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Carbon Nanotube Passive Intermodulation Device for Nonlinear Energy Harvesting MITCHELL LERNER, ISRAEL PEREZ, JOHN ROCKWAY, SPAWAR Systems Center Pacific — The navy is interested in designing RF front-ends for receivers to handle high power jammers and other strong interferers. Instead of blocking that energy or dissipating it as heat in filters or amplifiers, this project investigates re-directing that energy for harvesting and storage. The approach is based on channelizing a high power jamming signal into a passive intermodulation device to create intermodulation products in sub-band frequencies, which could then be harvested for energy. The intermodulation device is fabricated using carbon nanotube transistors and such devices can be modified by creating chemical defects in the sidewalls of the nanotubes and locally gating the devices with a slowly varying electric field. These effects controllably enhance the hysteretic non-linearity in the transistors IV behavior. Combining these components with a RF energy harvester on the back-end should optimize the re-use of inbound jamming energy while maximizing the utility of standard back end radio components.

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