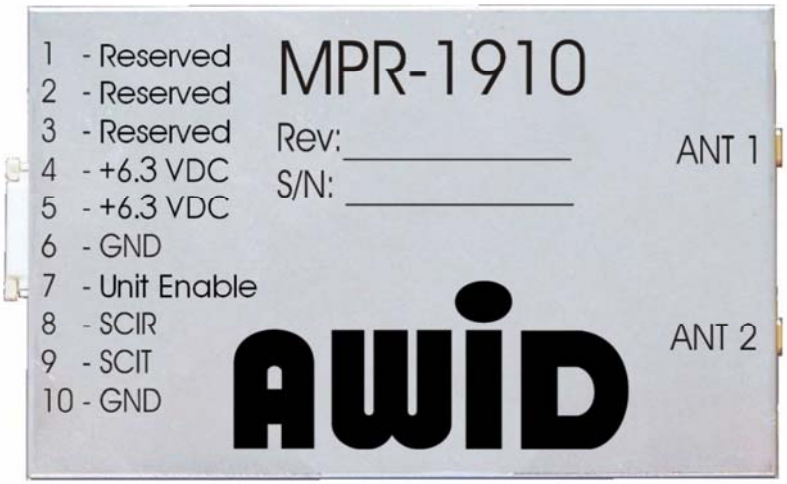
SENTINEL-SENSE MPR-1910

Installation & Operation Manual - 041396



APPLIED WIRELESS ID

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AWID

18300 Sutter Blvd

Morgan Hill, CA 95037

http://www.AWID.com

FCC COMPLIANCE INTERFERENCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **22** cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that **22** cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that **22** cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: OGSMPR1910A”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Industry Canada statement
This device complies with ISED's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d' ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement
This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **32**cm between the radiator & your body.

Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de **32** cm de distance entre la source de rayonnement et votre corps.
This device is intended only for OEM integrators under the following conditions: (For module device use)
1) The antenna must be installed such that **32** cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)
1) L'antenne doit être installée de telle sorte qu'une distance de **32** cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

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IMPORTANT NOTE:
In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:
Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that **32** cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC:6449A-MPR1910C”.

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 6449A-MPR1910C ".

Manual Information To the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final
L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.
Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

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Table of Content

NOTE: READ AND USE THIS MANUAL

FAILURE TO FOLLOW THE INSTALLATION (SET UP) GUIDE MAY RESULT IN POOR PERFORMANCE OR EVEN CAUSE PERMANENT DAMAGE TO THE READER, THUS VOIDS THE PRODUCT WARRANTY.

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REVISION HISTORY

Version No.	Revised By	Date	Sections Affected	Remarks
0.1	AWID Engineering	10/2008	-	Initial version
0.2	AWID Engineering	7/2009	-	Engineering review update
0.3	AWID Engineering	9/2009	p. 2	Compliance section added
1.0	AWID Engineering	11/2009	2	Input voltage changed to +6.5 VDC
1.1	AWID Engineering	12/2009	5.1.1, 6	Editorial and reference
1.2	AWID Engineering	1/2010	-	Cover photo update
1.3	AWID Engineering	4/2010	2, 2.2, 4.2.2	Input voltage change, cover photo update, heat sink requirements section added
1.4	AWID Engineering	5/2010	-	Cover photo update
1.5	AWID Engineering	10/2014	2, 2.2	Updates for input voltage spec and pins.
1.6	AWID Engineering	1/2015	1.1	ISO-18000-6B footnote
2.0	AWID Engineering	10/2018	-	Re-certification testing update

1. INTRODUCTION

AWID's Sentinel-Sense MPR-1910 is a long-range (up to 20 feet) Radio Frequency IDentification (RFID) reader module with 3.3 V TTL logical interface that works with most leading passive UHF passive tags. The reader module comes with a unique combination of long read range, small size, and low power consumption. Its primary applications are asset management and tracking, and fleet management applications.

MPR-1910 is delivered with Firmware Version such as US0-25.xx.xx.

