



EMC Technologies Pty Ltd

ABN 82 057 105 549
Unit 3/87 Station Road
Seven Hills NSW 2147 Australia

Telephone +61 2 9624 2777
Facsimile +61 2 9838 4050
Email syd@emctech.com.au
www.emctech.com.au

**APPENDIX H
OF
TEST REPORT T61218_F**

TEST SAMPLE TEST PLAN

FCC ID: TVN-MARS-24
Manufacturer: Magellan Technology
Test Sample: RFID Terminal
Model: MARS24
Serial Number: Production Prototype

Date: 15th January 2007



MULTIPLE ANTENNA READER SYSTEM (MARS-24)

12 December 2006

Test Plan USA and Canada

MAGELLAN-IN-CONFIDENCE

NO WARRANTIES OF ANY NATURE ARE EXTENDED BY THIS DOCUMENT. Any product and related material disclosed herein are only furnished pursuant and subject to the terms and conditions of a duly executed Program Product Licence or Agreement to purchase or lease equipment. The only warranties made by Magellan Technology, if any, with respect to the products described in this document are set forth in such Licence or Agreement. Magellan Technology cannot accept any financial or other responsibility that may be the result of your use of the information or software material, including direct, indirect, special or consequential damages. You should be careful to ensure that the use of this information and/or software material complies with the laws, rules, and regulations of the jurisdictions with respect to which it is used.

Copyright © 2006 Magellan Technology

Author : Ken McAnulty

Checked: Tai Wai Pong

Document Number: 063-70-018-DOC

Date: 12 December

Revision Number: 1.1

Table of Contents

TABLE OF CONTENTS.....	II
REVISION STATUS.....	III
SECTION 1 - INTRODUCTION.....	1
1. PURPOSE.....	1
1.1 TEST REQUIREMENTS.....	1
1.1.1 Test Standards.....	1
1.2 PRODUCT DESCRIPTION.....	1
1.2.1 Ports.....	1
1.2.2 Antenna.....	1
1.3 PRODUCT SPECIFICATIONS.....	1
1.4 PRODUCT BUILD LEVEL.....	2
1.4.1 Auxiliary Equipment.....	3
1.5 TESTING.....	3
1.5.1 Order of Testing.....	3
1.5.2 Test Method and EUT Configuration.....	3
1.5.3 EUT Operation.....	3
2. USA REQUIREMENTS.....	5
2.1 PRODUCT CLASSIFICATION.....	5
2.2 TEST CONFIGURATION AND OPERATION.....	5
2.3 TEST REQUIREMENTS.....	5
2.3.1 Intentional Radiator Testing.....	5
2.4 PERFORMANCE CRITERIA.....	5
2.5 TEST REPORTS.....	5
2.6 CERTIFICATION.....	5
3. CANADIAN REQUIREMENTS.....	6
3.1 PRODUCT CLASSIFICATION.....	6
3.2 TEST CONFIGURATION AND OPERATION.....	6
3.3 TEST REQUIREMENTS.....	6
3.3.1 Intentional Radiator Testing.....	6
3.4 PERFORMANCE CRITERIA.....	6
3.5 TEST REPORTS.....	6
3.6 CERTIFICATION.....	6
4. SUMMARY OF TEST AND REPORT REQUIREMENTS.....	7

Revision status

<i>Revision</i>	<i>Date</i>	<i>Description</i>
1.0	12/12/06	Initial Release
1.1	12/12/06	Removal of alternate power supply

SECTION 1 - INTRODUCTION

1. PURPOSE

The purpose of this document is to describe the requirements for testing Multiple Antenna Reader System (MARS-24) 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 following standards:

- USA
FCC Part 15.31, 15.207, 15.225 (Radio/EMC)
- Canada
 - (a) RSS-210 : Issue 6 (Radio)
 - (b) RSS-Gen : Issue 1 (EMC)
 - (c) RSS-102 : Issue 2 (RF Exposure)

1.2 PRODUCT DESCRIPTION

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

The MARS-24 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 is provided for testing:

- Panel reader antenna (PRA-5050) – PN : 057-70-014-ASY

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	424 kbit/s
Number of external antennas:	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 8 cm (H)
Operating environment:	Indoors

1.4 PRODUCT BUILD LEVEL

The build level of the MARS-24 (with 24 ports) under test is as follows:

Model Number:	MARS-24
Serial Number:	Production Prototype
Part Number:	63-70-000
Microprocessor type:	AT91RM9200
Frequencies:	50 MHz 27.120 MHz 18.432 MHz
Real Time Clock:	32,768 kHz
BOM:	63-70-000-BOM Ver. 6 MLC03 Version 2 (Master BOM) 63-10-021-BOM Ver. B6 61-10-000-BOM Ver. B6 63-10-022-BOM Ver. B3 63-10-014-BOM Ver. B6
Main PCB Circuit:	63-10-100-SCH Ver. C2 63-10-021-SCH Ver. B3 63-10-022-SCH Ver. B2 63-10-014-SCH Ver. B2
Main PCB:	63-70-000-ASY Ver. 2 63-10-021-ASY Ver. B3 61-10-000-ASY Ver. B2 63-10-022-ASY Ver. B2 63-70-016-ASY Ver. 1
Antenna:	Panel Antenna BOM 57-50-053-BOM Ver 1 Circuit 57-50-022-SCH Ver 1 Assembly 57-50-032-ASY Ver 1
Antenna type:	External inductive loop antenna
Power Supply:	Manufacturer : GlobTek Model Number : GT-21097-5012 Input : 100 – 240V, 1.6A, 50-60 Hz Output : 12VDC, 4.17A
Data Cables:	Ethernet Cable minimum 3 meters in length
Antenna Cables:	RCA cable 3 meters long

