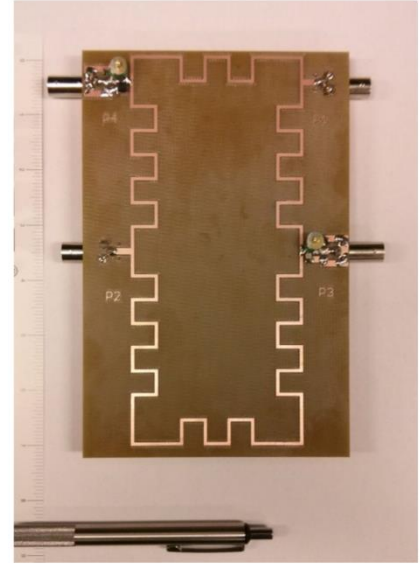


(a)



(b)

Figure S1. (a) Picture of a coupled 2-channel parallel transmit array to be decoupled. (b) Layout of the hybrid coupler used in our decoupling matrix

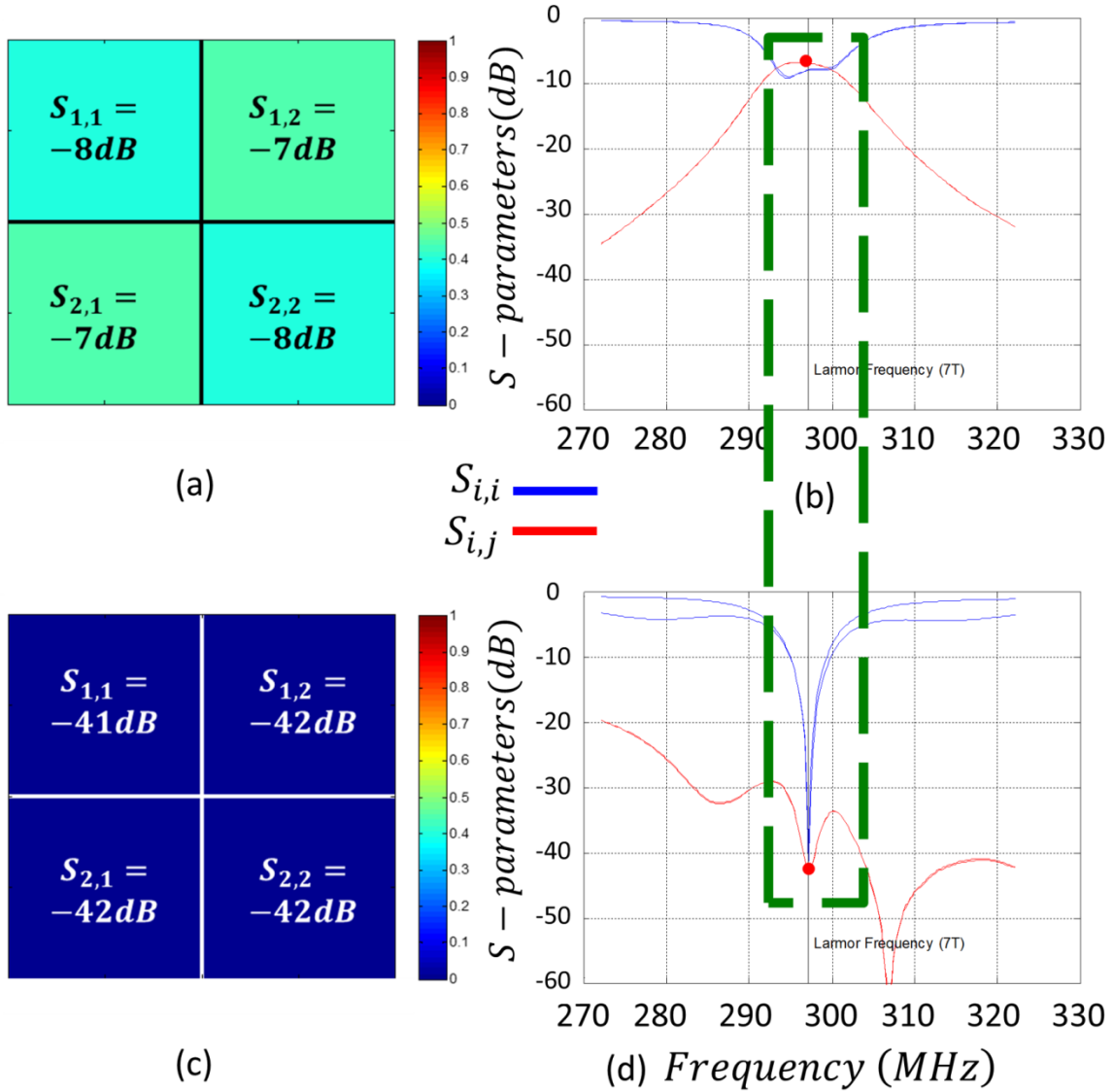


Figure S2. (a) S-parameter matrix of the coupled array at the operating frequency. (b) Frequency dependence of the S-parameters of the coupled array. Blue curves indicate the diagonal, while red curves indicate off-diagonal elements. (c) S-parameter matrix of the decoupled array at the operating frequency using our decoupling matrix. (d) Frequency dependence of the S-parameters of the decoupled array. The green dotted box highlights the band around the Larmor frequency and shows the improvement in terms of the S-parameters.