In order to operate an MPR-1910 you will need the following:

- PC running Windows[1] XP or higher and one serial port
- Host software (AWID's demo software or your own custom software)

1.1. SPECIAL FEATURES

- Multi-Protocol: ISO-18000-6 Type C[2], EPC Class 1 Gen 2
- Thin passive tags with long-range performance
- 3.3 V (5.0V tolerable) Serial TTL logical interface

[1] Though MPR-1910 can also be controlled from a non-Windows programming platform, AWID demo and FW upgrade programs are applications to run in Windows.
[2] Contact AWID for support of ISO-18000-6 Type B

2. SPECIFICATIONS

Input voltage	+6 VDC +/- 0.5V
Input current	1.4 A max @ +6V
Idle Power	0.3W in stand-by
Protocol language	ISO Type B/C, EPC Class 1 Gen 2
Read range	Depends on type & size of labels used
RF connectors	2xMMCS (F) USWR<1.2 @50OHMs
Output power	+30 dBm max
Transmit frequency	902.60-927.40 MHz
Receiver frequency	902.60-927.40 MHz (Amplitude Modulated)
Hopping channels	125 Channels
Channel spacing	200 kHz typical
Hopping sequence	Pseudo random
Operating temperature range	-30° C to +65° C (-22° F to 149° F) (*)
Output data formats	3.3V TTL Serial
I/O Connector	10-pin ZIF
Dimension	2.11”x3.31”x0.35”

(*) depends on heat sink size

2.1. CHANNEL FREQUENCY TABLE

Frequency range: 902.60 ~ 927.40 MHz Minimum number of frequency channels: 125

CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz
0	902.60	MHz	25	907.60	MHz	50	912.60	MHz	75	917.60	MHz	100	922.60	MHz
1	902.80	MHz	26	907.80	MHz	51	912.80	MHz	76	917.80	MHz	101	922.80	MHz
2	903.00	MHz	27	908.00	MHz	52	913.00	MHz	77	918.00	MHz	102	923.00	MHz
3	903.20	MHz	28	908.20	MHz	53	913.20	MHz	78	918.20	MHz	103	923.20	MHz
4	903.40	MHz	29	908.40	MHz	54	913.40	MHz	79	918.40	MHz	104	923.40	MHz
5	903.60	MHz	30	908.60	MHz	55	913.60	MHz	80	918.60	MHz	105	923.60	MHz
6	903.80	MHz	31	908.80	MHz	56	913.80	MHz	81	918.80	MHz	106	923.80	MHz
7	904.00	MHz	32	909.00	MHz	57	914.00	MHz	82	919.00	MHz	107	924.00	MHz
8	904.20	MHz	33	909.20	MHz	58	914.20	MHz	83	919.20	MHz	108	924.20	MHz
9	904.40	MHz	34	909.40	MHz	59	914.40	MHz	84	919.40	MHz	109	924.40	MHz
10	904.60	MHz	35	909.60	MHz	60	914.60	MHz	85	919.60	MHz	110	924.60	MHz
11	904.80	MHz	36	909.80	MHz	61	914.80	MHz	86	919.80	MHz	111	924.80	MHz
12	905.00	MHz	37	910.00	MHz	62	915.00	MHz	87	920.00	MHz	112	925.00	MHz
13	905.20	MHz	38	910.20	MHz	63	915.20	MHz	88	920.20	MHz	113	925.20	MHz
14	905.40	MHz	39	910.40	MHz	64	915.40	MHz	89	920.40	MHz	114	925.40	MHz
15	905.60	MHz	40	910.60	MHz	65	915.60	MHz	90	920.60	MHz	115	925.60	MHz
16	905.80	MHz	41	910.80	MHz	66	915.80	MHz	91	920.80	MHz	116	925.80	MHz
17	906.00	MHz	42	911.00	MHz	67	916.00	MHz	92	921.00	MHz	117	926.00	MHz
18	906.20	MHz	43	911.20	MHz	68	916.20	MHz	93	921.20	MHz	118	926.20	MHz
19	906.40	MHz	44	911.40	MHz	69	916.40	MHz	94	921.40	MHz	119	926.40	MHz
20	906.60	MHz	45	911.60	MHz	70	916.60	MHz	95	921.60	MHz	120	926.60	MHz
21	906.80	MHz	46	911.80	MHz	71	916.80	MHz	96	921.80	MHz	121	926.80	MHz
22	907.00	MHz	47	912.00	MHz	72	917.00	MHz	97	922.00	MHz	122	927.00	MHz
23	907.20	MHz	48	912.20	MHz	73	917.20	MHz	98	922.20	MHz	123	927.20	MHz
24	907.40	MHz	49	912.40	MHz	74	917.40	MHz	99	922.40	MHz	124	927.40	MHz

