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This article deals with the formal validation of STIMAP, a medium access protocol which has been designed to meet the specific requirements of an implantable network-based neuroprosthesis. This article presents the modeling and the validation of its medium access, using model checking on Time Petri Nets. Doing so, we show that existent formal methods and tools are not perfectly suitable for the validation of real systems, especially when some hardware parameters have to be considered. This article then presents how these difficulties have been managed during the modeling and verification phases, and gives the validation results for STIMAP, providing constraints to respect.

Categories and Subject Descriptors: C.2.2 [**Computer-communication networks**]: Network Protocols—Protocol verification; C.2.5 [**Computer-communication networks**]: Local and Wide-Area Networks—Access schemes, Buses; D.2.4 [**Software engineering**]: Software/Program Verification—Validation

General Terms: Reliability, Verification

Additional Key Words and Phrases: Distributed architecture, Formal validation, MAC determinist protocol, Model checking, Modeling, Timed Petri nets

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