

APPENDIX H OF TEST REPORT T 60919_F

TEST SAMPLE TEST PLAN

FCC ID: TVN-MARS-1

Manufacturer: Magellan Technologies Pty Ltd

Test Sample: RFID Read Write Device

Model: Mars-1-2-4-6

Serial Number: Production Prototype

Date: 12th October 2006

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MULTIPLE ANTENNA READER SYSTEM (MARS-1-2-4-6)

Test Plan

10 October 2006

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Document Number: 64-70-025-DOC Version 1.2

Checked:

Date: 10 October 2006

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Revision status

<i>Revision</i>	<i>Date</i>	<i>Description</i>
1.0	Sept 2006	Initial Release
1.1	Oct 2006	Removal of alternate power supply and antenna. EUT operation modified to reflect more accurately how the unit was operating during testing.
1.2	Oct 2006	Change the EUT Part Number and BOM number to reflect the current and correct production build.

SECTION 1 - INTRODUCTION

1. PURPOSE

The purpose of this document is to describe the requirements for testing Multiple Antenna Reader System (MARS-1-2-4-6) against the EMC and radio 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) ICES-03 : Issue 4 (EMC)

1.2 PRODUCT DESCRIPTION

The Multiple Antenna Reader System (MARS-1-2-4-6) is a family of products which are RFID read/write devices designed to meet the requirements to monitor, manage and control a large number of valuable items.

The MARS-1-2-4-6 is capable of operating up to 6 antennas which can be arranged as required to operate 6 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 Interface
- RJ45 (Ethernet) port

1.2.2 Antenna

The following antennas are provided:

- Rectangular, inner antenna coil dimensions 60X420mm, single axis – PN : 63-10-003
- Rectangular, inner antenna coil dimensions 202X352mm, single axis – PN : 64-10-002

1.3 PRODUCT SPECIFICATIONS

Manufacturer: Magellan Technology Pty Limited
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Telephone: +61 2 9562 9800
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Transmission Frequency:	13.56 MHz
Voltage:	12VDC
Number of Axes:	1 or 2
Number of Reply Channels:	2
Command Data Rate	424 kbit/s
Number of external antennas:	Up to 6
Tag Type:	PJM Stack Tag and PJM Item Tag (TAGSTAR SYSTEMS ST-104-2.5" and "TAGSTAR SYSTEMS IT-104)
Dimensions:	27 (L) x 19 (W) x 5 mm (H)
Operating environment:	Indoors

1.4 PRODUCT BUILD LEVEL

The build level of the MARS-1-2-4-6 (with 6 ports) under test is as follows:

Model Number:	MARS-1-2-4-6
Serial Number:	Production Prototype
Part Number:	64-70-034-ASY MLC01 Ver. 1
Microprocessor type:	AT91RM9200
Frequencies:	50 MHz 27.120 MHz 18.432 MHz
Real Time Clock:	32,768 kHz
BOM:	64-70-034-BOM Ver. 1 (Master BOM) 64-10-009-BOM Ver. 14 (BOM Main ASY)
Main PCB Circuit:	64-10-000-SCH Ver. 5 64-10-010-SCH Ver. 1
Main PCB:	64-10-009-ASY Ver. 7 64-10-010-ASY Ver. 1
Antenna:	a) Rectangle 120x240mm BOM 63-10-004-BOM Ver 3 Circuit 63-10-004-SCH Ver 2 Assembly 63-10-004-ASY Ver 2 b) Rectangle 202x352mm BOM 64-10-002-BOM Ver 2 Circuit 64-10-002-SCH Ver 2 Assembly 64-10-002-ASY Ver 2
Antenna type:	External inductive loop antenna
Power Supply:	Manufacturer : GlobTek Model Number : GT-21097-5012 Part Number : TR9CE4000LCP-Y 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 metres long

1.4.1 Auxiliary Equipment

The following auxiliary equipment will be used during testing:

- Laptop "Toshiba Tecra 8100"
- Laptop "Toshiba TE2000"
- USB Flash drive "ASTONE 256MB 80X"
- USB AtoB cables, shielded type cable, unknown brand, shorter than 3m
- USB AtoA (extension) cables, shielded type cable, unknown brand, shorter than 3m
- Loopback with LEDs and ribbon cable, shorter than 3m
- 2 test tags, type "TAGSTAR SYSTEMS ST-104-2.5" and "TAGSTAR SYSTEMS IT-104"