Table 1 Channel Frequency Table for MPR-1910

2.2. CONNECTOR PIN ASSIGNMENT

Pin	Function	Pin	Function
1	Reserved (*)	6	GND
2	Reserved	7	Unit Enable (**)
3	Reserved	8	SCIR (***)
4	+6.5 V	9	SCIT (***)
5	+6.5 V	10	GND

(*) unit is disabled if pin 1 is low.

(**) pin 7 is internally pulled high, user may leave this pin unconnected if manual control is not required.

(***) SCIR receives input of reader, SCIT transmits output of reader.

2.3. MEASURING READ DISTANCE

Make sure you know the tag types. For certain readers and tags, user must also be mindful of the tag's orientation and the reader's antenna orientation, what mounting surface the tags are designed for and how the tags are supposed to be mounted. Any departure from its intended purpose will drastically affect the reader's ability to energize the tag and its read range.

When measuring the reader's read range, make sure that the tag is properly oriented to the reader antenna, and for optimum performance, be sure the operator's finger is not within three (3) inches of the tag's antenna surface.

3. Installation & Operation Guidelines

For ease of explanation, MPR reader in this section refers to an RFID device that consists of MPR-1910 and a high performance circular polarized antenna inside a splash proof, UV stabilized housing case. The module should be installed on a heat sink. Example of a heat sink could be an aluminum plate of size 8”x8”x0.1” exposed to convection air flow. The screws at the bottom of module shall be used for mounting the module on the heat sink

3.1. GENERAL WIRING REQUIREMENTS

MPR-1910 requires 10-pin flat flex cable (FFC) to connect from the supply source. Avoid using long (e.g., 1” or longer) cables when connecting the unit from the power supply source.

4. Installation Procedure

This section provides installation and operation information for MPR-1910 reader modules.

4.1. PARTS LIST

Verify that all items listed below are present before starting the installation.

- Sentinel-Sense MPR-1910 Qty=1
- Documentation and Demo SW[3] Qty=1

4.2. PREPARATION FOR INSTALLATION

Familiarize yourself with the connectors and pin out assignment of each I/O connectors.

4.2.1. Bench Top Verification

It is always a good idea to verify system operation before committing to a full-scale installation. The following are the necessary steps to test the reader's operation in a static environment.

- Connect MPR-1910 to the RS-232 port of a PC through the interface board provided in the demonstration kit
- Connect the power jack from the wall plug power supply to reader module
- Power up PC
- Install demo software on PC
- Activate demo software and verify performance of the reader.

