EDGES MEMO #285

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To: EDGES Group

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Subject: Preliminary results from lowband antenna on highband ground plane

On 15 August 2018 a lowband antenna was installed on the highband 5.35×5.35 m solid ground plane with 4 2×5 m mesh sections to address concerns that bad ohmic contacts between the lowband 2×2 m solid sections and the outer mesh could be responsible for the absorption signature.

Figure 1 shows the results of signature search using the 4 quasi-physical terms of the alternate polynomial discussed in memo 278. Owing to the large beam chromaticity of a small ground plane the GHA range was limited to 10 to 14 hours. The beam correction applied to the data was obtained from FEKO in GF mode using a uniform soil below the ground plane with dielectric constant 3.5 and the conductivity of 10^{-3} S/m measured near the ground plane in August 2018. The data span in Figure 1 is from 2018_227-2018_238.

Figure 2 shows the large sensitivity of the ground plane to the small change in conductivity of a uniform soil below the ground plane and extending to infinity calculated using FEKO. Even with the small change from 10^{-3} to 2×10^{-3} S/m and 5-terms removed the rms at GHA = 12 hours is 21 mK.

Figure 3 shows a signature search in which the signature from the Nature paper is used to simulate the spectrum using a soil conductivity of 10^{-3} S/m soil is processed using the beam chromaticity with 10^{-2} S/m soil.

