SENTINEL-SENSE MPR-1914

Installation & Operation Manual-041480

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FCC COMPLIANCE

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.

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 20cm 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 20 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 20 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: OGSMPR1914”. 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 COMPLIANCE

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet 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 IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 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 20 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 20 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.

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 20 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-MPR1914”.

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-MPR1914".

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.

Professional Installation Instructions

1. Installation personnel
   This product is designed for specific application and needs to be installed by a qualified personnel with knowledge in RF and related regulations. The general user shall not attempt to install or change the setting.

2. Installation location
   The product shall be installed at a location where the radiating antenna be kept 20cm from nearby person in normal operational condition to meet regulatory RF exposure requirement.

3. External antenna
   Use only the antennas which have been submitted for certification agencies approval by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC/IC limit and is prohibited.

4. Installation procedure
   Please refer to users manual for detail.

5. Warning
   Please carefully select the installation position and make sure that the final output power does not exceed the limit set forth in relevant rules. The violation of the rule could lead to serious federal penalty.

Instructions d'installation professionnelle

1. Installation
   Ce produit est destine a un usage specifique et doit etre installe par un personnel qualifie maitrisant les radiofrequences et les regles s'y rapportant. L'installation et les reglages ne doivent pas etre modifies par l'utilisateur final.

2. Emplacement d'installation
   En usage normal, afin de respecter les exigences reglementaires concernant l'exposition aux radiofrequences, ce produit doit etre installe de facon a respecter une distance de 20 cm entre l'antenne emettrice et les personnes.

3. Antenn externe.
   Utiliser uniiquement les antennes approuvees par le fabricant. L'utilisation d'autres antennes peut conduire a un niveau de rayonnement essentiel ou non essentiel depassant les niveaux limites definis par FCC/IC, ce qui est interdit.

4. Procedure d'installation
   Consulter le manuel d'utilisation.

5. Avertissement
   Choisir avec soin la position d'installation et s'assurer que la puissance de sortie ne depasse pas les limites en vigueur. La violation de cette regle peut conduire a de serieuses penalites federales.

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NOTE: READ AND USE THIS MANUAL.

NOTE: FAILURE TO FOLLOW THE INSTALLATION GUIDE MAY RESULT IN POOR PERFORMANCE OR EVEN CAUSE PERMANENT DAMAGE TO THE READER, THUS VOIDS THE PRODUCT WARRANTY.

REVISION HISTORY

Version No.	Revised By	Date	Sections Affected	Remarks
1.0	AWID Engineering	10/2014	-	Initial version
1.1	AWID Engineering	11/2014	-	Compliance/warning statements updated
1.2	AWID Engineering	12/2014	-	Compliance/warning statements updated
1.3	AWID Engineering	1/2015	-	Attestation for IC Professional Installation Instructions added

1 INTRODUCTION

AWID's Sentinel-Sense MPR-1914 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-1914 is delivered with Firmware Version such as 21.xx.xx.

In order to operate an MPR-1914 you will need the following:

- PC running Windows[1] XP or higher, CD-ROM drive
- Host software (AWID's demo software or your own custom software)

1.1 SPECIAL FEATURES

- Multi-Protocol: ISO-18000-6 Type B/C, 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-1914 can also be controlled from a non-Windows programming platform, AWID demo and FW upgrade programs are applications to run in Windows.

2 SPECIFICATIONS

Input voltage	+13 VDC ±1.0V
Input current	2.0 A max
Idle Power	1.3W 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	4xMMCS (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”x4.25”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-1914

2.2 CONNECTOR PIN ASSIGNMENT

Pin	Function	Pin	Function
1	Reserved	6	GND
2	Reserved	7	Unit Enable (*)
3	Reserved	8	SCIR
4	+13 V ± 1.0V	9	SCIT
5	+13 V ± 1.0V	10	GND

(*) Note: pin 7 is internally pulled high. User may leave this pin unconnected if manual control is not required

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-1914 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-1914 requires 10-pin flat flex cable (FFC) to connect from the supply source. Avoid using long (e.g., 12” or longer) cables when connecting the unit from the power supply source.

4 INSTALLATION PROCEDURE

This section provides installation and operation information for MPR-1914 reader modules.

4.1 PARTS LIST

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

- Sentinel-Sense MPR-1914 Qty=1
- Documentation 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-1914 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 1 on top page then click "Connect". Follow with some commands.

5 SOFTWARE PROGRAMMING AND SYSTEM OPERATION NOTES

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 developed using the *MPR Communication Protocol* and/or the supporting SDK (http://www.awid.com Support/Download) to issue commands to the MPR reader/module as specified.

5.1.2 Operating Modes

Applications can be developed to support typical operating modes for AWID MPR readers as listed below.

Mixed Mode
This mode assumes the user is aware of the types of protocol in use, and furthermore, the user made a determined effort to operate the reader in a mixed protocol mode. In this mode, the user can decide how many and which specific protocols to be selected. Once Mix Protocol Mode is selected, the reader will routinely cycle through each protocol, dwell long enough for the reader to wait for a response and then move on to the next protocol. It should be noted that in a mixed protocol mode, the tag must have sufficient time to respond to the reader, and therefore, it can only be used on a conveyor belt arrangement, with specific speed restrictions.

Single Protocol Mode
Single protocol is the normal mode of operation, where the protocol type is known and many tags are expected to pass through the readers.

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-1914.

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 which is .NET based with easy-to-follow GUI operations, simply select the COM port for which the MPR-1914 is configured then click “Connect” should get you started.

6 Reference

MPR Communication Protocol Manual – Doc# 041479
MPR Command Demo II Quick Reference Guide – Doc# 041483