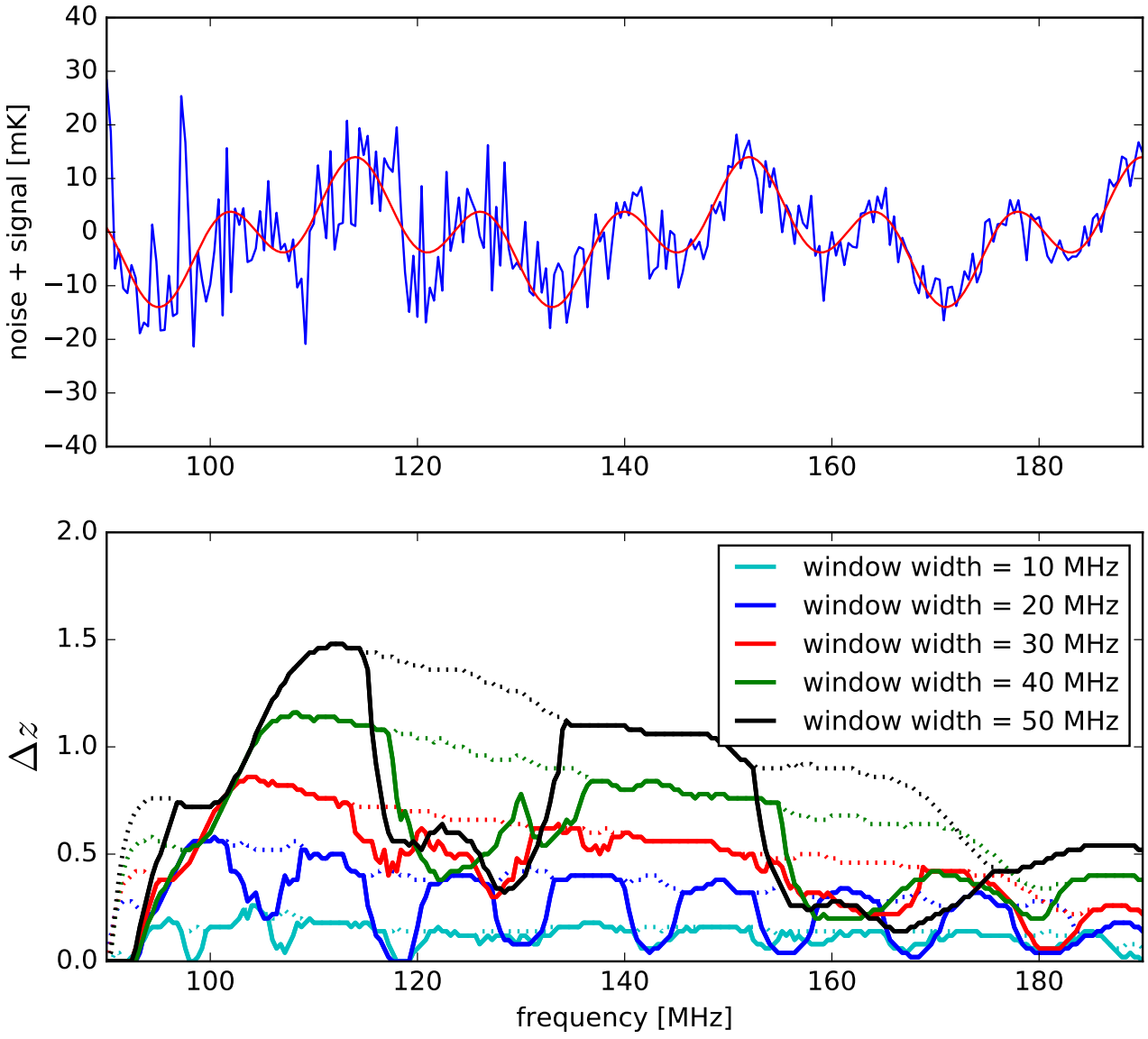

Figure 4: Rejection limits as a function of window width, for 3 foreground polynomial terms. The input signal (red line in top panel) was synthesized using two cosine functions with different periods.