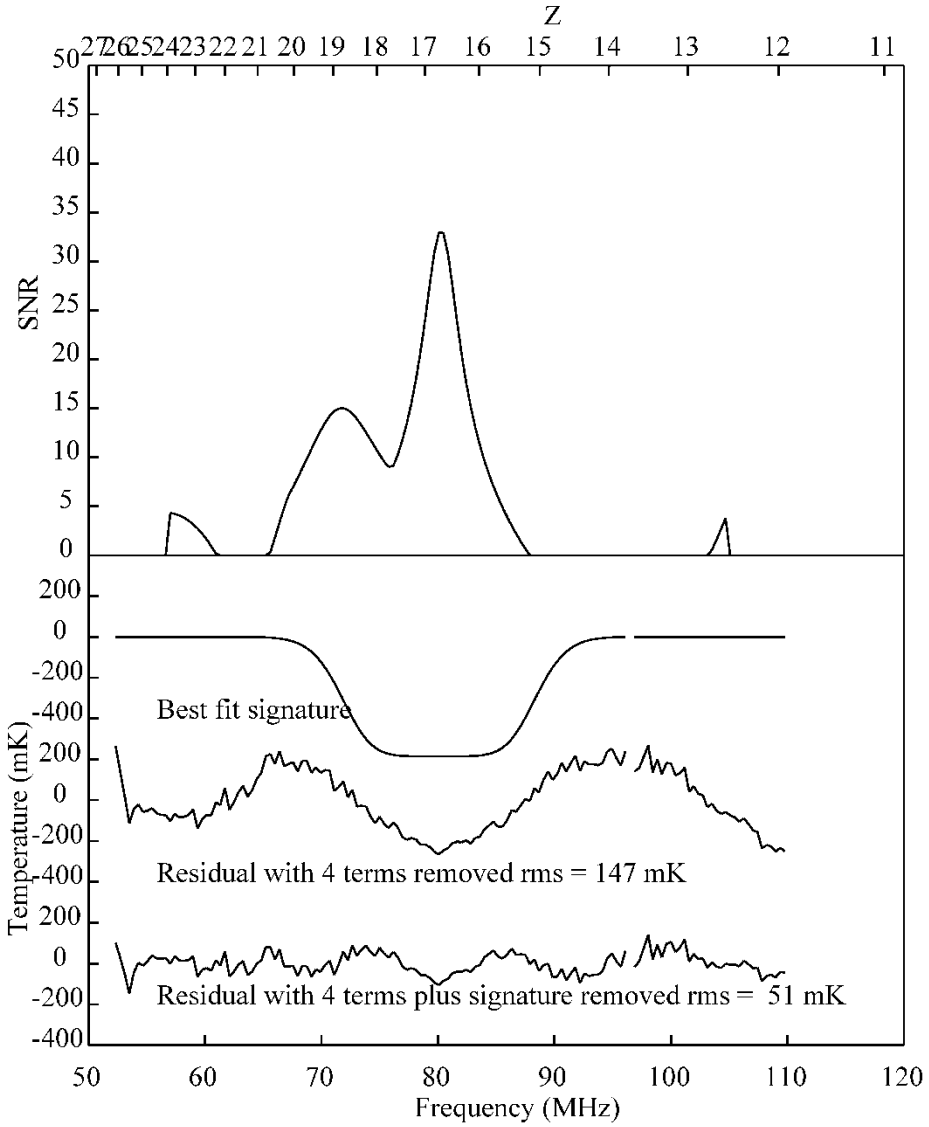

Figure 1. Signature search for lowband antenna on highband ground plane 2018_227-208_238.

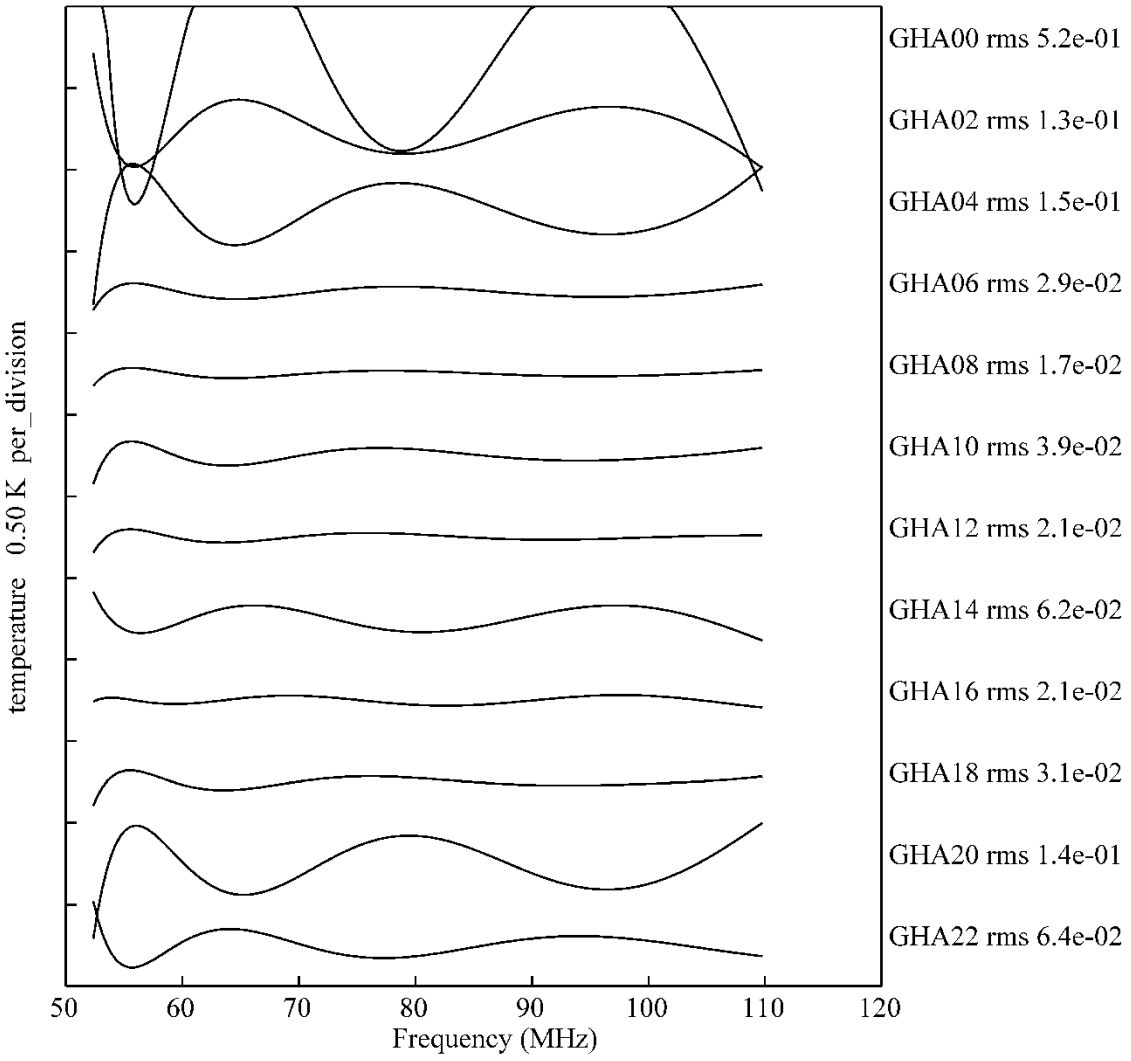

Figure 2. Beam chromaticity difference for soil 10^{-3} S/m and 2×10^{-3} vs GHA 5-terms removed.

