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May 11, 2026

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To: EDGES group

From: Alan E.E. Rogers

Subject: Tests of the filtering of solar emissions EDGES-3 data from 2026 days 80 and 81

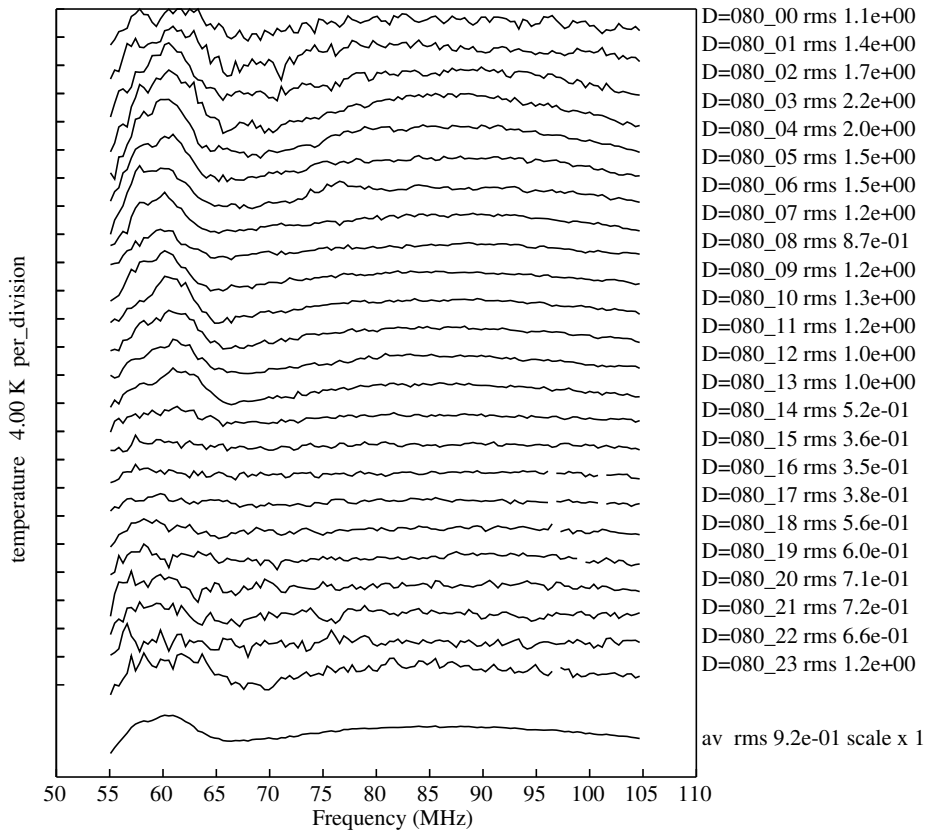
The data from EDGES-3 requires significant filtering in order to extract the global 21-cm absorption spectra. Memo 505 shows examples of the spectra from EDGES-3 at the WA for several days of 2024 2025 and 2026. This memo just shows the spectra obtained from all 24 one hour data blocks of GHA.

Figure 1 shows the spectra vs GHA with 4 physical terms removed for day 80 on the left and day 81 on the right.

