Marker Stored-Data Byte Layout

by Nick Clark | Published April 25, 2026

What the Byte Layout Specifies

The marker stored-data byte layout occupies a fixed number of bytes (typical: 64-128 bytes for passive RFID-class markers; up to several hundred bytes for higher-capacity tags). The layout comprises two rows separated by a row delimiter.

The payload row carries operational content: marker identifier (uniquely identifying the marker within its authority's namespace), spatial-reference (latitude/longitude or relative-frame coordinates), segment-or-zone identifier (which roadway segment, port zone, custody perimeter the marker delineates), delineation-role classification (lane edge, hazard zone, transition point), geometry hint (curvature, slope, or other geometric property), advisory flags (speed advisory, hazard advisory, special-handling advisory), distance to next marker, and hazard flags.

The governance-chain row carries credentialing content: authority credential (signing identifier of the credentialing authority), temporal scope (when the marker's stored data is valid), and cryptographic attestation (signature binding the entire payload to the credentialing authority).

Why Byte-Level Layout Matters for Reading Speed

Marker reading happens at vehicle speed. A vehicle traveling at highway speed passes a roadway marker in tens of milliseconds; the marker reading must complete in that

window with sufficient confidence to admit the observation. Variable-length encoding, parsing-intensive formats, or cryptographic operations requiring significant time per read all compromise the operational tempo.

Fixed-position byte layout solves the speed constraint. The reader knows exactly which bytes contain which fields; parsing is direct rather than navigated; signature verification operates on fixed-position data with predictable timing. The architecture supports the marker-read-at-speed operating profile that the deployment requires.

How the Two-Row Structure Composes With Reading

The reader parses the payload row first to extract operational content for immediate use. The governance-chain row is parsed in parallel for credentialing verification; the verification gate admits the observation into the receiving unit's admissibility framework only after the credential validates.

The row delimiter provides the structural boundary that supports both parallel-parsing and sequential-reading patterns. Different reader implementations (high-end vehicle readers with parallel parsers; low-cost handheld readers with sequential parsing) consume the same byte layout with the same outcome.

What This Enables for Marker Interoperability

The fixed byte layout supports cross-vendor reader interoperability. Trimble, Hexagon, Topcon, Garmin, and emerging marker-reader vendors all parse the same layout. Cross-jurisdictional operation handles transitions because the layout is invariant; only the credentialing authority differs.

The byte-level specification is also the load-bearing element for the patent's wire-format claims. Unlike functional-architectural diagrams that prose can replicate,

byte-level layout produces direct §112 enablement that infringement evaluation can directly match.