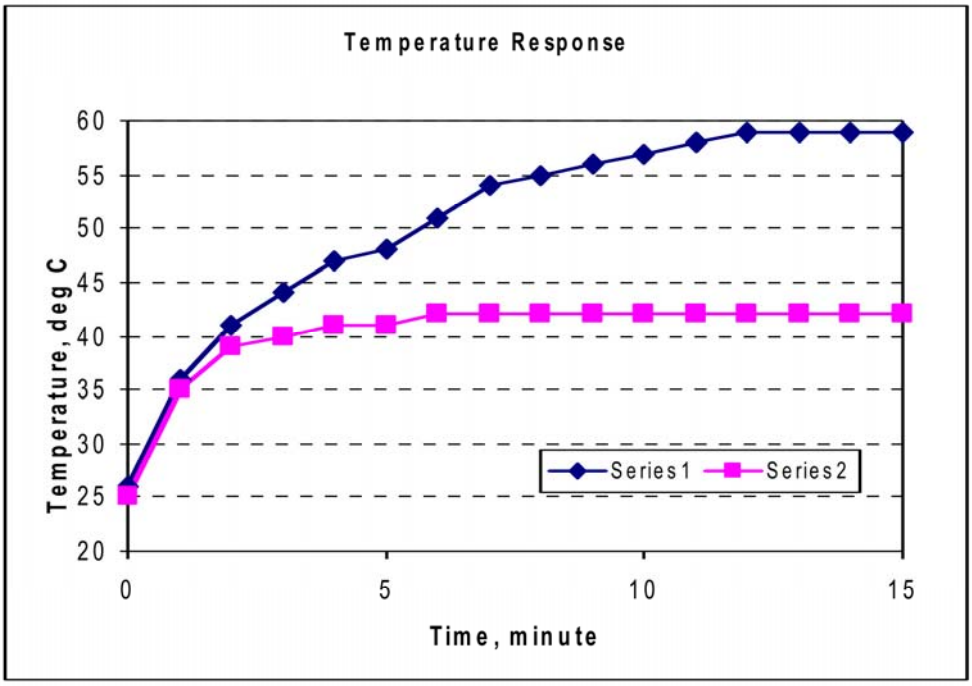
Select COM port on top page then click "Connect". Follow with some commands

4.2.2. Heat Sink Requirements

(1) Dynamics of Reader Module with bottom mounted aluminum plate heat sink

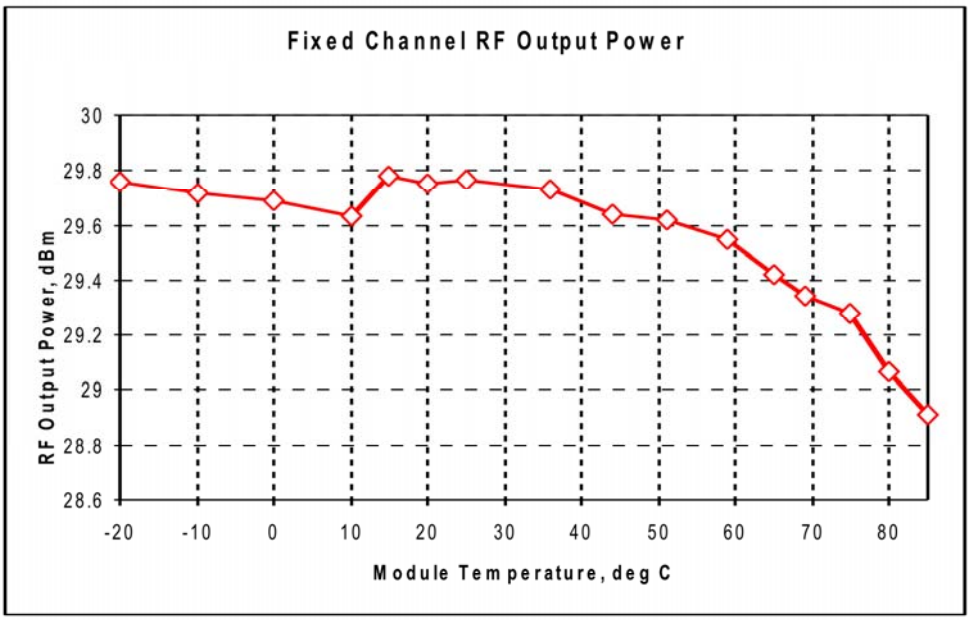
		Case 1	Case 2
DC input voltage	V	6	6.5
DC input current	A	1.35	1.45
RF output power	W	0.99	1
Total dissipated power	W	7.1	8.425
Heat sind dimension	cm^3	12*15*0.2	25*30*0.4
Ambient temperature	deg	23	23