1.4.1 Auxiliary Equipment

The following auxiliary equipment will be used during testing:

- Laptop "Toshiba Tecra 8100"
- USB AtoB cables, shielded type cable, unknown brand, shorter than 3m
- 2 test tags, type "TAGSTAR SYSTEMS ST-104-2.5" and "TAGSTAR SYSTEMS IT-104"

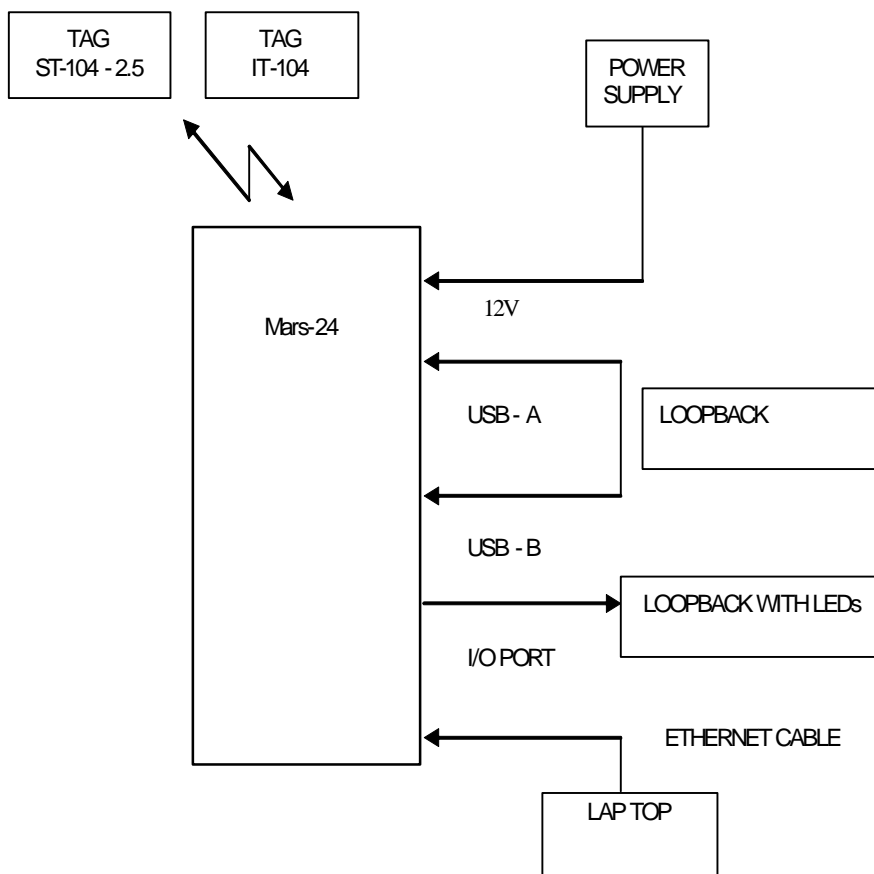
1.5 TESTING

1.5.1 Order of Testing

Conducted emissions testing is required to be completed first, followed by radiated emissions and immunity testing.

1.5.2 Test Method and EUT Configuration

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



1.5.3 EUT Operation

During testing, a single port of the MARS-24 will be connected and operating and the unit will be transmitting

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

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

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-24 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-24 is classified as a short range radio device.

2.2 TEST CONFIGURATION and OPERATION

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

Conducted emissions testing is to be performed prior to radiated emissions testing.

2.4 PERFORMANCE CRITERIA

MARS-24 must meet the limits required for compliance.

2.5 TEST REPORTS

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

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

2.6 CERTIFICATION

FCC certification, via a TCB, is required on completion of testing.

3. CANADIAN REQUIREMENTS

3.1 PRODUCT CLASSIFICATION

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

3.2 TEST CONFIGURATION and OPERATION

The test configuration and operation for MARS-24 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-24 must satisfy the requirements of RSS-210, RSS-102 and RSS-Gen.

Results are to be obtained from USA testing.

3.4 PERFORMANCE CRITERIA

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

3.5 TEST REPORTS

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

Test Report is not required if the MARS-24 does not meet the requirements.

3.6 CERTIFICATION

Industry Canada certification, via a TCB, is required on completion of testing.

4. SUMMARY OF TEST AND REPORT REQUIREMENTS

The following Tables provide a summary of all required testing.

TABLE 4.1 – TEST SUMMARY

TESTS	REQUIREMENTS		CERTIFICATION
	USA	CANADA	
Radio/emissions	Applicable. FCC Part 15.31, 15.207, 15.225	Applicable – obtain results from USA testing RSS-210 (Issue 6) RSS-102 RSS-Gen (Issue 1)	Required for USA and Canada

TABLE 4.2 – REPORT SUMMARY

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