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APPENDIX H
OF
TEST REPORT T71003_F

TEST SAMPLE TEST PLAN

FCC ID: TVN-MSTRP
Manufacturer: Magellan Technology Pty Limited
Test Sample: PJM Stack Tag Tunnel Reader
Model: MSTRP-5050
Serial No: Production Prototype

Date: 25th October 2007

MAGELLAN TECHNOLOGY

TUNNEL READER (MSTRP-5050)

EMC Test Plan

USA and CANADA

30 November 2007

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Revision status

Revision	Date	Description
1.0	Sep 07	Initial Release.
1.1	Nov 07	Add document ANSI C63.4-2003 to Section 1.1.1

1 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the requirements for testing Tunnel Reader Model MSTRP-5050 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

    a) FCC Part 15.31, 15.207, 15.225 (Radio/EMC)
    b) ANSI C63.4-2003 (Method of Measurement)

- Canada

    c) RSS-210 (Radio)
    d) RSS-Gen (EMC)
    e) RSS-102 (RF Exposure)

1.2 PRODUCT DESCRIPTION

The MSTRP-5050 Tunnel Reader is an RFID read/write device designed to meet the requirements to monitor, manage and control a large number of items. It is designed to work primarily with conveyor belts

The product has an aperture of 500 x 500 mm and is a multi-axis tunnel reader which switches the magnetic field rapidly between the three axis of X, Y and Z.

The MSTRP-5050 will read and write to all PJM ItemTag and StackTag labels within the internal working volume of the tunnel despite the orientation of the tags.

The unit consists of external power supply, USB and Ethernet ports.

There are three orthogonal internal antenna fitted to the unit. Only one antenna is operational any one time. They are operated in sequence.

Two antenna will be used during testing – on a PCB based and the other a polycarbon based internal inductive loop antenna.

Power is provided from an external 12VDC power supply.

1.2.1 Ports

The following ports are provided on the product:

- Power port
- USB device port
- USB host port
- RJ45 (Ethernet) port

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:	3
Number of Reply Channels:	8
Command Data Rate Number:	424 kbit/s
Tag Type:	PJM Stack Tag and PJM Item Tag (TAGSTAR SYSTEMS ST-104-2.5" and TAGSTAR SYSTEMS IT-104)
Antenna:	PCB based or polycarbon based inductive loop antenna.
Dimensions:	1010 (L) x 610 (W) x 710mm (H)
Internal Aperture:	500 x 500mm
Weight:	120 kg
Operating Environment:	Indoors

1.4   PRODUCT BUILD LEVEL

The build level of the MSTRP-5050 under test is as follows:

Model Number:	MSTRP-5050
Serial Numbers:	Production prototype
Part Number:	049-70-000
Microprocessor type:	AT91RM9200
Frequencies:	50MHz, 27.12MHz,18.432MHz
Transmission Frequencies:	13.56 MHz
Real Time Clock:	32,768 kHz
MSTRP-5050 MLC05	
BOM:	049-70-000-BOM MSTRP5050 MLC05 Version 1
	063-10-000-BOM Version C12
	049-10-124-BOM Version C2
Main PCB Circuit:	063-10-000-SCH Version C6
	049-10-124-SCH Version C2
Antenna Type:	Polycarbon based inductive loop antenna
	BOM: 049-10-126-BOM Version 1
	049-10-135-BOM Version 1
	049-10-005-BOM Version 1
	049-10-013-BOM Version 1
	049-10-028-BOM Version 1
	049-10-031-BOM Version 1
	049-10-097-BOM Version 2
	049-10-115-BOM Version 1
	Circuit: 049-10-126-SCH Version B

049-10-135-SCH Version B
049-10-003-PCB Version 1
049-10-010-SCH Version 1
049-10-023-SCH Version 3
049-10-099-PCB Version 2

MSTRP-5050 MLC06
BOM: 049-70-000-BOM MSTRP5050 MLC06 Version 1
                              063-10-000-BOM Version C12
                              049-10-124-BOM Version C2

Main PCB Circuit: 063-10-000-SCH Version C6
                              049-10-124-SCH Version C2

Antenna Type: PCB based inductive loop antenna
                              BOM: 049-10-127-BOM Version A1
                                     049-10-128-BOM Version A1
                                     049-10-129-BOM Version A1
                                     049-10-130-BOM Version A1
                                     049-10-131-BOM Version A1
                                     049-10-132-BOM Version A1
                                     049-10-133-BOM Version A1
                                     049-10-134-BOM Version A1

