



Global Product Certification  
EMC-EMF Safety Approvals

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**APPENDIX H  
OF  
TEST REPORT T080316\_F**

**TEST SAMPLE TEST PLAN**

FCC ID: TVN-MARS-24E  
Manufacturer: Magellan Technology Pty Limited  
Test Sample: MARS-24 RFID Desktop Reader  
Model: MARS-24E  
Serial Number: 7014360  
Part Number: 63-70-034

Date: 20<sup>th</sup> May 2008



## **(MARS-24E RFID Desktop Reader)**

### **EMC Test Plan**

### **USA and CANADA**

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## Revision status

<i><b>Revision</b></i>	<i><b>Date</b></i>	<i><b>Description</b></i>
1.0	4/4/2008	Initial Release.

# 1 INTRODUCTION

## 1.1 PURPOSE

The purpose of this document is to describe the requirements for testing a modified Multiple Antenna Reader System (MARS-24E) against the relevant requirements of USA and Canada.

## 1.1 TEST REQUIREMENTS

### 1.1.1 Test Standards

Testing is to be performed using the procedures and criteria contained in the latest version of the following standards:

- USA
  - FCC Part 15.31, 15.207, 15.225 (Radio/EMC)
- Canada
  - a) RSS-210 (Radio)
  - b) RSS-Gen (EMC)
  - c) RSS-102 (RF Exposure)

## 1.2 PRODUCT DESCRIPTION

The Multiple Antenna Reader System (MARS-24E) is an RFID read/write device designed to meet the requirements to monitor, manage and control a large number of valuable items.

The MARS-24E is capable of operating up to 24 antennas which can be arranged as required to operate 24 separate read/write stations. Only a single antenna can be activated at any one time.

The unit consists of external power supply, USB, general purpose I/O interface and Ethernet ports.

Power is provided from an external 12VDC power supply.

Each antenna port is electrically identical.

### 1.2.1 Ports

The following ports are provided on the product:

- Power port
- USB device port
- USB host port
- I/O port
- RJ45 (Ethernet) port

### 1.2.2 Antenna

The following antenna used is provided for testing:

- Panel Reader antenna (PRA-5050) – P/no 057-70-002

### 1.3 PRODUCT SPECIFICATIONS

Manufacturer:	Magellan Technology Pty Limited 65 Johnston Street Annandale NSW 2038
	Telephone: +61 2 9562 9800 Fax: +61 2 9518 7620
Transmission Frequency:	13.56 MHz
Voltage:	12VDC
Number of Axes:	1
Number of Reply Channels:	8
Command Data Rate Number:	424 kbit/s
Number of external antenna	Up to 24
Tag Type:	PJM Stack Tag and PJM Item Tag (TAGSTAR SYSTEMS ST-104-2.5" and TAGSTAR SYSTEMS IT-104)
Dimensions:	38 (L) x 17 (W) x 8cm (H)
Operating Environment:	Indoors

### 1.4 PRODUCT BUILD LEVEL

The build level of the MARS-24E under test is as follows:

Model Number:	MARS-24E
Serial Numbers:	Production prototype
Part Number:	63-70-034
Microprocessor type:	AT91RM9200
Frequencies:	50MHz, 27.12MHz, 18.432MHz
Transmission Frequencies:	13.56 MHz
Real Time Clock:	32,768 kHz
BOM:	63-70-034-BOM Ver. 01 (Master BOM) 63-10-021-BOM Ver. D16 61-10-000-BOM Ver. C12 63-10-022-BOM Ver. E3 63-10-014-BOM Ver. B9
Main PCB Circuit:	63-10-000-SCH Ver. C6 63-10-021-SCH Ver. D2 63-10-022-SCH Ver. D1 63-10-014-SCH Ver. B2
Main PCB:	63-10-021-ASY Ver. D5 61-10-000-ASY Ver. C3 63-10-022-ASY Ver. E3 63-10-016-ASY Ver. B3
Antenna Type:	External Inductive loop
Power Supply:	Manufacturer: GlobTek Model: GT-21097-5012 Input: 100-240VAC, 1.6A, 50-60Hz Output: 12VDC, 4.17A
Data Cable:	Ethernet cable minimum 3m in length
Antenna Cable:	RCA cable 3m in length

### 1.4.1 Auxiliary Equipment

The following auxiliary equipment will be used during testing:

- Laptop Toshiba Tecra 8100
- USB A to mini-B cables, shielded cable
- 2 Test tags type TAGSTAR SYSTEMS ST-104-2.5" and TAGSTAR SYSTEMS IT-104

