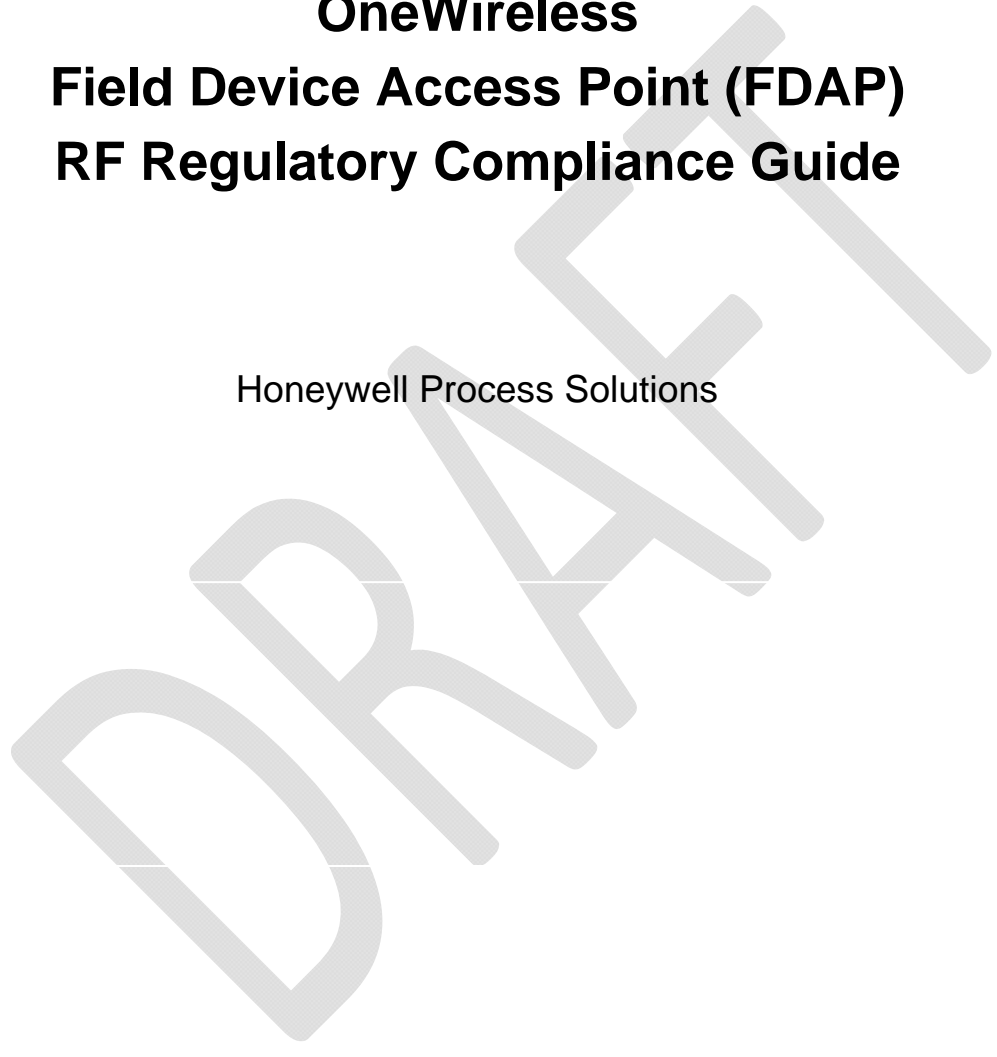


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# OneWireless Field Device Access Point (FDAP) RF Regulatory Compliance Guide

