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Wearable MRI RTD 2013

FNSNF

Textile integrated EM Immune GBit/s Communication and Coil for Wearable MRI

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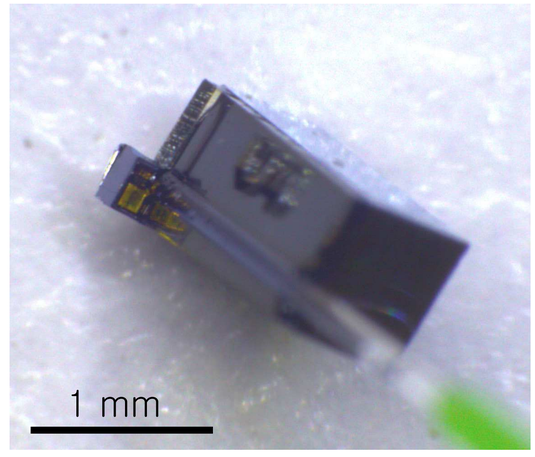
MRI Challenge

- 18 kW RF Power [1]
- 208 mT/m/ms [1] Magnetic Fields
- 3–7 T static Magnetic Field

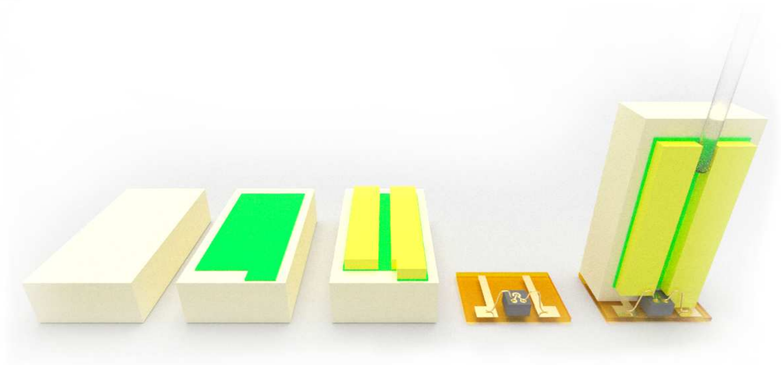
Solution

- Glass Fiber Transmission
- Requires textile integrated micro optical module



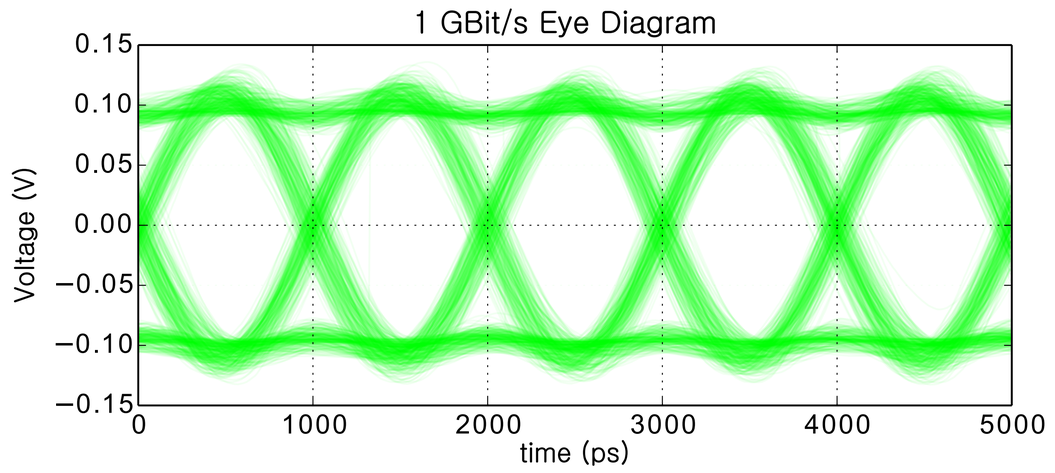
Assembled micro optical module

Micro Optic Module Fabrication

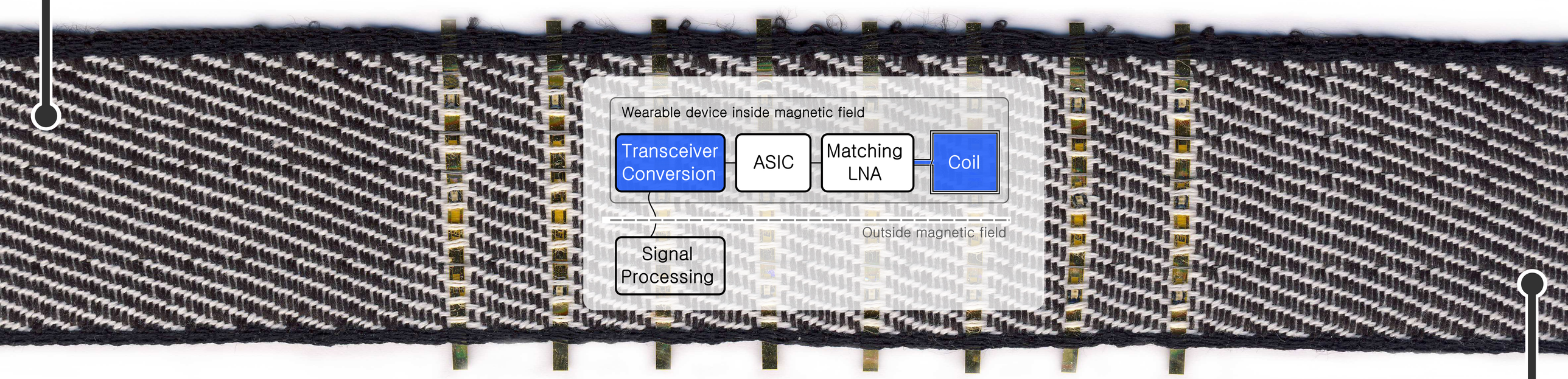


- SU-8 U-groove on Silicon substrate
