

# **RDL-3000 Family**

## *Broadband Wireless Systems*

# **RDL-3000-RME**

## **Radio Module**

# **Product Manual**

|          |                                              |           |
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# 1 Product Overview

The RDL-3000 radio modules are each comprised of a proprietary Media Access Control (MAC) protocol engine and Time Division Duplexing (TDD)/ Orthogonal Frequency Division Duplexing (OFDM) digital radio.

The modules are not designed for stand-alone operation. The modules are sold as one component of a packaged system which includes a suitable housing for the module connectors for required external components including a power supply and antenna system. This is afterwards referred to as the 'final product'. The final product may be designed and manufactured by Redline or a licensed third party.

Frequency settings within the specified frequency ranges are software keyed to be compliant with specific regulatory agency requirements in the region of deployment.

## RDL-3000-RME

|         |                 |
|---------|-----------------|
| Canada: | 2305-2320 MHz   |
|         | 2345-2360 MHz   |
|         | 2400-2483.5 MHz |
| USA:    | 2496-2690 MHz   |

**Important:** Read this entire document prior to installing or operating these modules.

## 2 Conditions of Use

### 2.1 General Conditions

These modules are not provided for sale to the general public. The modules contain a proprietary radio interface and can not be directly connected to any standard telecommunications or computer devices. This manual is provided as supplement to technical and operational documentation and training provided by Redline and its agents.

Any operation or use of these modules in any manner not expressly specified within this manual or approved in writing by Redline (or its agents) is expressly forbidden and voids the users right to operate the module. This includes, but is not limited to, any modification of the module hardware or software, installation of the module in a non approved enclosure, and use with non approved antennas.

### 2.2 Country of Use

Refer to the regulatory notices in this document before installing or operating the module.

Operation of the final product requires a software 'key' that is available exclusively from Redline or its authorized agents. The software key is unique to each module and must be installed and activated before the radio will operate. The key contains sufficient security features that the professional installer and operator can not decode, modify, substitute, or otherwise circumvent the operational restrictions imposed by the 'key'.

The software 'key' limits the transmit power, operating frequency range, and channel bandwidth per the regulator domain governing the location where the radio will be deployed. The operator does not have the option to select the country or regulatory region of operation.

The software 'key' limits the mode of operation as a master or client. The client mode is 'passive listener' and while in this mode the module can not initiate any transmission without first receiving and decoding a valid authorization message from the master. A module with a key for client operation can not be changed by the installer to enable master mode operation. A module with a key for master operation can operate in master or client (passive) mode.

#### **RDL-3000-RME**

##### **Operation in the United States**

The RDL-3000-RME module is certified with limited modular approval for use as an 'intentional radiator' in the United States as device FCC ID: QC8-RDL3000RME.

##### **Operation in Canada**

The RDL-3000-RME module is certified with limited modular approval for use as an 'intentional radiator' in Canada as device IC: 4310A-RDL3000RME

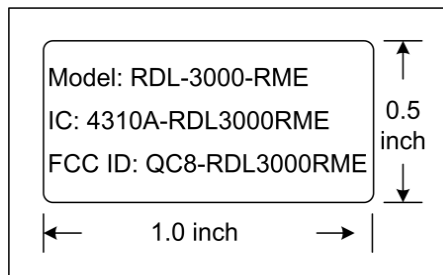
## 2.3 Product Labeling

### 2.3.1 Module Label

The modular transmitter will display a label referring to the FCC ID registration number and the Industry Canada IC registration number. An information label is applied directly to the modular transmitter (examples shown below).

Do not to remove any labels from the module.

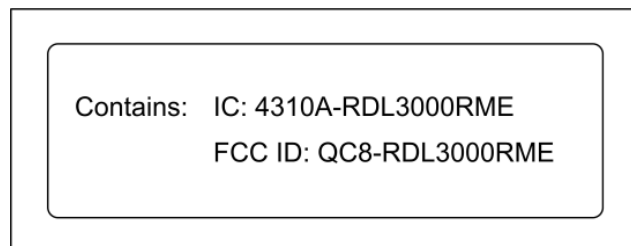
#### RDL-3000-RME



### 2.3.2 External Label

Information labels are applied to the final product. The final product features a label on the outside surface listing the registration number for the enclosed module. Do not to remove any labels from the module or the final product.