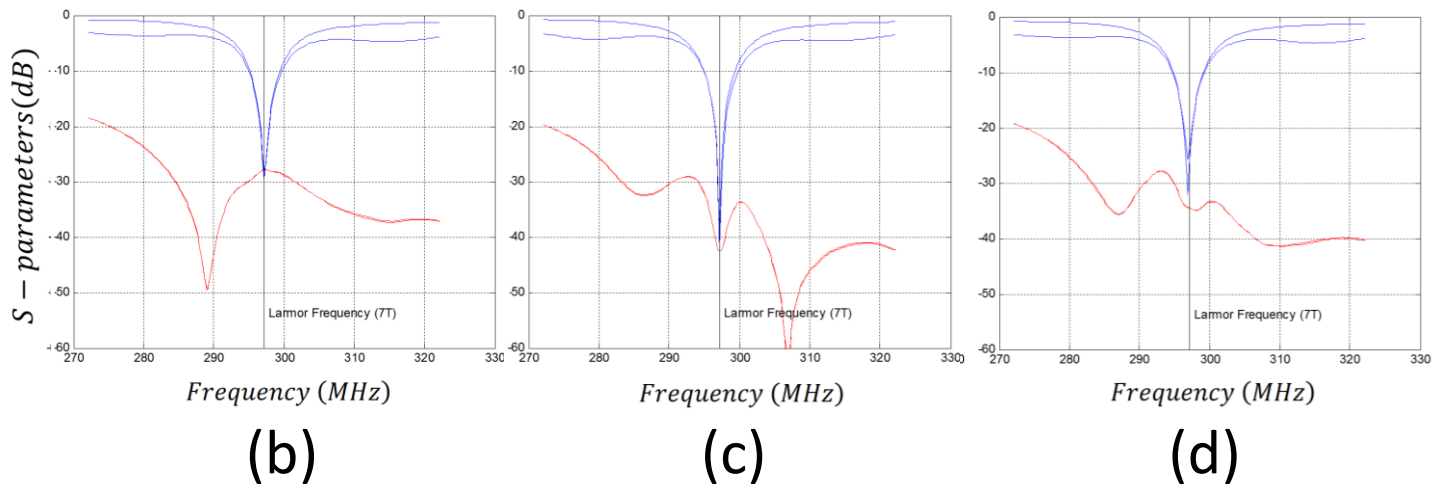
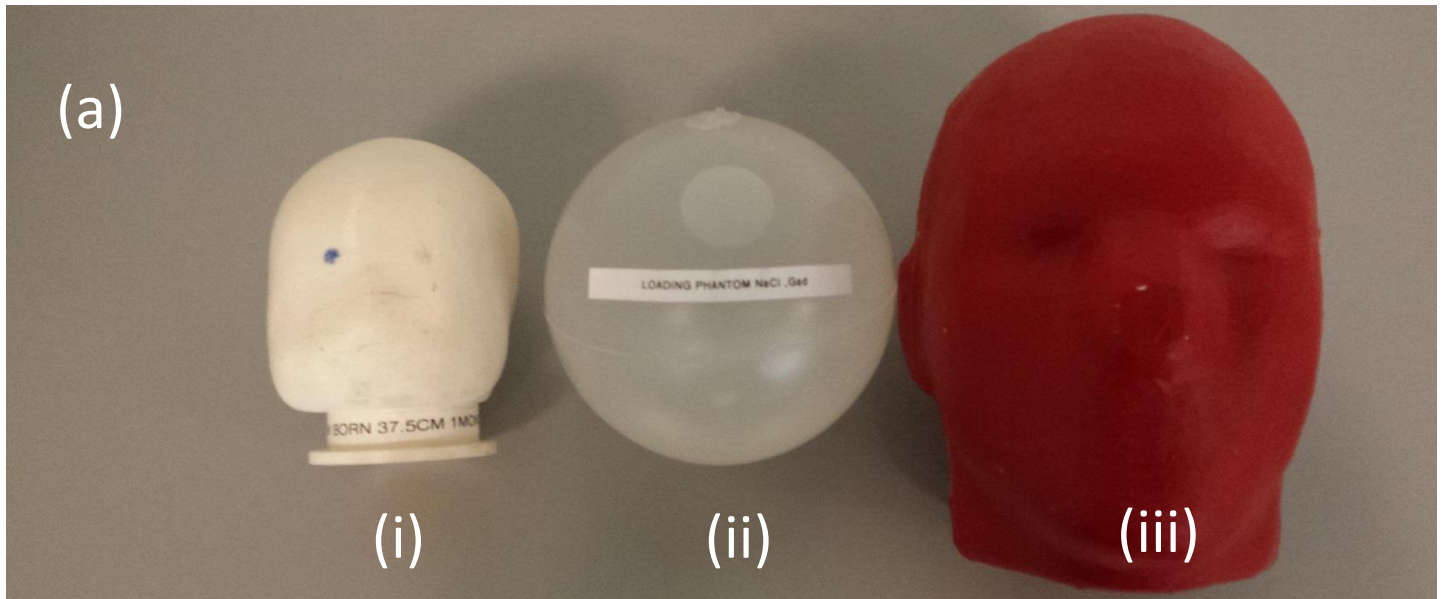


Figure S3. Frequency dependent S -parameters of the 2-channel array with a decoupling matrix, tested with different phantom sizes. (a) Three phantoms used to test performance under load variations. All phantoms were filled with a 0.9% NaCl, 0.09% Magnevist gadopentetate dimeglumine solution. (i) “Child” head phantom with circumference of 37.5cm (ii) “Nominal” spherical loading phantom with circumference of 47cm (iii) “Adult” head phantom with circumference of 61.5cm (b) With phantom (i), the decoupling level is less than -28dB (c) With phantom (ii), decoupling level is less than -40 dB (d) With phantom (iii), decoupling level is less than -35 dB.