

Company: Radwin Ltd.

Test of: Outdoor Subscriber Radio Unit

To: FCC 15.407 (non-DFS Bands), FCC 15B & ICES-003

Report No.: RDWN41-U5\_Master Rev A

## MASTER TEST REPORT



# MASTER TEST REPORT



Test of: Radwin Ltd. Outdoor Subscriber Radio Unit

To: FCC 15.407 (non-DFS Bands), FCC 15B & ICES-003

Test Report Serial No.: RDWN41-U5\_Master Rev A

This report supersedes: NONE

As a result of the 6 Mbyte FCC file size limitation potentially large test reports require to be split into smaller components. This document is the Master document controlling Addendum reports as listed below. This Master document combined with the Addendums demonstrate compliance with the standard

| Master Document Number | Addendum Reports                   |
|------------------------|------------------------------------|
| RDWN41-U5_Master       | RDWN41-U5 Conducted                |
|                        | RDWN41-U5 Radiated                 |
|                        | RDWN41-U5 (FCC Part15B & ICES-003) |

Applicant: Radwin Ltd.  
27 Habarzel Street  
Tel Aviv, 69710  
Israel

Product Function: Outdoor Subscriber Radio Unit

Issue Date: 13<sup>th</sup> July 2016

## **This Test Report is Issued Under the Authority of:**

**MiCOM Labs, Inc.**  
575 Boulder Court  
Pleasanton California 94566  
USA  
Phone: +1 (925) 462-0304  
Fax: +1 (925) 462-0306  
[www.micomlabs.com](http://www.micomlabs.com)



**MiCOM Labs is an ISO 17025 Accredited Testing Laboratory**



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 3 of 21

---

## Table of Contents

|  |           |
|--|-----------|
| <b>1. ACCREDITATION, LISTINGS &amp; RECOGNITION.....</b> | <b>4</b>  |
| 1.1. TESTING ACCREDITATION.....                          | 4         |
| 1.2. RECOGNITION .....                                   | 5         |
| 1.3. PRODUCT CERTIFICATION .....                         | 6         |
| <b>2. DOCUMENT HISTORY .....</b>                         | <b>7</b>  |
| <b>3. TEST RESULT CERTIFICATE.....</b>                   | <b>8</b>  |
| <b>4. REFERENCES AND MEASUREMENT UNCERTAINTY .....</b>   | <b>9</b>  |
| 4.1. Normative References .....                          | 9         |
| 4.2. Test and Uncertainty Procedure .....                | 10        |
| <b>5. PRODUCT DETAILS AND TEST CONFIGURATIONS.....</b>   | <b>11</b> |
| 5.1. Technical Details .....                             | 11        |
| 5.2. Scope Of Test Program .....                         | 12        |
| 5.3. Equipment Model(s) and Serial Number(s) .....       | 13        |
| 5.4. Antenna Details .....                               | 13        |
| 5.5. Cabling and I/O Ports .....                         | 13        |
| 5.6. Test Configurations.....                            | 14        |
| 5.7. Equipment Modifications .....                       | 14        |
| 5.8. Deviations from the Test Standard .....             | 14        |
| <b>6. TEST SUMMARY .....</b>                             | <b>15</b> |
| <b>7. TEST EQUIPMENT CONFIGURATION(S) .....</b>          | <b>16</b> |
| 7.1. Conducted .....                                     | 16        |
| 7.2. Radiated Emissions .....                            | 18        |
| 8.1. ac Wireline Emission .....                          | 20        |

---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

## 1. ACCREDITATION, LISTINGS & RECOGNITION

### 1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) [www.a2la.org](http://www.a2la.org) test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 5 of 21

