RFID SOLUTION FOR SOLAR PANELS

Preface

As part of a national strategy to increase the amount of energy generated via solar power, the Indian government is mandating that all solar modules be tagged and tracked. The government mandated that each solar—or photovoltaic (PV)—module placed into use must carry an RFID tag, so that it can be easily identified and tracked throughout its useful life. The objective is to link PV module manufacturers to solar power deployments—which, in some cases, will contain many hundreds of modules

MNRE GUIDELINES

- Each PV module used in any solar power project must use a RFID tag for identification.
- The RFID tag used on each module can be inside or outside the laminate and withstand harsh environment conditions.
- Each RFID tag must be encoded with the name of the module manufacturer and the solar cells; the month, year and country of manufacture for the module and the cells; The modules technical characteristics, such as its wattage and expected performance statistics; and a serial number that uniquely identifies the module.

INFORMATION STORED IN RFID TAG

- Name of the manufacturer of PV Module
- Name of the Manufacturer of Solar cells
- Month and year of the manufacture (separately for solar cells and module)
- Country of origin (separately for solar cells and module)
- I-V curve for the module
- Wattage, Im, Vm and FF for the module
- Unique Serial No and Model No of the module
- Date and year of obtaining IEC PV module qualification certificate
- Name of the test lab issuing IEC certificate

Proposed Solution

- Manufacturing
  - After production, RFID tag will be fixed on the Solar panel
  - A portable RFID reader or fixed RFID reader will be used to write the necessary information on to the RFID Tag
  - Transfer data to application software to update the inventory
  - Solar panel will be stored in the warehouse
- Dispatch
  - A dispatch advice will be created in the application software
  - Based on the dispatch advice, software will create a pick list containing the location & serial number of the panels to be dispatched
  - Panels picked for dispatch will be scanned using a portable RFID reader
  - Application software verifies the serial number of the panel with the pick list and if not matching, it will show the appropriate error message
  - After reading all panels for dispatch, data will be updated to the application software and inventory will be updated
- Information Retrieval
  - At any point of time, a portable RFID reader can be used to read the RFID tag on a solar panel
  - Application software loaded in the reader will display all information stored in the RFID tag

Advantages

- ✓ Enhanced Visibility & greater transparency.
- ✓ Ability to write to track the defective modules whenever required.
- ✓ Avoiding duplication at the time of production.
- ✓ Ability to write & Read all manufacturing related data at source.
- ✓ Low Maintenance cost.
- ✓ Simple GUI for handling.
- ✓ More susceptible to Rough Environmental conditions.

Suggested Items

Item	Image	Description	Application
Alien Technology ALN-9640 Squiggle tag		EPC Gen 2(v1.2.0) compliant - ISO/IEC 18000-6C compliant - Worldwide RFID UHF operation(840-960MHZ) - Higgs TM IC with 800-bits Nonvolatile Memory -32 bit TID -64-bit unique TID -96-bit EPC Memory, extensible to 480-bits -512-bit user Memory -32-bit Access password -32-bit Kill password - Pre-programmed with a unique, unalterable 62-bit serial number(idea for authentication) - User Memory can be block Perma-Locked - User Memory can be Read Password protected in 64-bit blocks, prohibiting unintended Reads without an access password - Supports all Mandatory and Optional Gen 2 commands including item level commands - Custom commands for high speed programming - Available in High-yield, high capacity dry/wet inlay rolls for high volume converting processes System Components -RFID Tag System Description	For fixing on each Solar Panel
STA IR0507E Integrated Reader		UHF middle-distance integrated reader Processor :ARM CORTEX M3 100M Memory :RAM 16Kbits + FRAM 32Kbits. Frequency : 860MHz-868MHz(CE) Protocol : ISO18000-6B, EPC G2 Interface : RS232, RS485, TCP/IP GPIO : 1 Relay output, 2 TTL outputs, 2 TTL inputs Reading Range : 5 - 8 m Power Consumed : DC+9V/12V	Tag reading/ programming
STA PT0707 Handheld Reader		UHF handheld reader with PDA Frequency : 860MHz-868MHz(CE) Protocol : ISO18000-6B EPC G2 Reading Range : 7M Read Rate: 150 tags per second Connectivity: Wi Fi (802.11 b/g), USB, RS232 Processor :Samsung, 400 MHz Memory: 128 MByte Flash, 64 MByte RAM	Tag reading/ programming