Abstract— In this paper we derive an engineering specification for functionality, security, and implementation demands for RFID Implantable Medical Devices (IMD) requiring medical data storage and wireless communication. We illustrate the specification by sketching a secure communication protocol for RFID IMDs. The specification follows from our requirements analysis of application characteristics, legal restrictions, security requirements and ethical concerns of IMDs. In our analysis we have recognized three main types of IMD applications: identification, financial and medical/emergency. The hardware implementation constraints and security level requirements of IMD systems differ from mainstream applications of RFID. The presented specification that considers the special operating environment, delicate use cases and safety-critical functionality of IMD systems is aimed to be a conceptual platform for designing robust security schemes and long-term functional and physical reliability.