## 1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

| Country   | Recognition Body   | Status | Phase      | Identification No.                      |
|-----------|--|--------|------------|---|
| USA       | Federal Communications Commission (FCC)  | TCB    | -          | US0159<br>Listing #: 102167             |
| Canada    | Industry Canada (IC)   | FCB    | APEC MRA 2 | US0159<br>Listing #: 4143A-2<br>4143A-3 |
| Japan     | MIC (Ministry of Internal Affairs and Communication)   | CAB    | APEC MRA 2 | RCB 210                                 |
|           | VCCI   | --     | --         | A-0012                                  |
| Europe    | European Commission  | NB     | EU MRA     | NB 2280                                 |
| Australia | Australian Communications and Media Authority (ACMA)   | CAB    | APEC MRA 1 | US0159                                  |
| Hong Kong | Office of the Telecommunication Authority (OFTA)   | CAB    | APEC MRA 1 |   |
| Korea     | Ministry of Information and Communication Radio Research Laboratory (RRL)                        | CAB    | APEC MRA 1 |   |
| Singapore | Infocomm Development Authority (IDA)   | CAB    | APEC MRA 1 |   |
| Taiwan    | National Communications Commission (NCC)<br>Bureau of Standards, Metrology and Inspection (BSMI) | CAB    | APEC MRA 1 |   |
| Vietnam   | Ministry of Communication (MIC)  | CAB    | APEC MRA 1 |   |

EU MRA – European Union Mutual Recognition Agreement.

NB – Notified Body

APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 6 of 21

### 1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) [www.a2la.org](http://www.a2la.org) test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



United States of America – Telecommunication Certification Body (TCB)  
Industry Canada – Certification Body, CAB Identifier – US0159  
Europe – Notified Body (NB), NB Identifier - 2280  
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 7 of 21

---

## 2. DOCUMENT HISTORY

| Draft History |                           |          |
|---------------|---------------------------|----------|
| Revision      | Date                      | Comments |
| Draft         | 1 <sup>st</sup> July 2016 | Initial  |
|               |                           |          |

| Released Document History |                            |                      |          |                            |                 |
|---------------------------|----------------------------|----------------------|----------|----------------------------|-----------------|
| Master Revision           | Date                       | Addendum             | Revision | Date                       | Comments        |
| Rev A                     | 13 <sup>th</sup> July 2016 | Conducted            | Rev A    | 13 <sup>th</sup> July 2016 | Initial Release |
|                           |                            | Radiated             | Rev A    | 13 <sup>th</sup> July 2016 |                 |
|                           |                            | Part 15B<br>ICES-003 | Rev A    | 13 <sup>th</sup> July 2016 |                 |
|                           |                            |                      |          |                            |                 |
|                           |                            |                      |          |                            |                 |
|                           |                            |                      |          |                            |                 |

In the above table the latest report revision will replace all earlier versions.

---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.





**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 8 of 21

### 3. TEST RESULT CERTIFICATE

|   |   |
|---|---|
| <b>Manufacturer:</b> Radwin Ltd.<br>27 Habarzel Street<br>Tel Aviv 69710<br>Israel                  | <b>Tested By:</b> MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton<br>California 94566 USA |
| <b>Model:</b> SU Pro, SU Air<br><b>Equipment Type:</b> Outdoor Subscriber Radio Unit                | <b>Telephone:</b> +1 925 462 0304<br><b>Fax:</b> +1 925 462 0306                              |
| <b>S/N's:</b> U01U0000034   U01U0000035  <br>A000040961-2   A000040961-3  <br>#RDWN41-2   #RDWN41-1 |   |
| <b>Test Date(s):</b> 27 <sup>th</sup> – 29 <sup>th</sup> June 2016                                  | <b>Website:</b> <a href="http://www.micomlabs.com">www.micomlabs.com</a>                      |

| STANDARD(S)   | TEST RESULTS       |
|---|--------------------|
| FCC CFR 47 Part 15 Subpart E 15.407 (non-DFS Bands),<br>FCC Part 15B & ICES-003 | EQUIPMENT COMPLIES |

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

#### Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

**Approved & Released for MiCOM Labs, Inc. by:**



Graeme Grieve  
Quality Manager MiCOM Labs, Inc.

Gordon Hurst  
President & CEO MiCOM Labs, Inc.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



