

English version

**Smart tracker chips -  
Feasibility study on the inclusion of RFID  
in Electrical and Electronic Equipment  
for WEEE management**

This Technical Report was approved by CENELEC on 2006-06-17.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## Foreword

This Technical Report was prepared by CENELEC BTTF 116-3, Waste from electrical and electronic equipment (WEEE).

The text of the draft was submitted to the formal vote and was approved by CENELEC as CLC/TR 50489 on 2006-06-17.

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## Introduction

An RFID (Radio Frequency Identification) system consists of a transmitter, a receiver (mostly combined and called a transceiver, interrogator or reader), an antenna and a tag or transponder. The transmitter sends out a radio signal on a certain frequency by means of an antenna. This signal is recognised by the tag if within the transmitter's reading range. The tag then responds with a signal that is recognised by the receiver. Data within a tag may provide identification for an item in manufacture, goods in transit, a location, the identity of a vehicle, an animal, an individual, etc. By including additional data, it is possible to support applications by item specific information or instructions immediately available on reading the tag. A certain protocol takes care of the communication between reader and the host computer.

Three frequency ranges has generally been distinguished for RFID systems: low, medium and high. Table 1 summarises these three frequency ranges, along with the typical system characteristics and examples of major areas of application.

**Table 1 – Frequency bands and typical characteristics**

Frequency range	Typical characteristics
Low 1 Hz - 300 kHz	Short to medium read range Low reading speed
Medium 300 – 3 000 kHz	Short to medium read range Potentially, medium reading speed
High 3 MHz – 30 GHz	Long read range High reading speed Line of sight required

The choice of operating frequency is of primary importance in determining data transfer rates. Generally speaking the higher the frequency the higher the data transfer or throughput rates that can be achieved.

The CECED report "ELECTRONIC PRODUCT IDENTIFICATION, A Study into the feasibility of technologies that enable the identification of producer and product characteristics", (see Annex A) was considered the most relevant report available and used as main reference for this Technical Report.

## 1 Scope

This Technical Report investigates in the light of the implementation of the WEEE Directive (2002/96/EC) the feasibility of deploying machine readable product identification technologies (e.g. smart tracker chips) to fulfil the marking requirement for the purpose of implementing producer responsibility. The product recognition shall provide information for waste stream management (sorting, reporting and cost allocation).

Machine readable product identification technologies can be utilized during every phase of the product life cycle of an EEE. The WEEE management is the last phase. This Technical Report focuses on this phase only.

## 2 Abbreviations

In the body of this Technical Report the following abbreviations have been used:

CECED: Comité Européen des Constructeurs d'Équipements Domestiques

EEE: Electrical and Electronic Equipment

RFID: Radio Frequency Identification

SWOT: Strength Weakness Opportunity Threat

WEEE: Waste Electrical and Electronic Equipment

## 3 SWOT Analysis of RFID use in waste management

Strength	Weakness
<ul style="list-style-type: none"> <li>• No line of sight</li> <li>• Bulk tag reading</li> <li>• Not affected by dirt or scratches</li> <li>• Information link</li> <li>• Non-contact identification</li> </ul>	<ul style="list-style-type: none"> <li>• Shielding of metals</li> <li>• Initially only pallets &amp; boxes are tagged</li> <li>• Range Readability.</li> <li>• Reliability/Durability</li> <li>• Changing technology in lifetime of product</li> <li>• Recycling Industry may not use RFID unless whole WEEE category uses them</li> <li>• Creating more WEEE.</li> <li>• Missing infrastructure</li> </ul>
Opportunity	Threat
<ul style="list-style-type: none"> <li>• Read-rate</li> <li>• Cost / tag</li> <li>• Process innovation</li> <li>• Key to Product Life-cycle Management</li> <li>• Additional data</li> <li>• Data format standardization</li> <li>• Integrity of supply chain management systems</li> </ul>	<ul style="list-style-type: none"> <li>• Data security</li> <li>• Limitation of RFID use until Point of Sales</li> <li>• Privacy</li> <li>• Cost of Tag</li> <li>• Could be used for other purposes</li> <li>• Could store commercially sensitive data</li> <li>• Identity Theft</li> <li>• Miss-Identification</li> <li>• Future incompatibility technology changes</li> <li>• RFID not implemented in logistics at item level</li> </ul>