1.5 TESTING

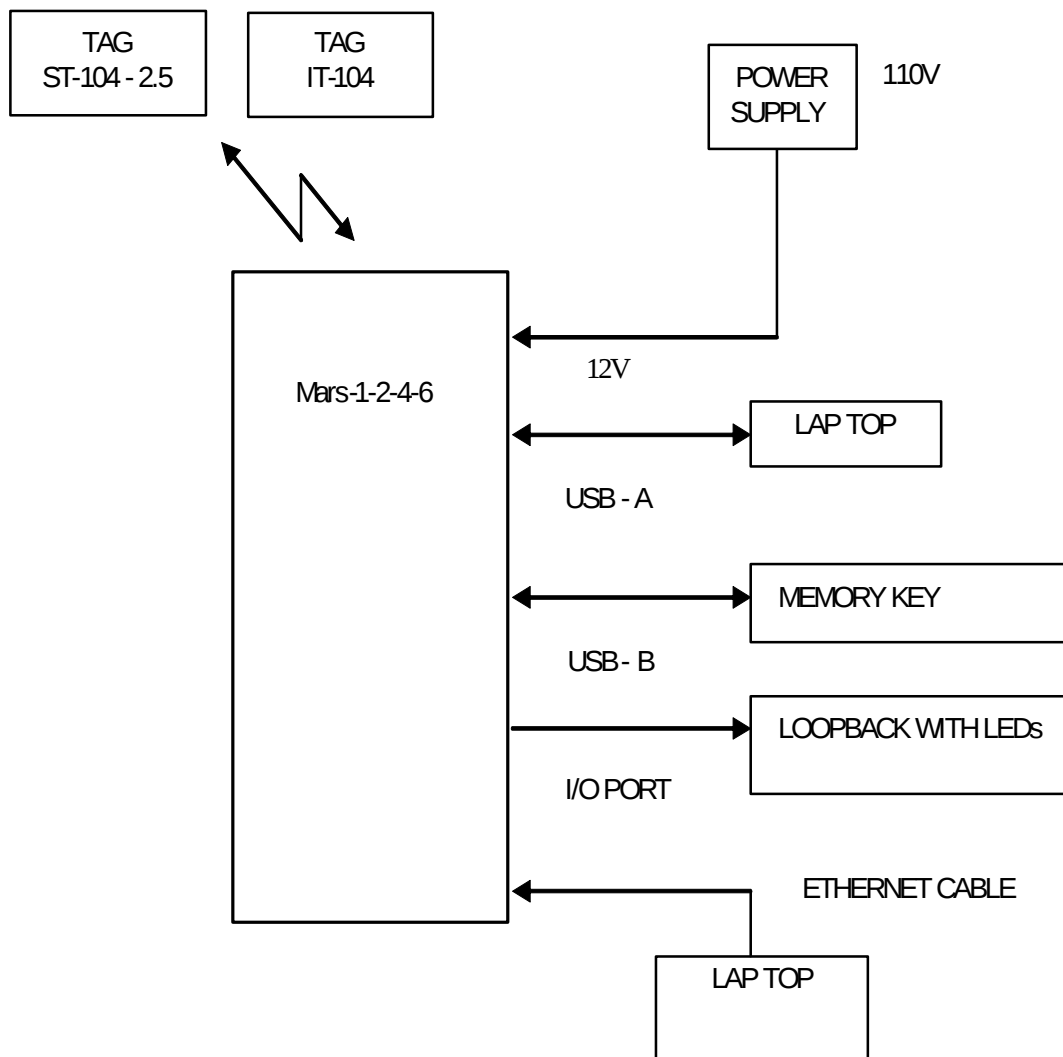
1.5.1 Order of Testing

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

1.5.2 Test Method and EUT Configuration

MARS-1-2-4-6 will be tested separately with each type of antenna. These results will be used to determine the worst case future testing for Australia and the European Union.

EUT is to be tested as a tabletop unit with all ports connected as shown below.



1.5.3 EUT Operation

During testing, a single port of the MARS-1-2-4-6 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:

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

In this mode the test software will:

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 2 Receiver LEDs on the MARS-1-2-4-6 will on when receiving replies from the Tags.

USB host:

A USB flash drive will be connected to this port via an extension cable. The EUT test software will monitor this device for unintended disconnection

USB device:

A host PC will be connected via a USB A-B cable to this port. 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-1-2-4-6 is classified as a short range radio device.

2.2 TEST CONFIGURATION and OPERATION

The test configuration and operation for MARS-1-2-4-6 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 *Radio/EMC Testing*

The MARS-1-2-4-6 must satisfy the requirements of FCC Part 15.31, 15.207 and 15.225 for intentional radiators.

Each antenna type is to be tested separately.

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

2.3.2 *Safety Testing*

As the external power supply is already certified for use within USA, testing is not required.

2.4 PERFORMANCE CRITERIA

MARS-1-2-4-6 must meet the limits required for compliance.

2.5 TEST REPORTS

Provided MARS-1-2-4-6 meets the requirements, an FCC 15 test report is required (soft copy only).

Test Reports are not required if the MARS-1-2-4-6 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-1-2-4-6 is classified as a short range radio device.

3.2 TEST CONFIGURATION and OPERATION

The test configuration and operation for MARS-1-2-4-6 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 *Radio/EMC Testing*

The MARS-1-2-4-6 must satisfy the requirements of RSS-210 and RSS-Gen.

Results are to be obtained from USA testing.

3.3.2 *Safety Testing*

As the external power supply is already certified for use within Canada, testing is not required.

3.4 PERFORMANCE CRITERIA

The MARS-1-2-4-6 must meet the limits required for compliance.

3.5 TEST REPORTS

Provided MARS-1-2-4-6 meets the requirements, a combined RSS-210 and RSS-Gen test report is required (soft copy only).

Test Report is not required if the MARS-1-2-4-6 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 1 – TEST SUMMARY

TESTS	APPLICABILITY		CERTIFICATION
	USA	CANADA	
Radio/emissions (Intentional radiators)	Applicable (test with each type of antenna) FCC Part 15.31, 15.207, 15.225 See Para 2.3.1 regarding antenna	Applicable – obtain results from USA testing RSS 210 (Issue 6) RSS-Gen (Issue 1)	Required for USA and Canada

TABLE 2 – REPORT SUMMARY

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