                              Circuit: 049-10-127-SCH Version A
                                       049-10-128-SCH Version A
                                       049-10-129-PCB Version A
                                       049-10-130-SCH Version A
                                       049-10-131-SCH Version A
                                       049-10-132-PCB Version A
                                       049-10-133-PCB Version A
                                       049-10-134-PCB Version A

Power Supply: Manufacturer: Cincon Electronics
                              Model: TR100A12021E11
                              Input: 100-240V, 1.5A
                              Output: 12V, 8.33A
Data Cable: Ethernet cable minimum 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 emissions testing is required to be completed first, followed by conducted emissions testing.

1.5.2 Test Method and EUT Configuration

The MSTRP-5050 will be tested as a standing unit with all ports connected as depicted below.

Testing will be done with both antenna.
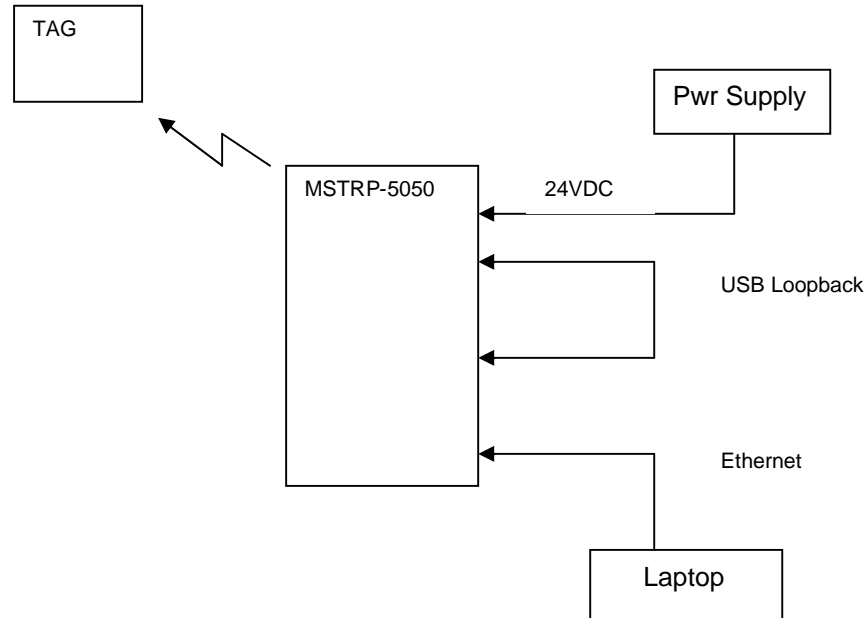
1.5.3 EUT Operation

During testing, the MSTRP-5050 will be connected and transmitting.

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

Antenna are operated in sequence during testing.

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.

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.

2 USA REQUIREMENTS

2.1 PRODUCT CLASSIFICATION

The MSTRP-5050 is classified as a short range radio device.

2.2 TEST CONFIGURATION and OPERATION

The test configuration and operation for MSTRP-5050 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 MSTRP-5050 must satisfy the requirements of FCC Part 15.31, 15.207 and 15.225 for intentional radiators.

2.4 PERFORMANCE CRITERIA

MSTRP-5050 must meet the limits required for compliance.

2.5 TEST REPORTS

Provided MSTRP-5050 meets the requirements, an FCC Part 15 test report is required (soft copy only)

Test Reports are not required if the MSTRP-5050 does not meet the requirements.

2.6 CERTIFICATION

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

3 CANADIAN REQUIREMENTS

3.1 PRODUCT CLASSIFICATION

The MSTRP-5050 is classified as a short range radio device.

3.2 TEST CONFIGURATION and OPERATION

The test configuration and operation for MSTRP-5050 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 MSTRP-5050 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

MSTRP-5050 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 Reports are not required if the MSTRP-5050 does not meet the requirements.

3.6 CERTIFICATION

Application, via a TCB, is to be made to Industry Canada for certification 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 with both antenna **(See Note 1)** FCCPart 15.31, 15.207, 15.225	Applicable – obtain results from USA testing RSS-210 RSS-102 RSS-Gen	Required for USA and Canada

Note 1: Two (2) tests will be required as two (2) different antenna are being used.

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