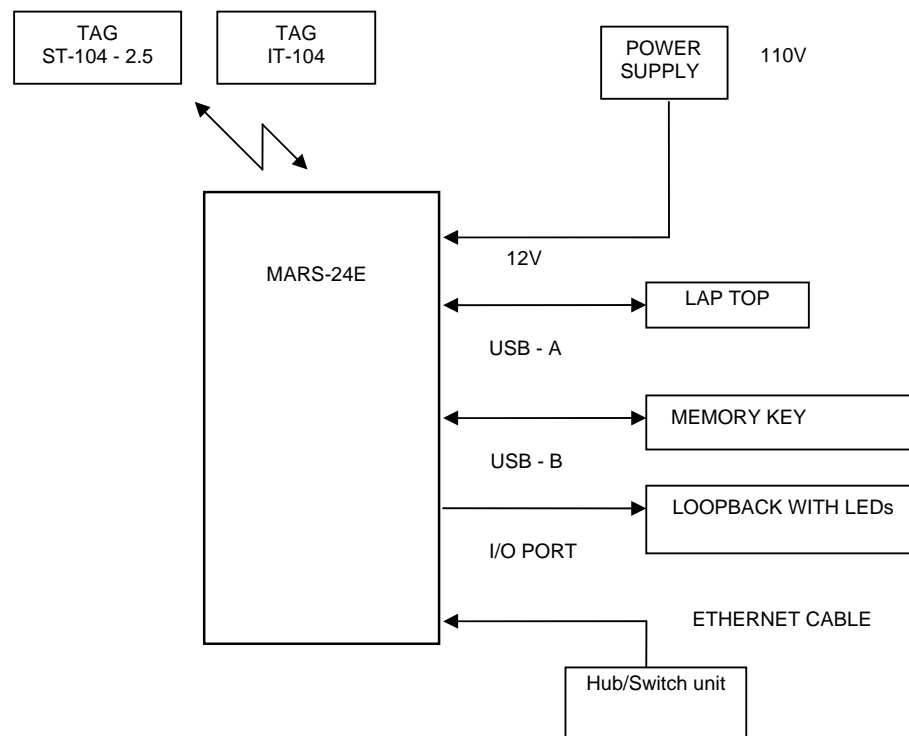
## 1.5 TESTING

### 1.5.1 Order of Testing

Radiated emission testing is required to be completed first, followed by conducted emissions testing.

### 1.5.2 Test Method and EUT Configuration

The MARS-24E will be tested as a tabletop unit with all ports connected as depicted below.



### 1.5.3 EUT Operation

During testing, a single antenna port of the MARS-24E will be connected and transmitting.

The unit will be polling the antenna during the test cycle.

In this mode, the test software will operate the data ports as follow:

Ethernet:

The EUT will be connected via an Ethernet cable to a host PC in the test area. The host PC will connect to a server application on the EUT. Approximately twice a second, the host PC communicates with the server application to check the connection state of the USB host, the USB device and the RFID functionality of the reader. This information will slowly scroll upward on the host PC display and will look as follows:

```
e.g.  
8: USB host: online, USB device: online, RFID: online,  
9: USB host: online, USB device: online, RFID: online,  
10: USB host: online, USB device: online, RFID: online,  
11: USB host: online, USB device: online, RFID: online,  
12: USB host: online, USB device: online, RFID: online,  
ERROR - network connection is offline
```

The number on the left is the number of seconds since the device was started, the last error indicates that the Ethernet connection to the EUT has been lost either due to EUT reset or Ethernet connection lost. Whenever there is an error, the host PC will play a short sound to alert the tester that an error has occurred.

The 8 receiver LEDs on the MARS-24E will be ON (one at a time) when receiving replies from the Tags.

USB host:

The USB host will be looped back to the USB device via an extension cable. The EUT test software will monitor this device for unintended disconnection.

USB device:

USB device will be constantly pulled by the USB host (both USB ports are being exercised constantly during the test). The EUT test software will monitor this device for unintended disconnection.

I/O Port:

This port will be connected via a cable to a loopback plug with LED indication. During testing data will be sent down the cable with the LED providing a visual indication.



## **2 USA REQUIREMENTS**

### **2.1 PRODUCT CLASSIFICATION**

The MARS-24E is classified as a short range radio device.

### **2.2 TEST CONFIGURATION and OPERATION**

The test configuration and operation for MARS-24E is detailed in Paragraph 1.5.

### **2.3 TEST REQUIREMENTS**

A summary of all test requirements is given in Section 4 of this document.

#### **2.3.1 *Intentional Radiator Testing***

The MARS-24E must satisfy the requirements of FCC Part 15.31, 15.207 and 15.225 for intentional radiators.

### **2.4 PERFORMANCE CRITERIA**

MARS-24E must meet the limits required for compliance.

### **2.5 TEST REPORTS**

Provided MARS-24E meets the requirements, an FCC Part 15 test report is required (soft copy only)

Test Reports are not required if the MARS-24E does not meet the requirements.

### **2.6 CERTIFICATION**

Application, via a TCB, is to be made for certification, is required on completion of testing.

### **3 CANADIAN REQUIREMENTS**

#### **3.1 PRODUCT CLASSIFICATION**

The MARS-24E is classified as a short range radio device.

#### **3.2 TEST CONFIGURATION and OPERATION**

The test configuration and operation for MARS-24E is detailed in Paragraph 1.5.

#### **3.3 TEST REQUIREMENTS**

A summary of all test requirements is given in Section 4 of this document.

##### **3.3.1 *Intentional Radiator Testing***

The MARS-24E must satisfy the requirements of Industry Canada regulations RSS-210, RSS-102 and RSS-Gen.

Results to be generated from USA testing.

#### **3.4 PERFORMANCE CRITERIA**

MARS-24E must meet the limits required for compliance.

#### **3.5 TEST REPORTS**

Provided MARS-24A meets the requirements, a combined RSS-210, RSS-102 and RSS-GEN test report is required (soft copy only)

Test Reports are not required if the MARS-24E does not meet the requirements.

#### **3.6 CERTIFICATION**

Application, via a TCB, is to be made for certification, is required on completion of testing.

## 4 SUMMARY OF TESTING AND REPORT REQUIREMENTS

The following Tables provide a summary of all required testing.

**TABLE 4.1 TEST SUMMARY**

TESTS			
	USA	CANADA	CERTIFICATION
Radio/emissions	Applicable  FCC Part 15.31, 15.207, 15.225	Applicable – obtain results from USA testing RSS-210 RSS-102 RSS-Gen	Required for USA and Canada

**TABLE 4.2 – REPORT SUMMARY**

COUNTRY	REQUIRED REPORT	COMMENT
USA	Radio/EMC/EMR –FCC Pt 15	
Canada	Radio/EMC/EMR – RSS-210, RSS-102, RSS-Gen	Report generated from USA results