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Interactive comment on "Origin of the Residual Linewidth Under FSLG-Based Homonuclear Decoupling in MAS Solid-State NMR" *by* Johannes Hellwagner et al.

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With respect to point 3, most of the points are now clear. I do still wonder, however, precisely what is meant by "We checked the phase and amplitude of the rf pulses and found no significant deviations from the intended shape in the experimental implementation.". The issue here is exactly how the phase (in particular) was checked. The only reliable way to do this (that I am aware of) would be to use an antenna to pick up the rf generated in the coil itself. The phase of this would have to be determined by comparison with a reference wave with the same frequency (and which would also switch in frequency with the FSLG). Was this, or a similar procedure, used? I think

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the authors should clarify exactly how the phase and amplitude were checked, for a frequency-switched rf waveform driving a narrowband tuned circuit such as found in an NMR probe. If such a procedure were not used then the article should make it clearer that doubts remain about the frequency-dependent phase of the frequency-switched waveform, at the site of the NMR sample.

This is precisely how we checked the phases and amplitudes of the pulses. All probes where we can do transient compensation are equipped with a small pickup coil close to the NMR coil that can be used to measure the radio-frequency field. The coupling to the NMR coil is weak (about 40-50 dB) and we measure the voltage of the pickup coil with a fast digital scope (5-10 GS/s). The signal is then down sampled and mixed down in a phase-sensitive way using MATLAB so that we can determine the phase and the amplitude of the pulses with a high time resolution. In this way, we can confirm that the transient-compensated pulses have indeed the intended amplitude shape with minor deviations. This procedure is described in (Wittmann et al., 2016) (J.J. Wittmann, V. Mertens, K. Takeda, B.H. Meier, M. Ernst, Quantification and compensation of the influence of pulse transients on symmetry-based recoupling sequences, J. Magn. Reson. 263 (2016) 7–18) where also examples of measured pulse shapes with transient compensation are shown. We hope that this answer makes the methods used to determine the experimental pulse shape at the site of the sample clearer.

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