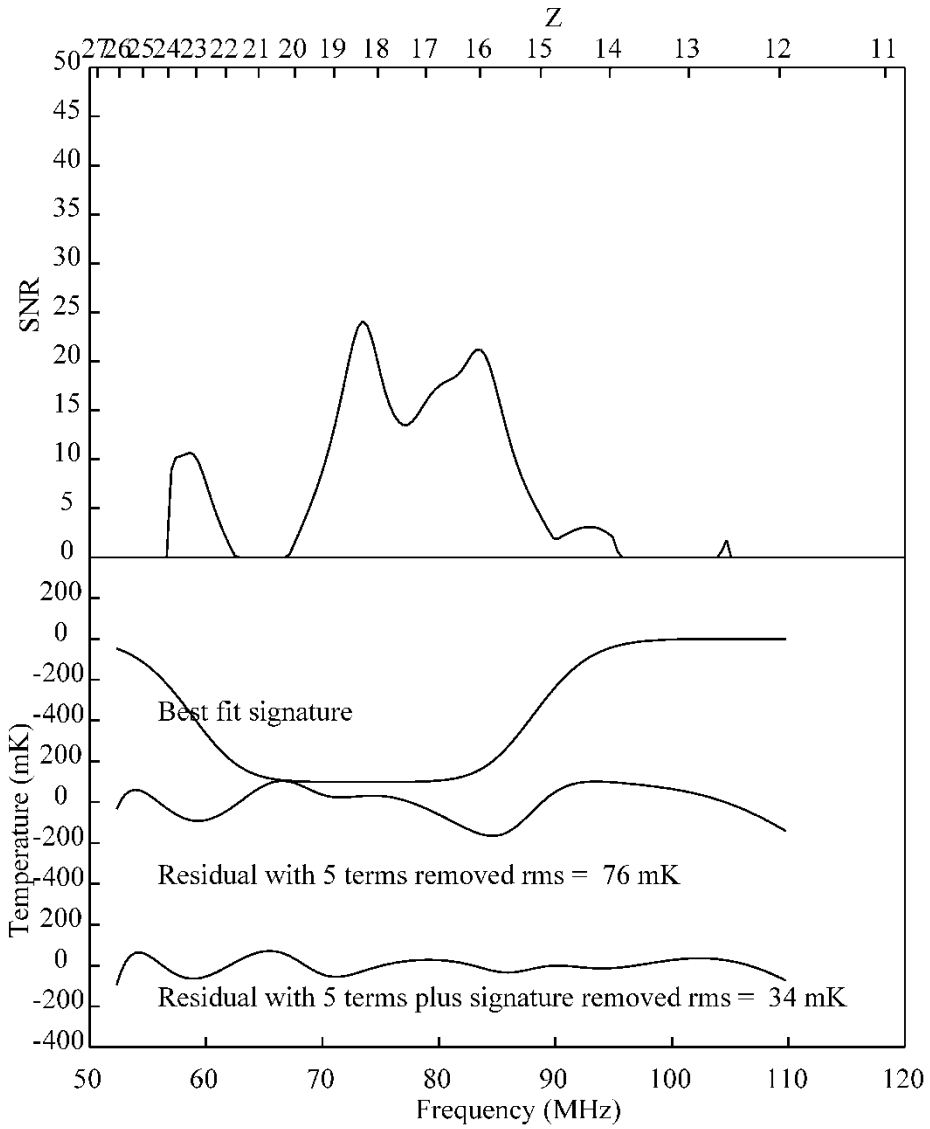

Figure 3. Simulation of signature from Nature paper using 10^{-3} S/m processed with 10^{-2} S/m soil.