#### RDL-3000-RME



## 3 Module Installation and Service

### 3.1 Installation into a Final Product

The modules must be installed only by trained professional technicians authorized by Redline or its agents. The module must be installed only into an approved enclosure (see Conditions of Use) and only at an approved manufacturing facility or service depot.

Redline shall retain complete control over the final installation of the module and will ensure compliance of the end product to all applicable FCC/IC regulations. The module must be installed only into an approved enclosure (see Conditions of Use) and only at an approved manufacturing facility or service depot.

Redline licensing of the modular transmitter includes monitoring to ensure compliance in the operation and use of the module as expressly specified within this manual. This includes restrictions against modification of the module hardware, approval of the final enclosure, operational restrictions for installers and end-users, and approval of antennas provided for use with the product.

Operation of the final product requires the 'key' be controlled exclusively by the manufacturer. The 'key' must be unique to each module and must be installed and activated before the radio will operate. The key must contain sufficient security features to the professional installer and operator can not decode, modify, substitute, or otherwise circumvent the operational restrictions imposed by the 'key'.

The software 'key' must limit the transmit power, operating frequency range, and channel bandwidth per the regulator domain governing the location where the radio will be deployed. The operator does not have the option to select the country or regulatory region of operation.

The software 'key' must limit the mode of operation as a master or client. The client mode is 'passive listener' and while in this mode the module can not initiate any transmission without first receiving and decoding a valid authorization message from the master. A module with a key for client operation can not be changed by the installer to enable master mode operation.

Redline will review all final products for compliance to regulatory restrictions.

The manufacturer must meet all labeling described in section 2.3.

### 3.2 Module Servicing

The modules are not intended to be field serviceable, and contains no field serviceable or field replaceable parts. The module must be serviced only at an approved manufacturing facility or service depot.



**Warning:** The modules are susceptible to damage from electrostatic charge. Electrostatic Discharge (ESD) must be avoided to prevent damaging or destroying the module. The module must always be store in an anti-static container/bag prior to installation and following removal from the product for servicing. Observe ESD precautions when handling the module.

### 3.3 Professional Installation

Devices containing the module require professional installation. It is the responsibility of the installer to understand the product operation by attending training as required, reading and understanding the product documentation, and ensuring that all building, safety and regulatory codes are met and the installation is complete and secure.

### 3.4 Safety Precautions

Installation and service of modules must be performed by personnel having technical training and experience necessary to be aware of hazards during installation and/or service of RF equipment. The installation and/or service must be done using procedures designed to minimize any danger to technical personnel or any other person.

### 3.5 Radio Frequency Safety

The installer of this radio equipment must ensure the antenna is located or pointed such that it does not emit RF fields in excess of the general population limits as defined by:

- FCC CFR 47, Part 2.1091  
<http://www.gpo.gov/fdsys/pkg/CFR-2009-title47-vol1/pdf/CFR-2009-title47-vol1-sec2-1091.pdf>
- FCC OET Bulletin 65, Radio frequency radiation exposure evaluation for fixed devices  
[http://transition.fcc.gov/Bureaus/Engineering\\_Technology/Documents/bulletins/oet65/oet65c.pdf](http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65c.pdf)
- Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website:  
[http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php)

Refer to the regulatory statements included in this document.

## 4 Final Product Requirements

The following requirements apply to all final products incorporating the modules.

### 4.1 RDL-3000-RME

#### 4.1.1 Frequency Bands

Operation of the final product (containing the module) requires a software 'key' that is available exclusively from Redline. This key restricts device operation to the FCC 2496-2690 MHz, IC 2305-2320 MHz and IC 2345-2360 MHz bands which are subject to licensing, and the IC 2400-2483.5 MHz unlicensed band (Canada only). The professional installer and operator can not modify or otherwise circumvent these operational restrictions.

#### 4.1.2 Antenna Use and Transmit Power

The module supports operation with 2x2 MIMO antenna systems with two transmit chains and two receive chains. The module must be used only with certified antennas and using the channel size and output power level specified by the FCC for operation in USA or by IC regulations for operation in Canada.