## 4. REFERENCES AND MEASUREMENT UNCERTAINTY

### 4.1. Normative References

| REF.  | PUBLICATION            | YEAR               | TITLE   |
|-------|------------------------|--------------------|---|
| I     | KDB 662911 D01 & D02   | Oct 31 2013        | Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band |
| II    | KDB 905462 D07 v01r01  | 8th April 2016     | Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements.  |
| III   | KDB 926956 D01 v01r06  | 8th April 2016     | U-NII Device Transition Plan  |
| IV    | KDB 789033 D02 v01r02  | 8th April 2016     | General UNII Test Procedures New Rules  |
| V     | A2LA                   | Feb 2016           | R105 - Requirement's When Making Reference to A2LA Accreditation Status   |
| VI    | ANSI C63.10            | 2013               | American National Standard for Testing Unlicensed Wireless Devices  |
| VII   | ANSI C63.4             | 2014               | American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz                                  |
| VIII  | CISPR 22               | 2008               | Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement  |
| IX    | ETSI TR 100 028        | 2001-12            | Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics  |
| X     | FCC 06-96              | Jun 30 2006        | Memorandum Opinion and Order  |
| XI    | FCC 47 CFR Part 15.407 | 2014               | Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices  |
| XII   | ICES-003               | Issue 6 Jan 2016   | Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.              |
| XIII  | M 3003                 | Edition 3 Nov.2012 | Expression of Uncertainty and Confidence in Measurements  |
| XIV   | RSS-247 Issue 1        | May 2015           | Digital Transmission Systems (DTSS), Frequency Hopping System (FHSS) and Licence-Exempt Local Area Network (LE-LEN) Devices   |
| XV    | RSS-Gen Issue 4        | November 2014      | General Requirements and Information for the Certification of Radiocommunication Equipment  |
| XVI   | KDB 644545 D03 v01     | August 14th 2014   | Guidance for IEEE 802.11ac New Rules  |
| XVII  | FCC 47 CFR Part 2.1033 | 2014               | FCC requirements and rules regarding photographs and test setup diagrams.   |
| XVIII | EN 55022               | 2010 + AC:2011     | Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement  |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 10 of 21

---

#### **4.2. Test and Uncertainty Procedure**

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 11 of 21

## 5. PRODUCT DETAILS AND TEST CONFIGURATIONS

### 5.1. Technical Details

| Details                              | Description  |
|--------------------------------------|--|
| Purpose:                             | Test of the Radwin Ltd. SU Pro, SU Air to FCC CFR 47 Part 15 Subpart E 15.407.<br>Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices |
| Applicant:                           | Radwin Ltd.<br>27 Habarzel Street<br>Tel Aviv 69710 Israel   |
| Manufacturer:                        | As Applicant   |
| Laboratory performing the tests:     | MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton California 94566 USA   |
| Test report reference number:        | RDWN41-U5_Master   |
| Date EUT received:                   | 21 <sup>st</sup> June 2016   |
| Standard(s) applied:                 | FCC CFR 47 Part 15 Subpart E 15.407  |
| Dates of test (from - to):           | 27 <sup>th</sup> – 29 <sup>th</sup> June 2016  |
| No of Units Tested:                  | 1  |
| Type of Equipment:                   | Outdoor CPE 5 GHz 2x2 MIMO   |
| Product Family Name:                 | RADWIN SU  |
| Model(s):                            | SU Pro, SU Air   |
| Location for use:                    | Outdoor  |
| Declared Frequency Range(s):         | 5150 - 5250 and 5725 - 5850 MHz;   |
| Primary function of equipment:       | Outdoor Subscriber Radio Unit  |
| Secondary function of equipment:     | n/a  |
| Type of Modulation:                  | 64AM to 256QAM   |
| EUT Modes of Operation:              | 10 MHz; 20 MHz; 40 MHz; 80 MHz;  |
| Declared Nominal Output Power (Ave): | 5150 – 5250 MHz: +45 dBm EIRP<br>5725 – 5850 MHz: +29 dBm  |
| Transmit/Receive Operation:          | Transceiver  |
| Rated Input Voltage and Current:     | POE (POE adaptor sold with unit) 24Vdc   |
| Operating Temperature Range:         | Declared Range -40°C to +60°C  |
| ITU Emission Designator:             | 10 MHz 10M0W7W<br>20 MHz 20M0W7W<br>40 MHz 40M0W7W<br>80 MHz 80M0W7W   |
| Equipment Dimensions:                | 7.5" x 7.1" x 1.2" inches  |
| Weight:                              | 0.4 kg   |
| Hardware Rev:                        | Prototype  |
| Software Rev:                        | Prototype  |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

## **5.2. Scope Of Test Program**

### **Radwin Ltd. SU Pro, SU Air**

The scope of the test program was to test the Radwin SU Pro, SU Air, Outdoor Subscriber Radio Unit configurations in the frequency ranges 5150 - 5250 and 5725 - 5850 MHz; for compliance against the following specification:

### **FCC CFR 47 Part 15 Subpart E 15.407 (non-DFS Bands)**

Radio Frequency Devices; Subpart E – Unlicensed National Information Infrastructure Devices

### **Radwin SU Pro, SU Air**



---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 13 of 21

### 5.3. Equipment Model(s) and Serial Number(s)

| Type              | Description                | Manufacturer | Model          | Serial no.   | Delivery Date |
|-------------------|----------------------------|--------------|----------------|--------------|---------------|
| EUT               | Outdoor CPE 5 GHz 2x2 MIMO | Radwin Ltd.  | SU Pro, SU Air | U01U0000034  | 21 June 2016  |
| EUT               | Outdoor CPE 5 GHz 2x2 MIMO | Radwin Ltd.  | SU Pro, SU Air | U01U0000035  | 21 June 2016  |
| Support Equipment | 55V-1A PoE Injector        | Sinpro       | 0334B5555      | A000040961-2 | 21 June 2016  |
| Support Equipment | 55V-1A PoE Injector        | Sinpro       | 0334B5555      | A000040961-3 | 21 June 2016  |
| Support Equipment | 24V-1A PoE Injector        | GOSPELL      | G0720-240-100  | #RDWN41-2    | 21 June 2016  |
| Support Equipment | 24V-1A PoE Injector        | Phining      | FAS2400100-C56 | #RDWN41-1    | 21 June 2016  |

### 5.4. Antenna Details

| Type                           | Manufacturer | Model     | Family  | Gain (dBi) | BF Gain | Dir BW                    | X-Pol | Frequency Band (MHz)       |
|--------------------------------|--------------|-----------|---------|------------|---------|---------------------------|-------|----------------------------|
| integral                       | RADWIN Ltd.  | MP0188280 | Flat DP | 16.0       | -       | 17.5° Hor.<br>29.1° Vert. | Y     | 5150 – 5250<br>5725 - 5850 |
| MIMO array gain: +3 dB         |              |           |         |            |         |                           |       |                            |
| BF Gain - Beamforming Gain     |              |           |         |            |         |                           |       |                            |
| Dir BW - Directional BeamWidth |              |           |         |            |         |                           |       |                            |
| X-Pol - Cross Polarization     |              |           |         |            |         |                           |       |                            |

### 5.5. Cabling and I/O Ports

| Port Type | Max Cable Length | # Of Ports | Screened | Conn Type | Data Type   |
|-----------|------------------|------------|----------|-----------|-------------|
| PoE       | 100m             | 1          | N        | RJ-45     | Packet Data |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 14 of 21

---

## 5.6. Test Configurations

Results for the following configurations are provided in this report:

| Operational Mode(s) | Data Rate with Highest Power MBit/s | Channel Frequency (MHz) |          |          |
|---------------------|-------------------------------------|-------------------------|----------|----------|
|                     |                                     | Low                     | Mid      | High     |
| 5150 - 5250 MHz     |                                     |                         |          |          |
| 10 MHz              | 15                                  | 5,160.00                | 5,200.00 | 5,245.00 |
| 20 MHz              | 15                                  | --                      | 5,200.00 | --       |
| 40 MHz              | 15                                  | 5,170.00                | 5,200.00 | 5,230.00 |
| 80 MHz              | 15                                  | 5,190.00                | 5,200.00 | 5,210.00 |
| 5725 - 5850 MHz     |                                     |                         |          |          |
| 10 MHz              | 15                                  | 5,730.00                | 5,785.00 | 5,845.00 |
| 20 MHz              | 15                                  | 5,735.00                | 5,785.00 | 5,840.00 |
| 40 MHz              | 15                                  | 5,745.00                | 5,785.00 | 5,825.00 |
| 80 MHz              | 15                                  | 5,765.00                | 5,785.00 | 5,810.00 |