Honeywell Process Solutions



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**Revision Record**

Revision	Date	Purpose/Distribution

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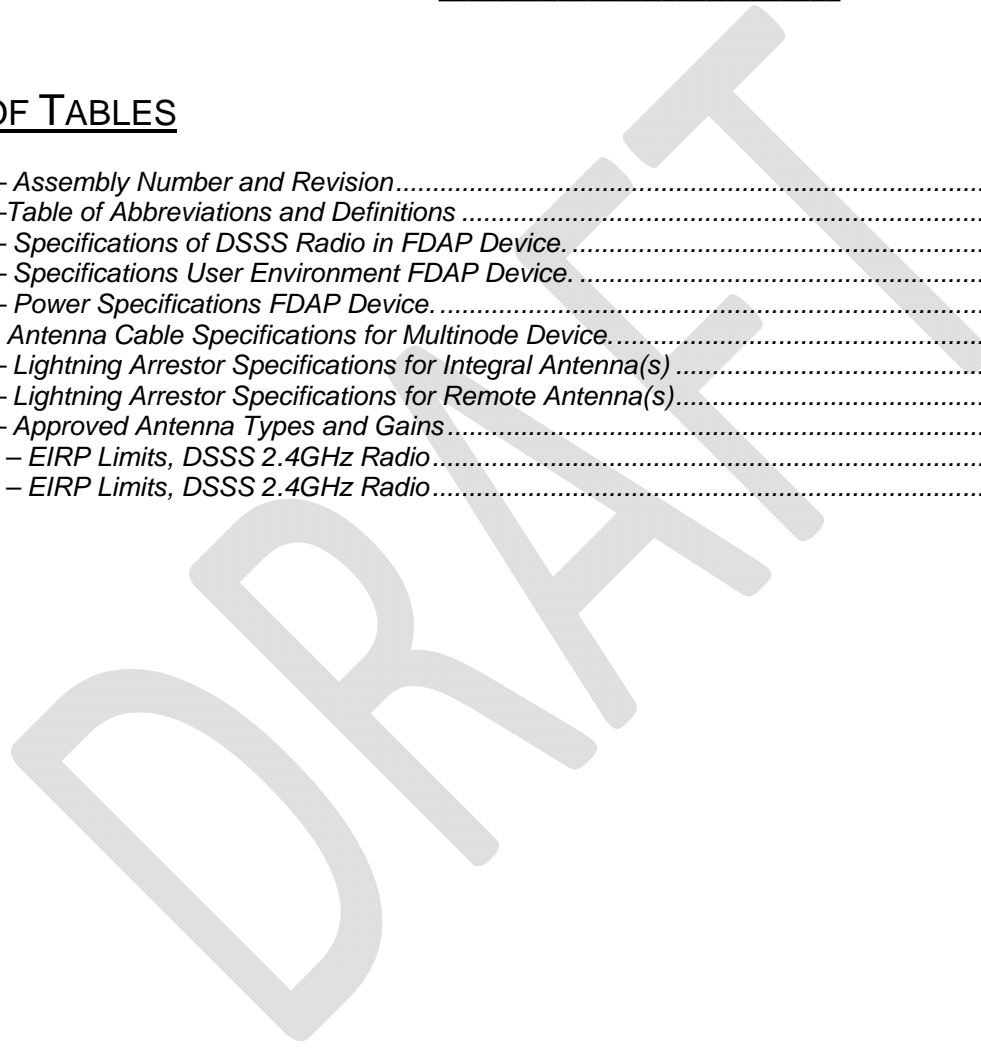
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## 1 DESIGNATION, SCOPE AND PREFACE

### 1.1 Designation

*HONEYWELL ONEWIRELESS FIELD DEVICE ACCESS POINT (FDAP).*

#### 1.1.1 Model Numbers and Revisions :

This document is valid for the following assembly number:

Model Number	Assembly #	Rev.	Description
FDAP1	51198665-100	A	Field Device Access Point with Class 1 Div 1 certification (24VDC power input)
FDAP2	51198665-200	A	Field Device Access Point with Class 1 Div 2 certification (i.e. 24VDC and 120/230V AC power input)

**Table 1 – Assembly Number and Revision**

### 1.2 Scope

This document outlines professional installation requirements for the Honeywell Field Device Access Point (FDAP) for the Honeywell OneWireless Network. Professional installation is required to comply with certification agency and legal requirements. This document must be adhered to for all installations of the Honeywell OneWireless FDAP device.

### 1.3 Preface

This manual covers professional installation of the optional external antennas for use with the Honeywell OneWireless FDAP device. Since this device requires manual power limit settings for use with the higher gain antennas, it is classified by the FCC as a professional install device. To be in compliance with FCC requirements, the radio must be installed with one of several approved antenna types listed in this document.