#### 4.1.3 Certified Antennas

The module has been designed to operate with the antennas listed in the following tables.

**Table 1: RDL-3000-RME: Approved Antennas for IC**

| Manufacturer | Part #           | Gain (dBi) | Beamwidth (degrees) | Frequency Range (MHz) |
|--------------|------------------|------------|---------------------|-----------------------|
| Redline      | 30-00328-30      | 14.5       | 35                  | 2300 - 2700           |
| Redline      | AFS-DBG-02120-01 | 15         | 120                 | 2300-2700             |
| Redline      | AFS-DBG-0290-01  | 16         | 90                  | 2300-2700             |
| Redline      | AFS-DBG-0260-01  | 17         | 60                  | 2300-2700             |

**Table 2: RDL-3000-RME: Approved Antennas for FCC**

| Manufacturer | Part #           | Gain (dBi) | Beamwidth (degrees) | Frequency Range (MHz) |
|--------------|------------------|------------|---------------------|-----------------------|
| Redline      | 30-00328-30      | 15         | 35                  | 2300-2700             |
| Redline      | AFS-DBG-02120-01 | 14         | 120                 | 2300-2700             |
| Redline      | AFS-DBG-0290-01  | 14.5       | 90                  | 2300-2700             |
| Redline      | AFS-DBG-0260-01  | 16         | 60                  | 2300-2700             |
| Redline      | APD-DB-02-4ft-01 | 27         | 7.3                 | 2300-2700             |

#### 4.1.4 Power & EIRP (MIMO Operation)

##### Operation at FCC 2496-2690 MHz Band

**Table 3: 2.5 GHz: RF Power & EIRP: 1.25 MHz channel: all 15 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2496.75         | 23.62               | 22.87               | 26.27                       | 15.00              | 42.27      | 64.35            | 22.08            |
| BPSK       | 2689.25         | 23.67               | 23.39               | 26.54                       | 15.00              | 42.54      | 64.35            | 21.81            |
| 256-QAM    | 2496.75         | 23.58               | 22.89               | 26.26                       | 15.00              | 42.26      | 64.35            | 22.09            |
| 256-QAM    | 2689.25         | 23.70               | 23.34               | 26.53                       | 15.00              | 42.53      | 64.35            | 21.82            |

**Table 4: 2.5 GHz: RF Power & EIRP: 1.25 MHz channel: all 16 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2496.75         | 23.62               | 22.87               | 26.27                       | 16.00              | 42.27      | 64.35            | 22.08            |
| BPSK       | 2689.25         | 23.67               | 23.39               | 26.54                       | 16.00              | 42.54      | 64.35            | 21.81            |
| 256-QAM    | 2496.75         | 23.58               | 22.89               | 26.26                       | 16.00              | 42.26      | 64.35            | 22.09            |
| 256-QAM    | 2689.25         | 23.70               | 23.34               | 26.53                       | 16.00              | 42.53      | 64.35            | 21.82            |

**Table 5: 2.5 GHz: RF Power & EIRP: 1.25 MHz channel: all 27 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2496.75         | 23.62               | 22.87               | 26.27                       | 27.00              | 53.27      | 56.57            | 3.30             |
| BPSK       | 2689.25         | 23.67               | 23.39               | 26.54                       | 27.00              | 53.54      | 56.57            | 3.03             |
| 256-QAM    | 2496.75         | 23.58               | 22.89               | 26.26                       | 27.00              | 53.26      | 56.57            | 3.31             |
| 256-QAM    | 2689.25         | 23.70               | 23.34               | 26.53                       | 27.00              | 53.53      | 56.57            | 3.04             |

**Table 6: 2.5 GHz: RF Power & EIRP: 2.5 MHz channel: all 15 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2497.25         | 23.93               | 22.94               | 26.47                       | 15.00              | 41.47      | 69.70            | 28.23            |
| BPSK       | 2688.75         | 23.93               | 23.43               | 26.70                       | 15.00              | 41.70      | 69.70            | 28.00            |
| 256-QAM    | 2497.25         | 23.63               | 22.89               | 26.29                       | 15.00              | 41.29      | 69.70            | 28.41            |
| 256-QAM    | 2688.75         | 23.86               | 23.47               | 26.68                       | 15.00              | 41.68      | 69.70            | 28.02            |