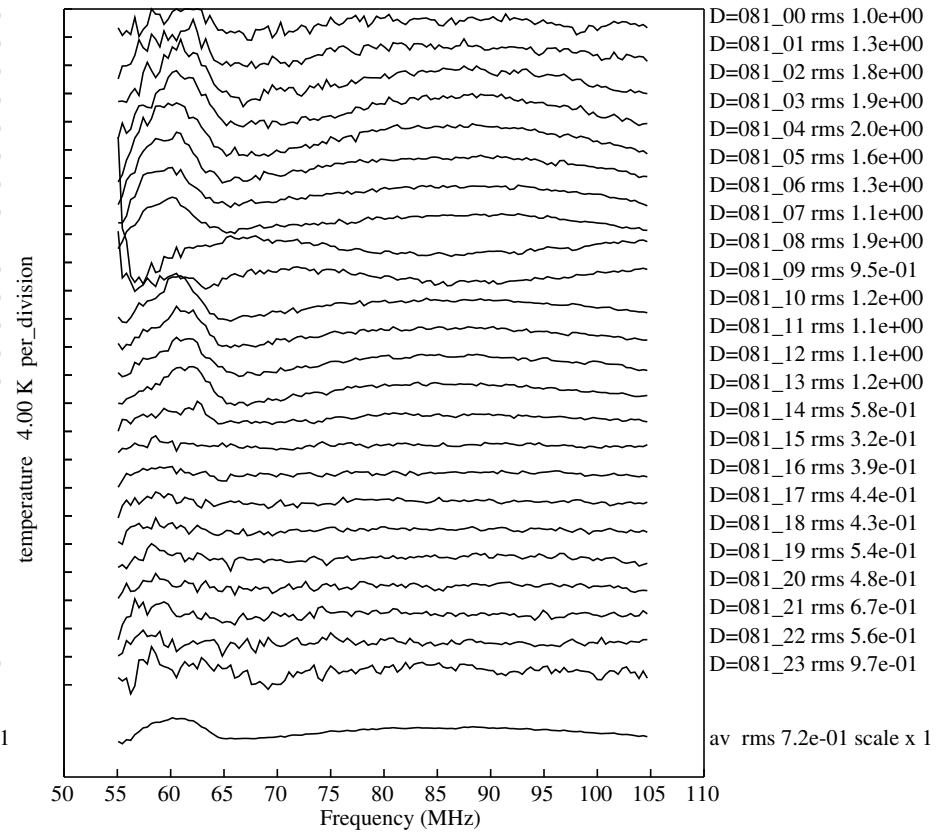
The lowest residual of 0.35 K on day 80 is obtained for GHA = 16 which corresponds to 14 UT equals 22 LT at the WA while highest rms residual of 2.2 K is at GHA = 3 at 1 UT equals 9 LT.

The “bump” at 60 MHz changes slowly changes strength from hour to hour. Figure 2 shows the same day and time span for days 80 and 81 with the RFI filter that is applied to every 3-position switch cycle turned off which shows the strong emission at GHA = 8 with rms of 56 K when averaged over one hour but reaches about 10000 K on an individual 3-position switch cycle time of 30 seconds.

An example of the fine time scale structure has been studied in detail in memos 452 and 453 which show the fine time scale structure of the spectra along with the waterfall plot of the very strong solar burst that occurred on 2024 day 185 at 8 UT which corresponds 16 LT when the sun is well above the horizon.