## 5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

## 5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 15 of 21

---

## 6. TEST SUMMARY

List of Measurements

| Test Header                                    | Result                                  | Comments |
|--|---|----------|
| <b>Conducted Testing</b>                       | See Report RDWN41-U5_Conducted Addendum |          |
| (a) Peak Transmit Power                        | Complies                                |          |
| (a) 26 dB & 99% Bandwidth                      | Complies                                |          |
| (a)(5) Power Spectral Density                  | Complies                                |          |
| <b>Radiated Testing</b>                        | See Report RDWN41-U5_Radiated Addendum  |          |
| (b)(2) Radiated Spurious & Band-Edge Emissions | Complies                                |          |
| <b>Digital Emissions</b>                       | See Report RDWN41-U5 Part 15B, ICES-003 |          |
| 15.109 Digital Emissions                       | Complies                                |          |
| <b>AC Wireline Emissions</b>                   | See Report RDWN41-U5 Part 15B, ICES-003 |          |
| 15.107 AC Wireline Emissions                   | Complies                                |          |

---

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



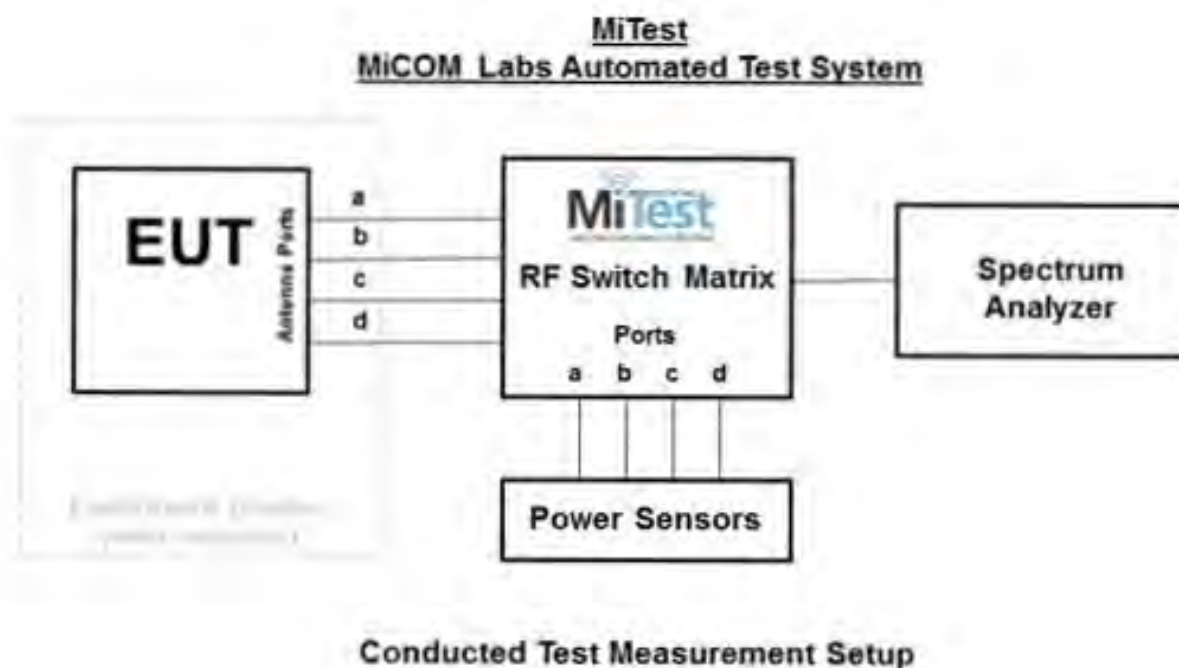
## **7. TEST EQUIPMENT CONFIGURATION(S)**

### **7.1. Conducted**

Conducted RF Emission Test Set-up(s)

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Peak Transmit Power
2. 26 dB & 99% Bandwidth
3. Power Spectral Density
4. Peak Excursion Ratio