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#### 1.4 Abbreviations & Definitions

The term Honeywell Multinode Device (or simply Multinode) will be used to describe the composite unit which includes the Honeywell DSSS or FHSS Radio Board, 3eTI Mesh Board, Power Supply board, and all subassemblies housed inside the Multinode enclosure.

<b>ACMA</b>	Australian Communications and Media Authority
<b>ATEX</b>	Potentially Explosive Atmospheres Directive
<b>AWG</b>	American Wire Gauge
<b>Co-located</b>	Two or more radios transmitting simultaneously and with less than 20cm of separation distance.
<b>COTS</b>	Commercial Off-The-Shelf
<b>CSA</b>	Canadian Standards Association
<b>DFS</b>	Dynamic Frequency Selection
<b>DSSS</b>	Direct Sequence Spread Spectrum
<b>EMC</b>	Electromagnetic Compatibility
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EU</b>	European Union
<b>FCC</b>	Federal Communications Committee
<b>FHSS</b>	Frequency-Hopping Spread Spectrum
<b>FM</b>	Factory Mutual
<b>IC</b>	Industry Canada
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>IR</b>	Infrared
<b>IrDA</b>	Infrared Data Association
<b>LED</b>	Light Emitting Diode
<b>MPE</b>	Maximum Permissible Exposure
<b>MTBF</b>	Mean Time Between Failures
<b>NEMA</b>	National Electrical Manufacturers Association
<b>PCB</b>	Printed Circuit Board
<b>PCI</b>	Peripheral Components Interconnect
<b>RAM</b>	Random Access Memory
<b>RJ-45</b>	Registered Jack-45
<b>RPN</b>	Reverse Polarity N-type
<b>SQA</b>	Supplier Quality Assurance
<b>Wi-Fi</b>	Wireless Local Area Network based on IEEE 802.11 Specifications
<b>WNSIA</b>	Wireless Network for Secure Industrial Application

**Table 2 –Table of Abbreviations and Definitions**

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## 2 FEDERAL COMMUNICATION COMMISSION (FCC)

### 2.1 FCC Compliance Statements

- This device complies with Part 15 of FCC Rules and Regulations. 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 A 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 radiofrequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Intentional or unintentional changes or modifications must not be made to the Multinode unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

## 3 INDUSTRY CANADA (IC)

### 3.1 IC Compliance Statements

- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (EIRP) is not more than that permitted for successful communication.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- This Class A digital apparatus complies with Canadian ICES-003.
- French: Cet appareil numérique de la classe **A** est conforme à la norme NMB-003 du Canada.

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**4 RF Safety Statement:**

**To comply with FCC’s and Industry Canada’s RF exposure requirements, the following antenna installation and device operating configurations must be satisfied. .**

- *When using integral or remote antenna(s) the FDAP unit must be fixed and mounted on outdoor permanent structures and the antennas must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.*

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**5 FCC and Industry Canada (IC) Identification Numbers:**

**5.1 FCC Identification Numbers:**

- Honeywell FDAP DSSS Radio
  - Limited Modular Approval
  - Federal Communication Commission Identification: **S57 – 51306533**

**5.2 Industry Canada Identification Numbers:**

- Honeywell FDAP DSSS Radio
  - Limited Modular Approval
  - *Industry Canada Identification: 573I - 51306533*

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## 6 INTENDED COUNTRY USAGE

### 6.1 NORTH AMERICA

Country	ISO 3166 2 letter code
UNIITED STATES	US
CANADA	CA

### 6.2 AUSTRALIA AND NEW ZEALAND

Country	ISO 3166 2 letter code
AUSTRALIA	AU
NEW ZEALAND	NZ

### 6.3 EUROPEAN UNION

Country	ISO 3166 2 letter code	Country	ISO 3166 2 letter code
Austria	AT	Latvia	LV
Belgium	BE	Liechtenstein	LI
Bulgaria	BG	Lithuania	LT
Cyprus	CY	Malta	MT
Czech Republic	CZ	Netherlands	NL
Denmark	DK	Norway	NO
Estonia	EE	Poland	PL
Finland	FI	Portugal	PT
France	FR	Romania	RO
Germany	DE	Slovakia	SK
Greece	GR	Slovenia	SI
Hungary	HU	Spain	ES
Iceland	IS	Sweden	SE
Ireland	IE	Switzerland	CH
Italy	IT	United Kingdom	BG