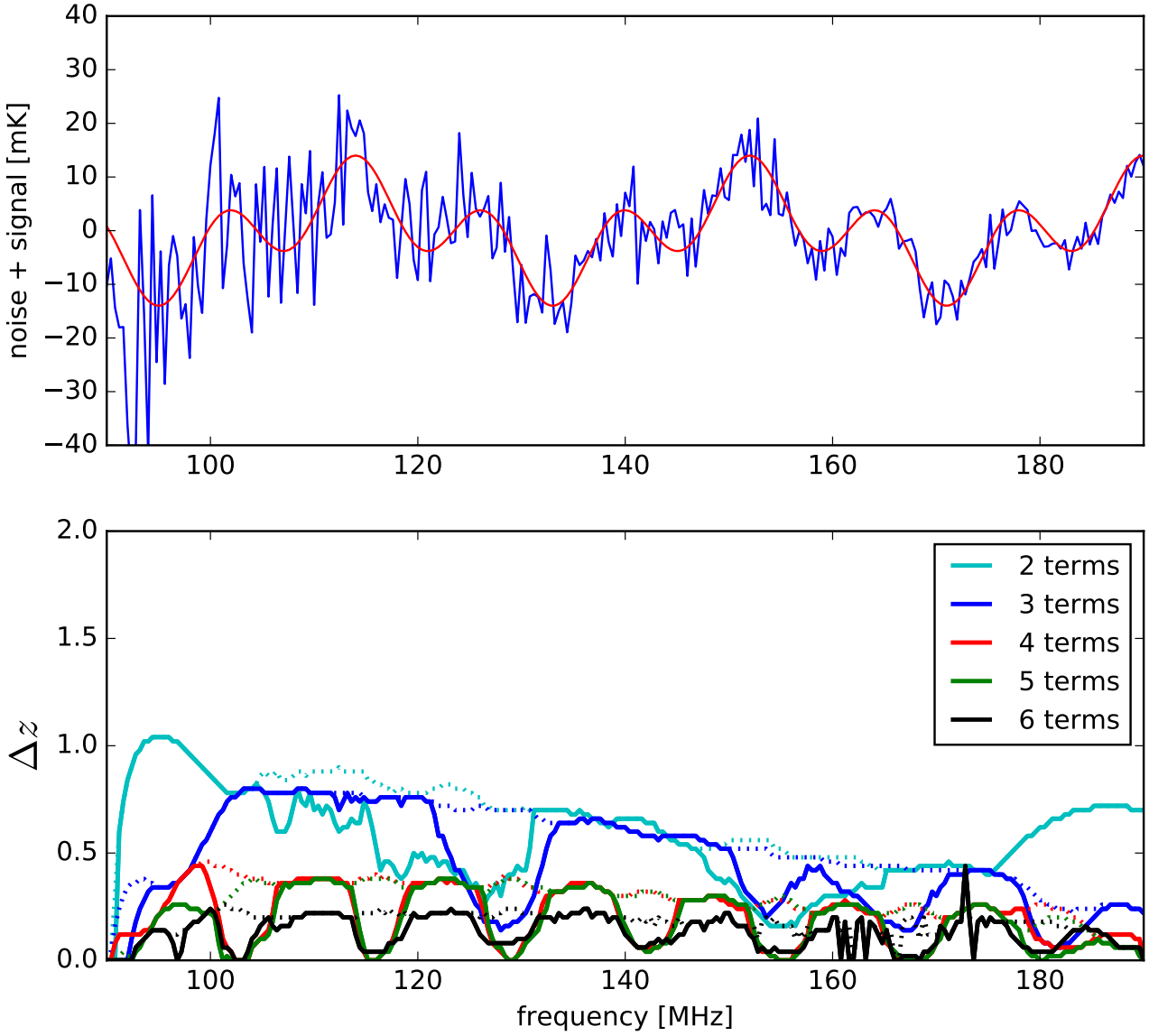

Figure 5: Rejection limits as a function of number of foreground terms, for window width of 30 MHz.