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 17 of 21

| Asset#           | Description                                    | Manufacturer         | Model#                         | Serial#          | Calibration Due Date |
|------------------|--|----------------------|--------------------------------|------------------|----------------------|
| 158              | Barometer/Thermometer                          | Control Company      | 4196                           | E2846            | 01 Dec 2016          |
| 249              | Resistance Thermometer                         | Thermotronics        | GR2105-02                      | 9340 #2          | 23 Oct 2016          |
| 287              | Rohde & Schwarz 40 GHz Receiver                | Rhode & Schwarz      | ESIB40                         | 100201           | 27 Aug 2016          |
| 361              | Desktop for RF#1, Labview Software installed   | Dell                 | Vostro 220                     | WS RF#1          | Not Required         |
| 378              | Rohde & Schwarz 40 GHz Receiver with Generator | Rhode & Schwarz      | ESIB40                         | 100107/040       | 04 Aug 2016          |
| 380              | 4x4 RF Switch Box                              | MiCOM Labs           | MiTest RF Switch Box           | MIC001           | 06 Dec 2016          |
| 390              | USB Power Head 50MHz - 24GHz -60 to +20dBm     | Agilent              | U2002A                         | MY50000103       | 17 Oct 2016          |
| 398              | Test Software                                  | MiCOM                | MiTest ATS                     | Version 3.0.0.16 | Not Required         |
| 405              | DC Power Supply 0-60V                          | Agilent              | 6654A                          | MY4001826        | Cal when used        |
| 408              | USB to GPIB interface                          | National Instruments | GPIB-USB HS                    | 14C0DE9          | Not Required         |
| 436              | USB Wideband Power Sensor                      | Boonton              | 55006                          | 8731             | 31 Jul 2016          |
| 437              | USB Wideband Power Sensor                      | Boonton              | 55006                          | 8759             | 31 Jul 2016          |
| 445              | PoE Injector                                   | D-Link               | DPE-101GL                      | QTAH1E2000625    | Not Required         |
| 461              | Spectrum Analyzer                              | Agilent              | E4440A                         | MY46185537       | 13 Aug 2016          |
| 75               | Environmental Chamber                          | Thermatron           | SE-300-2-2                     | 27946            | 24 Nov 2016          |
| RF#1 GPIB#1      | GPIB cable to Power Supply                     | HP                   | GPIB                           | None             | Not Required         |
| RF#1 SMA SA #452 | Precision SMA Male RG-402 Spectrun Analyzer    | Fairview Microwave   | Precision SMA Male RG 402 coax | None             | 06 Dec 2016          |
| RF#1 SMA#1       | EUT to Mitest box port 1                       | Flexco               | SMA Cable port1                | None             | 06 Dec 2016          |
| RF#1 SMA#2       | EUT to Mitest box port 2                       | Flexco               | SMA Cable port2                | None             | 06 Dec 2016          |
| RF#1 SMA#3       | EUT to Mitest box port 3                       | Flexco               | SMA Cable port3                | None             | 06 Dec 2016          |
| RF#1 SMA#4       | EUT to Mitest box port 4                       | Flexco               | SMA Cable port4                | None             | 06 Dec 2016          |
| RF#1 USB#1       | USB Cable to Mitest Box                        | Dynex                | USB Cable                      | None             | Not Required         |