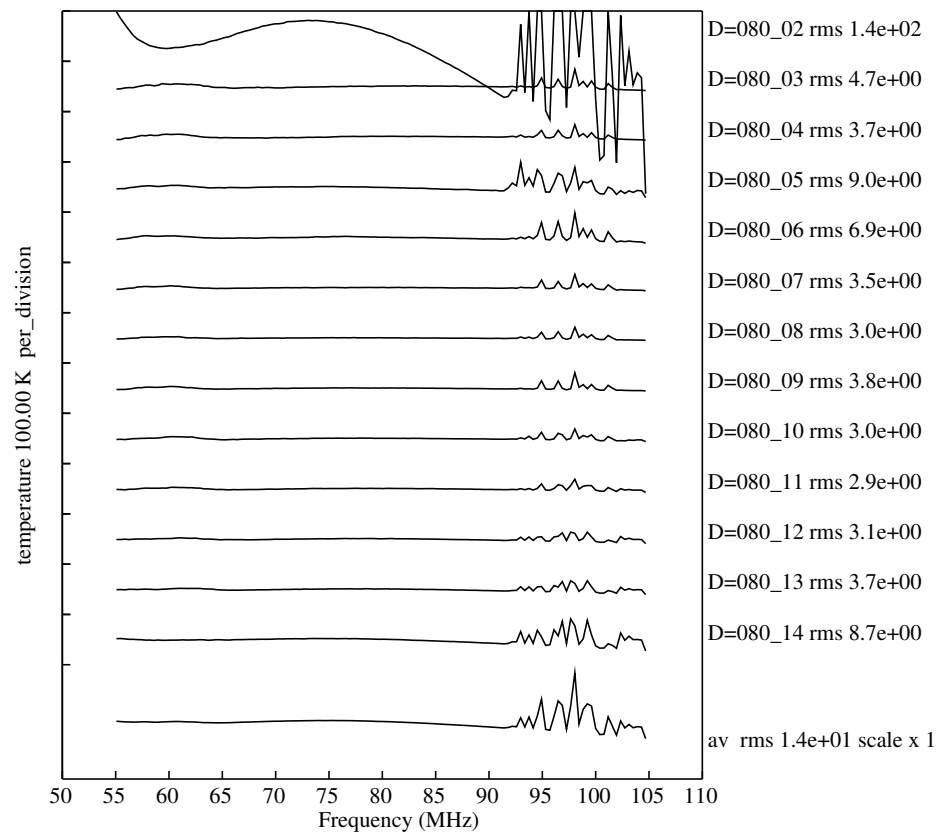


avrms 1.0511

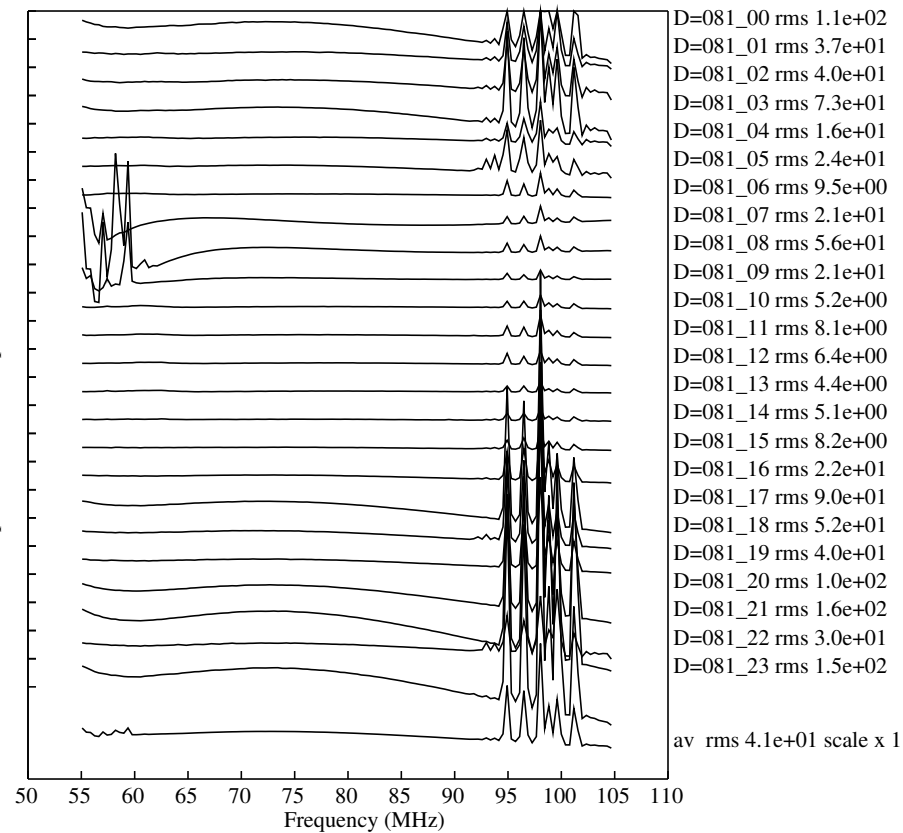


avrms 1.0373

Figure 1. The spectra for each GHA 0 to 23 hours with 4 physical terms removed for day 80 on the left and day 81 on the right.



avrms 14.8672



avrms 45.1494

Figure 2. The spectra with 4 physical terms removed for days 80 and 81 without RFI excision.