**Table 7: 2.5 GHz: RF Power & EIRP: 2.5 MHz channel: all 16 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2497.25         | 23.93               | 22.94               | 26.47                       | 16.00              | 42.47      | 67.36            | 24.89            |
| BPSK       | 2688.75         | 23.93               | 23.43               | 26.70                       | 16.00              | 42.70      | 67.36            | 24.66            |
| 256-QAM    | 2497.25         | 23.63               | 22.89               | 26.29                       | 16.00              | 42.29      | 67.36            | 25.07            |
| 256-QAM    | 2688.75         | 23.86               | 23.47               | 26.68                       | 16.00              | 42.68      | 67.36            | 24.68            |

**Table 8: 2.5 GHz: RF Power & EIRP: 2.5 MHz channel: all 27 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2497.25         | 23.93               | 22.94               | 26.47                       | 27.00              | 53.47      | 59.58            | 6.11             |
| BPSK       | 2688.75         | 23.93               | 23.43               | 26.70                       | 27/00              | 53.70      | 59.58            | 5.88             |
| 256-QAM    | 2497.25         | 23.63               | 22.89               | 26.29                       | 27.00              | 53.29      | 59.58            | 6.29             |
| 256-QAM    | 2688.75         | 23.86               | 23.47               | 26.68                       | 27.00              | 53.68      | 59.58            | 5.90             |

**Table 9: 2.5 GHz: RF Power & EIRP: 5 MHz channel: all 15 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2498.50         | 23.54               | 22.61               | 26.11                       | 15.00              | 41.11      | 72.71            | 31.60            |
| BPSK       | 2687.50         | 23.60               | 22.79               | 26.22                       | 15.00              | 41.22      | 72.71            | 31.49            |
| 256-QAM    | 2498.50         | 23.57               | 22.92               | 26.27                       | 15.00              | 41.27      | 72.71            | 31.44            |
| 256-QAM    | 2687.50         | 23.75               | 22.82               | 26.32                       | 15.00              | 41.32      | 72.71            | 31.39            |

**Table 10: 2.5 GHz: RF Power & EIRP: 5 MHz channel: all 16 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2498.50         | 23.54               | 22.61               | 26.11                       | 16.00              | 42.11      | 70.37            | 28.26            |
| BPSK       | 2687.50         | 23.60               | 22.79               | 26.22                       | 16.00              | 42.22      | 70.37            | 28.15            |
| 256-QAM    | 2498.50         | 23.57               | 22.92               | 26.27                       | 16.00              | 42.27      | 70.37            | 28.10            |
| 256-QAM    | 2687.50         | 23.75               | 22.82               | 26.32                       | 16.00              | 42.32      | 70.37            | 28.05            |

**Table 11: 2.5 GHz: RF Power & EIRP: 5 MHz channel: all 27 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2498.50         | 23.54               | 22.61               | 26.11                       | 27.00              | 53.11      | 62.59            | 9.48             |
| BPSK       | 2687.50         | 23.60               | 22.79               | 26.22                       | 27/00              | 53.22      | 62.59            | 9.37             |
| 256-QAM    | 2498.50         | 23.57               | 22.92               | 26.27                       | 27.00              | 53.27      | 62.59            | 9.32             |
| 256-QAM    | 2687.50         | 23.75               | 22.82               | 26.32                       | 27.00              | 53.32      | 62.59            | 9.27             |

**Table 12: 2.5 GHz: RF Power & EIRP: 10 MHz channel: all 15 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2501.00         | 23.46               | 22.52               | 26.03                       | 15.00              | 41.03      | 75.72            | 34.69            |
| BPSK       | 2685.00         | 23.46               | 22.56               | 26.04                       | 15.00              | 41.04      | 75.72            | 34.68            |
| 256-QAM    | 2501.00         | 23.47               | 22.50               | 26.02                       | 15.00              | 41.02      | 75.72            | 34.70            |
| 256-QAM    | 2685.00         | 23.60               | 22.57               | 26.13                       | 15.00              | 41.13      | 75.72            | 34.59            |

