



## General Description

em|echo corresponds to the latest generation of EM Microelectronic contactless devices, bringing innovative features to the NFC and EPC™ worlds. The chip combines two functionalities on one single die, the EPC technology used for long range application purposes and the NFC used to exchange data in a proximity range. Both protocols may share a common unique ID.

Targeted applications and market segments include retail, product authentication or smart NFC posters.

A tag or label based on the em|echo provides multiple benefits and usages via the EPC communication interface like stock inventory, product returns, and data privacy. The same tag or label also enables new marketing services like product information or loyalty programs using an NFC enabled smartphone.

The chip is a dual frequency device supporting ISO/IEC14443 Type A, NFC Forum™ Type 2 specifications, ISO/IEC18000-63 and EPC Gen2 V2. Additional features have been added to provide chip privacy. For the NFC interface, the smart counter increments its value each time the NFC message has been read by the end-user.

Each chip is manufactured with a 96-bit unalterable unique identifier (UID) to ensure full traceability. The same UID number is used by both RF protocols. During an ISO/IEC14443 anti-collision procedure, the 7 bytes which are part of the 96-bit are sent back by the transponder IC.

The em|echo offers two non-volatile memories which are accessible by both RF air interfaces. The two memories are segmented to implement multiple applications.

em|echo supports the optional BlockWrite command, enabling the fast encoding of a 96-bit EPC. em|echo also supports the optional Untraceable command to hide portions of memory of the tag or label.

## Applications

### | NFC

- Product Information
- Wifi, Bluetooth pairings
- Smart posters, Advertisings
- Coupons, loyalty programs

### | EPC

- Supply chain management
- Tracking and tracing
- Container identification
- Asset control

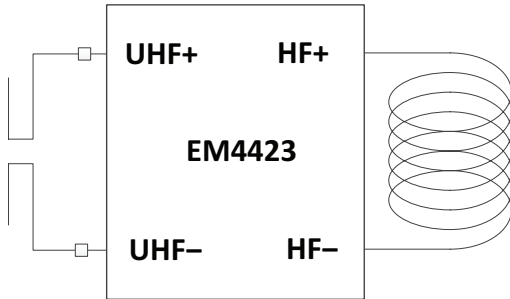
## DUAL Frequency NFC Type 2 & EPC GEN2V2 Transponder IC

### Features

- | Dual Frequency 1-step inlay manufacturing
- | Common unique ID
- | Shared memory
- | Minimum 100k write cycles endurance
- | Minimum 10 years data retention
- | Extended temperature range (-40 °C to +85 °C)
- | Sawn wafers, 3/6-mil thickness, gold bumps
- | **NFC Interface**
  - ISO/IEC 14443A -3 compliant tag
  - NFC Forum Type 2 compatible
  - Enables NDEF data structure configurations
  - Communication baud rates at 106kbps
  - 7 Bytes unique ID number using same serialization as EPC interface
  - 1920-bit user's memory
  - Anti-tearing support for NFC capability container (CC) and Static/Dynamic lock bytes
  - NFC Memory locking mechanism per block/page
  - ACCESS counter increased at first reading
  - Optional read-only locking function
  - Optional limit of unsuccessful LOGINS
  - Optional security timeout for unsuccessful LOGINS
  - Optional control of EPC privacy features
  - UHF power detection
  - 50pF NFC on-chip resonant capacitor
- | **EPC Interface**
  - ISO/IEC 18000-63 compliant
  - EPC Gen2 V2 compliant
    - Alteration EAS compliant
    - TAG alteration (Core) compliant
  - 128-bit or 224-bit UID/EPC
  - 96-bit TID number using same serialization as NFC interface
  - 160-bit or 64-bit USER memory bank
  - 32-bit Access and Kill passwords
  - Read sensitivity up to -18dBm with a dipole antenna
  - Write sensitivity up to -13dBm with a dipole antenna
  - Fast writing using the BlockWrite command
  - BlockPermalock of USER memory
  - NFC field detection
  - NFC ACCESS counter status readable



## Typical Operating Application



## Standard Versions & Samples

The versions below are considered standard and should be readily available. For other versions or other delivery form, please contact EM Microelectronic-Marin S.A. For samples, please order exclusively from the standard versions.

Part Number	EPC Memory Format	Package / Die Form	Delivery Form
EM4423V121WS6U	Small EPC	Sawn wafer / Gold bumped +PI - thickness of 6 mils	Wafer on frame
EM4423V221WS6U	Large EPC	Sawn wafer / Gold bumped +PI - thickness of 6 mils	Wafer on frame