- Low power VCSEL on flexible substrate
- 1.5 mm x 0.7 mm Size

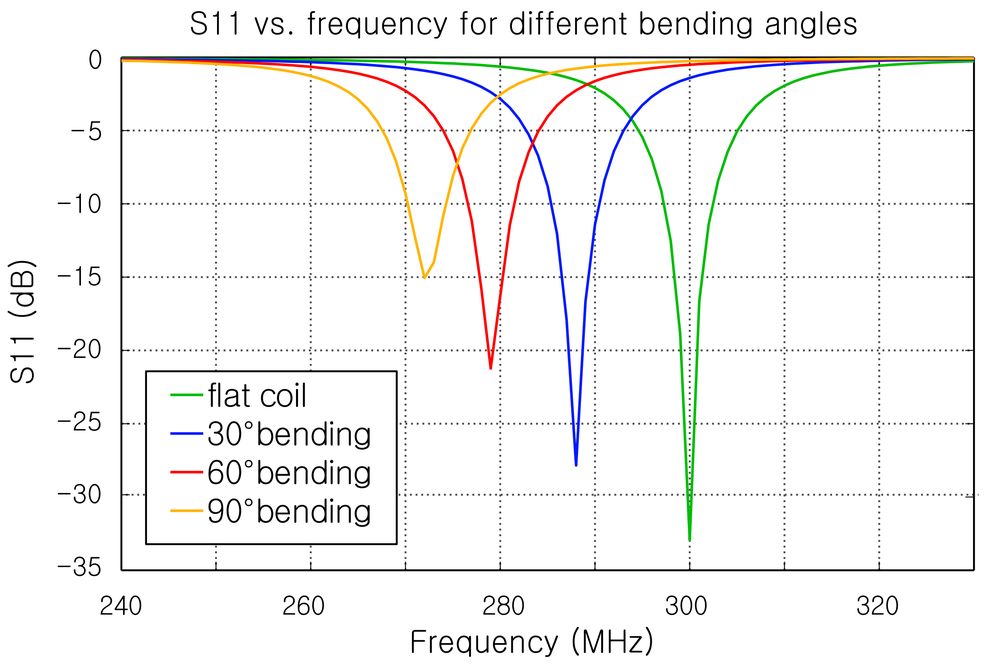
GBit/s Transmission using Micro Optic Module



- Clear Eye diagram at 1 GBit/s
- SLVDS output for easy Interface
- Distance: 2 m of Glass fiber

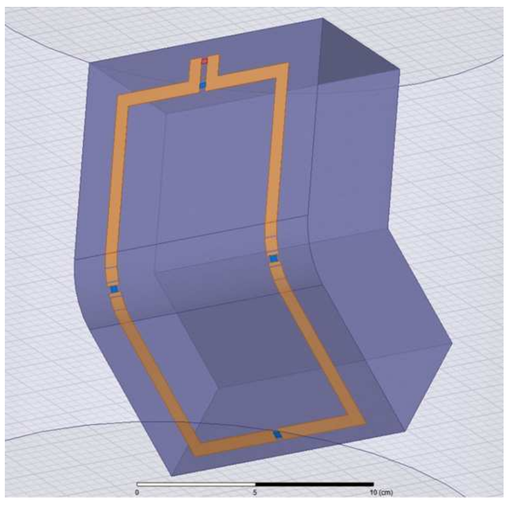


Simulation Results



- bending shifts resonance of coil significantly
- responsivity at 300 MHz severely reduced when bent

Flexible Coils



Coil simulation model

- 14.5 cm x 8.8 cm
- 6 mm trace width
- Tuned to 300 MHz by distributed Capacitances
- Bent with r = 3 cm to angles from 0° to 90°

[1] http://www.healthcare.philips.com/main/products/mri/systems/multiva/specifications.wpd