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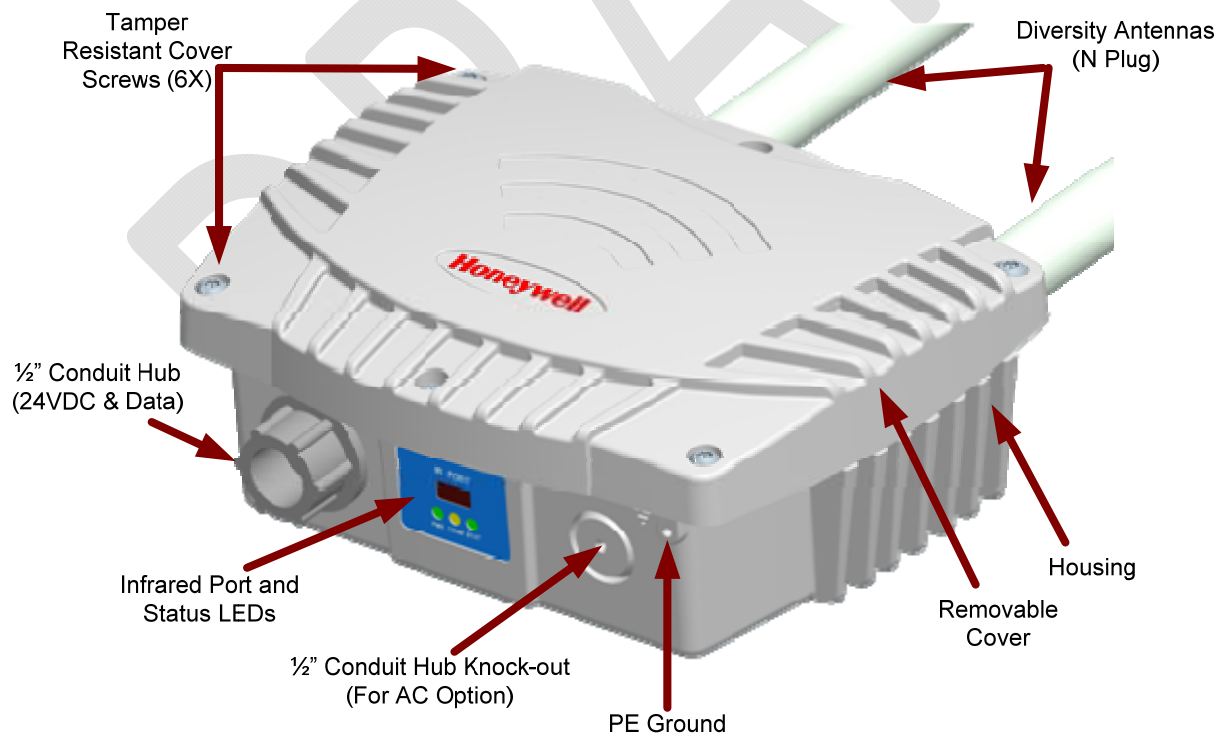
## 7 MULTINODE GENERAL DESCRIPTION

### 7.1 Intended Use

The Field Device Access Point (FDAP) is a key component of the Honeywell OneWireless system, a secure wireless network for industrial applications. It is a ruggedized industrial radio intended for use in hazardous locations to provide wireless connectivity for wireless sensor networks. As a wireless router, the FDAP provides connectivity between the wired DCS network and wireless field devices. The FDAP radio uses IEEE 802.15.4 *Direct Sequence Spread Spectrum* (DSSS) technology and is compliant with ISA 100.11a open-standard wireless networking technology. The FDAP is designed to be a standalone, pole or wall mounted unit. It is intrinsically-safe device and suitable for use in Class I, Division 1 and Zone 1 hazardous locations.

### 7.2 FDAP Device Diagrams

**Figure 1** shows the unit-level drawing of the FDAP Device. All cables exit the unit via a 1/2" conduit hub. The conduit hub allows end user to land conduit on the FDAP Device. **Figure 1** shows the FDAP and all of external interfaces.