[3] Go to http://www.awid.com Support/Download for demo SW

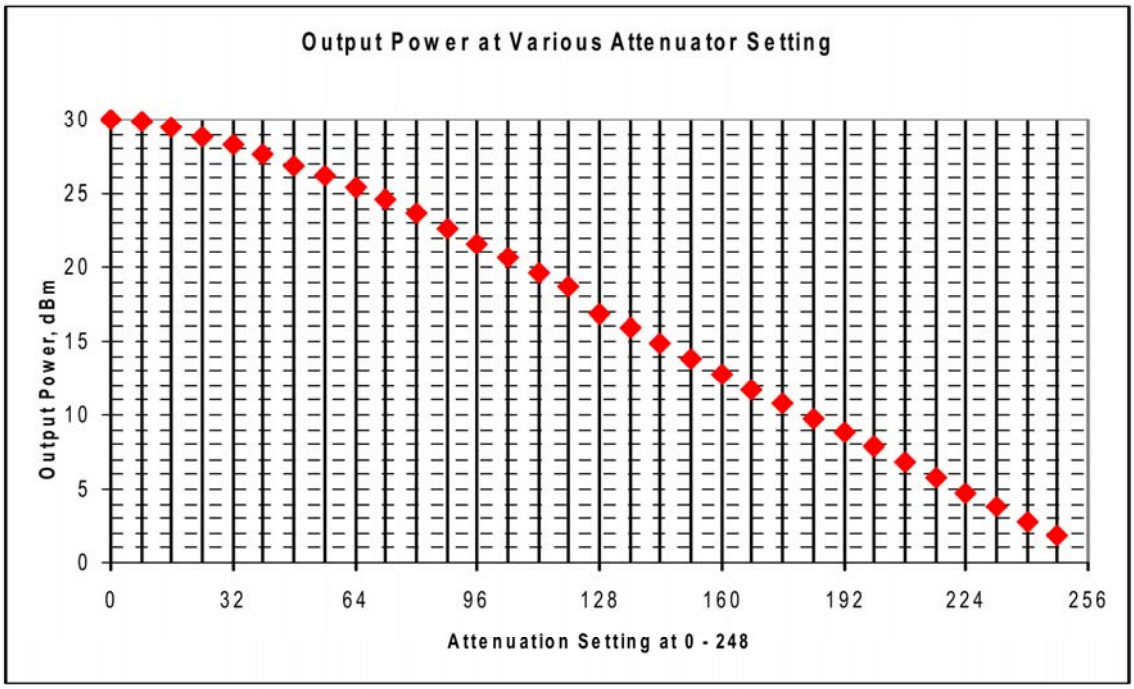


(2) Output RF Power at Different Module Temperatures

DC input voltage 6.0 V
Measuring frequency 919.7 MHz



(3) Output RF Power at Different Attenuation Settings



Note: do not set attenuation level to 256 and above

5. Notes on Software Programming and System Operation

5.1. SYSTEM OPERATION

5.1.1. Running a Custom Software Application or the AWID Demo Program

If AWID Demo Program is not used, it is expected user will launch a Custom Software Application to send commands using AWID *MPR Communication Protocol* and/or the supporting SDK[4] to the reader.

5.2. USERS NOTE

For System Integrators and/or Software Developers
System Integrators and/or Software developers should get familiar with the MPR Communication Protocol specifications and/or the supporting SDK for developing applications that control an MPR-1910.

For Custom System Users
For custom system user, please refer to your host software user guide for information regarding system and software operations

For Demo Software Users
If you are using the AWID RFID demonstration software application (AWIDMPRCommandDemoII) which is .NET based with easy-to-follow GUI operations (ref **Error! Reference source not found.**), simply fill in the IP address of the MPR reader installed then click “Connect” should get you started.

6. Reference

I. MPR Communication Protocol – Doc# 041479
II. MPR Command Demo II Quick Reference Guide - Doc# 041483

[4] Go to http://www.awid.com Support tab for download info.