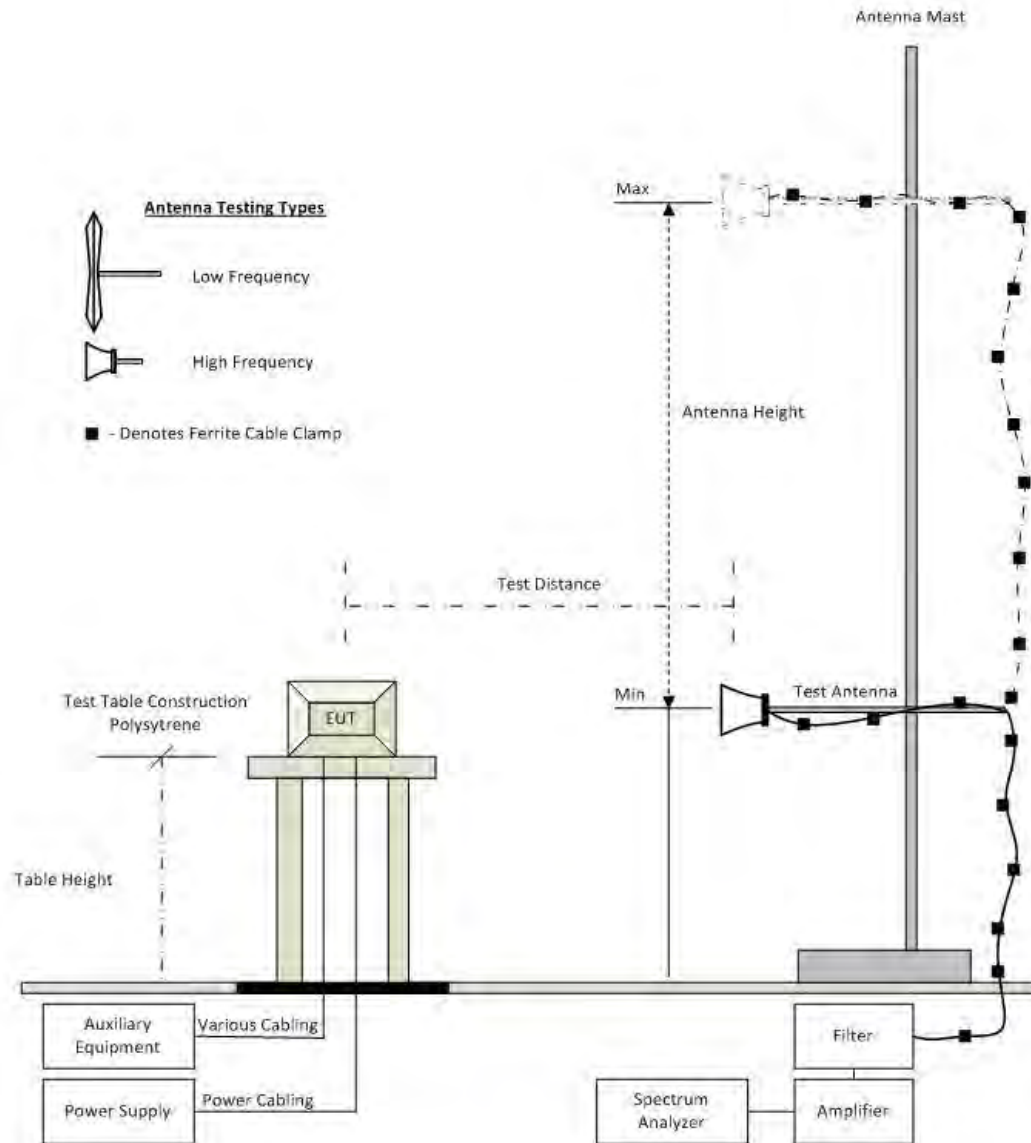
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

## 7.2. Radiated Emissions

The following tests were performed using the radiated test set-up shown in the diagram below;

- 1).. Radiated Spurious and Band-Edge Emissions
- 2).. Radiated Digital Emissions (0.03 – 1 GHz)

### Radiated Emission Measurement Setup Pictorial Representation



**Radiated Emission Test Setup**

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 19 of 21

| Asset# | Description                                       | Manufacturer         | Model#                                     | Serial#     | Calibration Due Date      |
|--------|---|----------------------|--|-------------|---------------------------|
| 158    | Barometer/Thermometer                             | Control Company      | 4196                                       | E2846       | 01 Dec 2016               |
| 170    | Video System Controller for Semi Anechoic Chamber | Panasonic            | WV-CY101                                   | 04R08507    | Not Required              |
| 287    | Rohde & Schwarz 40 GHz Receiver                   | Rhode & Schwarz      | ESIB40                                     | 100201      | 27 Aug 2016               |
| 338    | Sunol 30 to 3000 MHz Antenna                      | Sunol                | JB3  | A052907     | 15 Aug 2016               |
| 396    | 2.4 GHz Notch Filter                              | Microtronics         | BRM50701                                   | 001         | 18 Aug 2016               |
| 397    | Amp 10 - 2500MHz                                  | MiCOM Labs           | Amp 10 - 2500 MHz                          | NA          | 9 Jun 2017                |
| 399    | ETS 1-18 GHz Horn Antenna                         | ETS                  | 3117                                       | 00154575    | 18 <sup>th</sup> Oct 2016 |
| 406    | Amplifier for Radiated Emissions                  | MiCOM Labs           | 40dB 1 to 18GHz Amp                        | 0406        | 9 Jun 2017                |
| 410    | Desktop Computer                                  | Dell                 | Inspiron 620                               | WS38        | Not Required              |
| 411    | Mast/Turntable Controller                         | Sunol Sciences       | SC98V                                      | 060199-1D   | Not Required              |
| 412    | USB to GPIB Interface                             | National Instruments | GPIB-USB HS                                | 11B8DC2     | Not Required              |
| 413    | Mast Controller                                   | Sunol Science        | TWR95-4                                    | 030801-3    | Not Required              |
| 415    | Turntable Controller                              | Sunol Sciences       | Turntable Controller                       | None        | Not Required              |
| 447    | Rad Emissions Test Software                       | MiCOM                | Rad Emissions Test Software Version 1.0.73 | 447         | Not Required              |
| 462    | Schwarzbeck cable from Antenna to Amplifier.      | Schwarzbeck          | AK 9513                                    | 462         | 31 <sup>st</sup> May 2017 |
| 463    | Schwarzbeck cable from Amplifier to Bulkhead.     | Schwarzbeck          | AK 9513                                    | 463         | 31 <sup>st</sup> May 2017 |
| 464    | Schwarzbeck cable from Bulkhead to Receiver       | Schwarzbeck          | AK 9513                                    | 464         | 31 <sup>st</sup> May 2017 |
| 465    | Low Pass Filter DC-1000 MHz                       | Mini-Circuits        | NLP-1200+                                  | VUU01901402 | 18 Aug 2016               |
| 480    | Cable - Bulkhead to Amp                           | SRC Haverhill        | 157-157-3050360                            | 480         | 11 Aug 2016               |
| 481    | Cable - Bulkhead to Receiver                      | SRC Haverhill        | 151-151-3050787                            | 481         | 11 Aug 2016               |
| 482    | Cable - Amp to Antenna                            | SRC Haverhill        | 157-157-3051574                            | 482         | 11 Aug 2016               |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