**Figure 1 –Diagram of FDAP Unit showing various external attributes**

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## 8 PRODUCT SPECIFICATIONS

### 8.1 Direct Sequence Spread Spectrum (DSSS) Radio, 2.4GHz

**Warning!** The FDAP unit must be Professionally Installed in accordance with the requirements specified in this document. See Section 12, for professional installation maximum power setting requirements. Only the specified power settings, antenna types and gains and cable lengths (attenuation) as outlined in this document are valid for FDAP installations.

Item	Specification
Wireless Standard	Direct Sequence Spread Spectrum 2.4GHz
Data Rates and Modulation	Data Rate: 250kbps Modulation: OQPSK – DSSS
Frequency Band	2,405 – 2,475MHz
Transmit Power	Maximum: 18dBm (Maximum transmit power will vary by channel and individual country regulations.)
Receive Sensitivity (typical)	-97dBm

**Table 3 – Specifications of DSSS Radio in FDAP Device.**

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### 8.2 FDAP User Environment

Item	Specification
Operating Temperature:	-40 °C to +75 °C
Storage Temperature:	-40 °C to +75 °C
Operating Humidity:	0 to 100% RH

**Table 4 – Specifications User Environment FDAP Device.**

### 8.3 FDAP Power Specifications

Item	Specification
DC Operating Voltage:	24VDC, +10%/-15%
AC Operating Voltage:	85 – 264VAC, 50/60Hz
Power Consumption (typical):	2W

**Table 5 – Power Specifications FDAP Device.**

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#### 8.4 Antenna Cables

Cable Application	Honeywell Part #	Cable Type	Connector Type	Frequency (GHz)	Length (m)	Loss (dB)
DSSS, FHSS, 802.11	50018278-001	400 Series	NM – NM	2.4/5.8	1	1.0 / 2.0
DSSS, FHSS, 802.11	50018278-003	400 Series	NM – NM	2.4/5.8	3	1.5 / 2.5
DSSS, FHSS, 802.11	50018278-010	400 Series	NM – NM	2.4/5.8	10	2.5 / 3.5

**Table 6 - Antenna Cable Specifications for Multinode Device.**

#### 9 Antenna Lightning Arrestors

##### 9.1 For use with Integral or Remote Antenna(s)

Application	Honeywell Part Number	Specification	Connector Type	Frequency (GHz)	Attenuation (dB)
DSSS, FHSS, 802.11	51202359-200	50 ohm	NM - NF	0 – 6	0.4 (max)

**Table 7 – Lightning Arrestor Specifications for Integral Antenna(s)**

##### 9.2 For use with Remote Antenna(s)

Application	Honeywell Part Number	Specification	Connector Type	Frequency (GHz)	Attenuation (dB)
DSSS, FHSS, 802.11	50018279-090	50 ohm	NF to NF	0 – 3	0.4 (max)

**NOTE:** Depending on application needs, the “integral” arrestors may be used for remote antennas.

**Table 8 – Lightning Arrestor Specifications for Remote Antenna(s)**

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### 10 Approved Antenna Types/Gains

This radio transmitter (FCC ID: S57 – 51306533, IC: 5731 - 51306533) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type	Antenna Application	Manufacturer	Manufacturer Part Number	Honeywell Part Number	Beam Width	Peak Gain (dBi)	Freq. (GHz)
Omni (integral)	Point to Multi-Point	PacWireless	OD24M-5	51506534-101	Omni	5	2.4
Omni (integral)	Point to Multi-Point	SMARTANT	SAA04-051000	51506534-101	Omni	5	2.4
Omni (integral)	Point to Multi-Point	SMARTANT	HON04-052160	51506534-100	Omni	5	2.4
Omni (integral)	Point to Multi-Point	HUBER + SUHNER	1324.17.0047	NA	Omni	6	2.4
Omni (remote)	Point to Multi-Point	L-com	HGV-2409U	50018414-001	Omni	8	2.4
Sector (remote)	Point to Multi-Point	L-com	HG2414SP-120	NA	120°	14	2.4
Patch-RHC (remote)	Point to Multi-Point	L-com	HG2409PCR-NF	NA	65°	8	2.4
Patch-LHC (remote)	Point to Multi-Point	L-com	HG2409PCL-NF	NA	65°	8	2.4