**Table 13: 2.5 GHz: RF Power & EIRP: 10 MHz channel: all 16 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2501.00         | 23.46               | 22.52               | 26.03                       | 16.00              | 42.03      | 73.38            | 31.35            |
| BPSK       | 2685.00         | 23.46               | 22.56               | 26.04                       | 16.00              | 42.04      | 73.38            | 31.34            |
| 256-QAM    | 2501.00         | 23.47               | 22.50               | 26.02                       | 16.00              | 42.02      | 73.38            | 31.36            |
| 256-QAM    | 2685.00         | 23.60               | 22.57               | 26.13                       | 16.00              | 42.13      | 73.38            | 31.25            |

**Table 14: 2.5 GHz: RF Power & EIRP: 10 MHz channel: all 27 dBi antennas for FCC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2501.00         | 23.46               | 22.52               | 26.03                       | 27.00              | 53.11      | 62.59            | 9.48             |
| BPSK       | 2685.00         | 23.46               | 22.56               | 26.04                       | 27/00              | 53.22      | 62.59            | 9.37             |
| 256-QAM    | 2501.00         | 23.47               | 22.50               | 26.02                       | 27.00              | 53.27      | 62.59            | 9.32             |
| 256-QAM    | 2685.00         | 23.60               | 22.57               | 26.13                       | 27.00              | 53.32      | 62.59            | 9.27             |

## Operation at IC 2305-2320 MHz and IC 2345-2360 MHz Bands

Table 15: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 14.5 dBi antenna for IC

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2348            | 13.57               | 13.75               | 16.67                       | 14.50              | 31.17      | 63.00            | 31.83            |
|            | 2352.5          | 23.62               | 23.95               | 26.80                       | 14.50              | 41.30      | 63.00            | 21.70            |
|            | 2357.5          | 28.93               | 29.43               | 32.20                       | 14.50              | 46.70      | 63.00            | 16.30            |
|            | 2308            | 29.23               | 29.41               | 32.33                       | 14.50              | 46.83      | 63.00            | 16.17            |
|            | 2312.5          | 23.37               | 24.19               | 26.81                       | 14.50              | 41.31      | 63.00            | 21.69            |
|            | 2317            | 16.88               | 14.73               | 18.95                       | 14.50              | 33.45      | 63.00            | 29.55            |
| QPSK       | 2348            | 13.29               | 13.62               | 16.47                       | 14.50              | 30.97      | 63.00            | 32.03            |
|            | 2352.5          | 23.47               | 23.82               | 26.66                       | 14.50              | 41.16      | 63.00            | 21.84            |
|            | 2357.5          | 28.87               | 29.52               | 32.22                       | 14.50              | 46.72      | 63.00            | 16.28            |
|            | 2308            | 29.29               | 29.47               | 32.39                       | 14.50              | 46.89      | 63.00            | 16.11            |
|            | 2312.5          | 23.18               | 24.02               | 26.63                       | 14.50              | 41.13      | 63.00            | 21.87            |
|            | 2317            | 17.11               | 14.89               | 19.15                       | 14.50              | 33.65      | 63.00            | 29.35            |
| 16-QAM     | 2348            | 13.45               | 13.59               | 16.53                       | 14.50              | 31.03      | 63.00            | 31.97            |
|            | 2352.5          | 23.59               | 23.87               | 26.74                       | 14.50              | 41.24      | 63.00            | 21.76            |
|            | 2357.5          | 28.91               | 29.29               | 32.11                       | 14.50              | 46.61      | 63.00            | 16.39            |
|            | 2308            | 29.12               | 29.52               | 32.33                       | 14.50              | 46.83      | 63.00            | 16.17            |
|            | 2312.5          | 23.52               | 24.59               | 27.10                       | 14.50              | 41.60      | 63.00            | 21.40            |
|            | 2317            | 16.92               | 14.48               | 18.88                       | 14.50              | 33.38      | 63.00            | 29.62            |
| 64-QAM     | 2348            | 13.45               | 13.78               | 16.63                       | 14.50              | 31.13      | 63.00            | 31.87            |
|            | 2352.5          | 23.65               | 23.27               | 26.47                       | 14.50              | 40.97      | 63.00            | 22.03            |
|            | 2357.5          | 28.79               | 29.39               | 32.11                       | 14.50              | 46.61      | 63.00            | 16.39            |
|            | 2308            | 29.38               | 29.28               | 32.34                       | 14.50              | 46.84      | 63.00            | 16.16            |
|            | 2312.5          | 23.21               | 24.19               | 26.74                       | 14.50              | 41.24      | 63.00            | 21.76            |
|            | 2317            | 17.19               | 15.28               | 19.35                       | 14.50              | 33.85      | 63.00            | 29.15            |