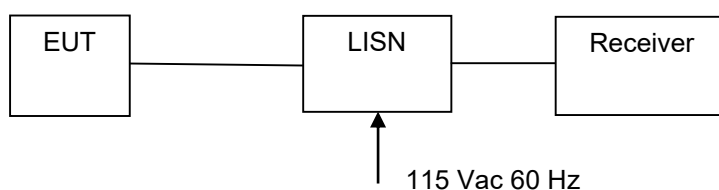
**Title:** Radwin Ltd. Outdoor Subscriber Radio Unit  
**To:** FCC 15.407 (non-DFS Bands), FCC Part 15B & ICES-003  
**Serial #:** RDWN41-U5\_Master Rev A  
**Issue Date:** 13<sup>th</sup> July 2016  
**Page:** 20 of 21

### 7.3. AC Wireline Emission

The following tests were performed using the conducted test set-up shown in the diagram below.

1. AC Wireline Conducted Emissions

#### Conducted Test Set-Up Pictorial Representation



Measurement set up for ac Wireline Conducted Emissions Test

| Asset#      | Description                                    | Manufacturer           | Model#       | Serial#     | Calibration Due Date |
|-------------|--|------------------------|--------------|-------------|----------------------|
| 158         | Barometer/Thermometer                          | Control Company        | 4196         | E2846       | 04 Dec 2016          |
| 184         | Pulse Limiter                                  | Rhode & Schwarz        | ESH3Z2       | 357.8810.52 | 27 Oct 2016          |
| 190         | LISN (two-line V-network)                      | Rhode & Schwarz        | ESH3Z5       | 836679/006  | 29 Oct 2016          |
| 193         | Receiver 20 Hz to 7 GHz                        | Rhode & Schwarz        | ESI 7        | 838496/007  | 17 July 2016         |
| 287         | Rohde & Schwarz 40 GHz Receiver                | Rhode & Schwarz        | ESIB40       | 100201      | 27 Aug 2016          |
| 307         | BNC-CABLE                                      | Megaphase              | 1689 1GVT4   | 15F50B002   | 27 Oct 2016          |
| 316         | Dell desktop computer workstation with Vasona  | Dell                   | Desktop      | WS04        | Not Required         |
| 372         | AC Variable PS                                 | California Instruments | 1251P        | L06951      | Cal when used        |
| 378         | Rohde & Schwarz 40 GHz Receiver with Generator | Rhode & Schwarz        | ESIB40       | 100107/040  | 04 Aug 2016          |
| 388         | LISN (3 Phase) 9kHz - 30MHz                    | Rohde & Schwarz        | ESH2-Z5      | 892107/022  | 30 Oct 2016          |
| ADAPT SMA#1 | SMA Cable                                      | Megaphase              | SMA Cable #1 | None        | Cal when used        |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



575 Boulder Court  
Pleasanton, California 94566, USA  
Tel: +1 (925) 462 0304  
Fax: +1 (925) 462 0306  
[www.micomlabs.com](http://www.micomlabs.com)