**Table 9 – Approved Antenna Types and Gains**

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### 11 Equivalent Isotropically Radiated Power (EIRP)

In radio communication systems, Equivalent isotropically radiated power (EIRP), or alternatively, Effective isotropic radiated power is the amount of power that would have to be emitted by an isotropic antenna (that evenly distributes power in all directions and is a theoretical construct) to produce the peak power density observed in the direction of maximum antenna gain. EIRP can take into account the losses in transmission line and connectors and includes the gain of the antenna. The EIRP is often stated in terms of decibels over a reference power level, that would be the power emitted by an isotropic radiator with an equivalent signal strength. The EIRP allows making comparisons between different emitters regardless of type, size or form. From the EIRP, and with knowledge of a real antenna's gain, it is possible to calculate real power and field strength values.

$$\text{EIRP(dBm)} = (\text{Radio Power (dBm)}) - (\text{Cable Loss (dB)}) + (\text{Antenna Gain(dBi)})$$

Antenna gain is expressed relative to a (theoretical) isotropic reference antenna (dBi).

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## 12 EIRP LIMITS, DSSS 2.4GHZ RADIO

### 12.1 FCC, IC, ACMA

This radio transmitter (FCC ID: S57 – 51306533, IC: 5731 - 51306533) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Agency/ Country
Omni	Point to Multi-Point	Integral	2.4	6	0	0	18	24	FCC, IC, ACMA
Omni	Point to Multi-Point	Remote	2.4	8	1	1.0	18	25	FCC, IC, ACMA
Patch	Point to Multi-Point	Remote	2.4	8	1	1.0	18	25	FCC, IC, ACMA
Sector	Point to Multi-Point	Remote	2.4	14	1	1.0	18	31	FCC, IC, ACMA

#### Notes:

- The values in the above table have been determined through agency certification testing.
- Maximum transmit power will vary by channel, data rate, and individual country regulations.
- The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
  - Antenna gains above the maximum values shown shall not be used.
  - Cable length/loss below the minimum values shown shall not be used.
  - Maximum overall radio output power shown shall not be exceeded.
  - Maximum EIRP values shown above shall not be exceeded.
- Beam width, for sector and dish antenna, may range between 0 – 180degrees.
- Industry Canada Compliance Statement: This device has been designed to operate with the antenna types listed in this document, and having a maximum gain of 14dBi. Antenna types not included in this list or having a gain greater than 14dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

**Table 10 – EIRP Limits, DSSS 2.4GHz Radio**

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## 12.2 ETSI

Antenna Type	Radio Usage / Application		Freq. (GHz)	Max. Ant. Gain (dBi)	Min. Cable Length (m)	Min. Cable Loss (dB)	Max. Radio Output Power (dBm)	Max. EIRP (dBm)	Agency/ Country
Omni	Point to Multi-Point	Integral	2.4	5	0	0	3.7	8.7	ETSI <sup>5</sup>
Omni	Point to Multi-Point	Integral	2.4	6	0	0	3.2	9.2	ETSI <sup>5</sup>
Omni	Point to Multi-Point	Remote	2.4	8	10	2.5	3.7	9.2	ETSI <sup>5</sup>
Patch	Point to Multi-Point	Remote	2.4	8	10	2.5	3.7	9.2	ETSI <sup>5</sup>
Sector	Point to Multi-Point	Remote	2.4	14	10	2.5	-2.8	8.7	ETSI <sup>5</sup>

### Notes:

- The values in the above table have been determined through agency certification testing.
- Maximum transmit power will vary by channel, data rate, and individual country regulations.
- The following shall apply for antenna type, frequency range, application/usage and agency/country compliance:
  - Antenna gains above the maximum values shown shall not be used.
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  - Maximum overall radio output power shown shall not be exceeded.
  - Maximum EIRP values shown above shall not be exceeded.
- Beam width, for sector and dish antenna, may range between 0 – 180degrees.
- France** restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454-2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 – 2,483.5MHz.

**Table 11 – EIRP Limits, DSSS 2.4GHz Radio**

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FMF:							IACD/Ft.W	
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**13 Setting Power and Country Code: DSSS Radio**

TBD

DRAFT

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### 14 RF Safety, Maximum Permissible Exposure (MPE) statement

**To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied. .**

- *When using integral or remote antenna(s) the FDAP unit must be fixed and mounted on outdoor permanent structures and the antennas must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.*

DRAFT

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## 15 AGENCY COMPLIANCE

### 15.1 Radio and EMC Certifications

#### 15.1.1 Federal Communication Commission (FCC)

- Specification: FCC Part 15.247 Subpart B for unintentional radiators
- Specification: FCC Part 15.247 Subpart C for intentional radiators

#### 15.1.2 Industry Canada (IC)

- Method: RSS-210, Issue 7
- RSS-Gen, Issue 2
- ICES-003, Issue 4

#### 15.1.3 European Telecommunications Standards Institute (ETSI)

- Emissions Specification and Method: EN 300 328 V1.7.1
- Immunity Specification: EN 301 489-17 V2.1.1
- Immunity Method: EN 301 489-1 V1.8.1
- Product Standard: IEC61326-1 (1<sup>st</sup> Edition, 2005, Industrial Locations)

#### 15.1.4 Australian communications and media authority (ACMA)

- Specification: AS/NZS 4268

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**15.2 Product Safety Agency Certifications**

**15.2.1 Canadian Standards Association (CSA)**

CSA electrical equipment requirements for use within Division 2 and Zone 2 hazardous locations.

IEC61010-1 (2<sup>nd</sup> Edition, 2001-02), "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, part 1: General Requirements

Canadian Standards Association Standard C22.2 No. 213-M1987, "Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations"

Canadian Standards Association Standard E60079-0:02, "Electrical Apparatus for explosive gas atmospheres – General Requirements"

Canadian Standards Association Standard E60079-15:02, "Electrical Apparatus for explosive gas atmospheres – Type of Protection "n"

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

FCF:	OneWireless Field Device Access Point (FDAP) RF Regulatory Compliance Guide					<b>Honeywell</b>	
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**15.2.2 Factory Mutual (FM)**

FM electrical equipment requirements for use within Division 2 and Zone 2 hazardous locations.

Factory Mutual Approval Standard Class No. 3600, "Electrical Equipment for Use in Hazardous (Classified) Locations - General Requirements

Factory Mutual Approval Standard Class No. 3810, "Electrical and Electronic Test, Measuring, and Process Control Equipment

Factory Mutual Approval Standard Class No. 3611, "Electrical Equipment for Use in Class I, Division 2, Class II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations

ANSI/ISA 12.00.01-2002, "Electrical Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements"

ANSI/ISA 12.12.02-2003, "Electrical Apparatus for explosive gas atmospheres – Type of Protection "n"

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

FCF:	OneWireless Field Device Access Point (FDAP) RF Regulatory Compliance Guide					<b>Honeywell</b>	
FMF:						IACD/Ft.W	
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### 15.2.3 European ATEX Certification (ATEX)

The completely assembled Multinode will conform to European electrical equipment requirements for use within Zone 2 Hazardous Locations.

IEC 60079-0:2004-01, "Electrical Apparatus for explosive gas atmospheres – General Requirements

IEC 60079-15:2005-03, "Electrical Apparatus for explosive gas atmospheres – Type of Protection "n"

- Temperature code: T4 (135°C) based on the maximum specified ambient of 60°C.

### 15.3 European Union Certification (CE-mark)

- Compliance with:
  - R&TTE Directive 1999/5/EC
  - EMC Directive 2004/108/EC
  - LVD Directive 73/23/EEC
  - ATEX Directive 94/9/EC

## 16 Reference Documents

1	OneWireless Field Device Access Point User's Guide
2	Field Device Access Point Specification Release 200 EP03-640-200, August 2010
3	
4	
5	
6	
7	
8	

FCF:	OneWireless Field Device Access Point (FDAP) RF Regulatory Compliance Guide				Honeywell	
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