**Table 16: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 15 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2348            | 13.57               | 13.75               | 16.67                       | 15.00              | 31.67      | 63.00            | 31.33            |
|            | 2352.5          | 23.62               | 23.95               | 26.80                       | 15.00              | 41.80      | 63.00            | 21.20            |
|            | 2357.5          | 28.93               | 29.43               | 32.20                       | 15.00              | 47.20      | 63.00            | 15.80            |
|            | 2308            | 29.23               | 29.41               | 32.33                       | 15.00              | 47.33      | 63.00            | 15.67            |
|            | 2312.5          | 23.37               | 24.19               | 26.81                       | 15.00              | 41.81      | 63.00            | 21.19            |
|            | 2317            | 16.88               | 14.73               | 18.95                       | 15.00              | 33.95      | 63.00            | 29.05            |
| QPSK       | 2348            | 13.29               | 13.62               | 16.47                       | 15.00              | 31.47      | 63.00            | 31.53            |
|            | 2352.5          | 23.47               | 23.82               | 26.66                       | 15.00              | 41.66      | 63.00            | 21.34            |
|            | 2357.5          | 28.87               | 29.52               | 32.22                       | 15.00              | 47.22      | 63.00            | 15.78            |
|            | 2308            | 29.29               | 29.47               | 32.39                       | 15.00              | 47.39      | 63.00            | 15.61            |
|            | 2312.5          | 23.18               | 24.02               | 26.63                       | 15.00              | 41.63      | 63.00            | 21.37            |
|            | 2317            | 17.11               | 14.89               | 19.15                       | 15.00              | 34.15      | 63.00            | 28.85            |
| 16-QAM     | 2348            | 13.45               | 13.59               | 16.53                       | 15.00              | 31.53      | 63.00            | 31.47            |
|            | 2352.5          | 23.59               | 23.87               | 26.74                       | 15.00              | 41.74      | 63.00            | 21.26            |
|            | 2357.5          | 28.91               | 29.29               | 32.11                       | 15.00              | 47.11      | 63.00            | 15.89            |
|            | 2308            | 29.12               | 29.52               | 32.33                       | 15.00              | 47.33      | 63.00            | 15.67            |
|            | 2312.5          | 23.52               | 24.59               | 27.10                       | 15.00              | 42.10      | 63.00            | 20.90            |
|            | 2317            | 16.92               | 14.48               | 18.88                       | 15.00              | 33.88      | 63.00            | 29.12            |
| 64-QAM     | 2348            | 13.45               | 13.78               | 16.63                       | 15.00              | 31.63      | 63.00            | 31.37            |
|            | 2352.5          | 23.65               | 23.27               | 26.47                       | 15.00              | 41.47      | 63.00            | 21.53            |
|            | 2357.5          | 28.79               | 29.39               | 32.11                       | 15.00              | 47.11      | 63.00            | 15.89            |
|            | 2308            | 29.38               | 29.28               | 32.34                       | 15.00              | 47.34      | 63.00            | 15.66            |
|            | 2312.5          | 23.21               | 24.19               | 26.74                       | 15.00              | 41.74      | 63.00            | 21.26            |
|            | 2317            | 17.19               | 15.28               | 19.35                       | 15.00              | 34.35      | 63.00            | 28.65            |

**Table 17: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 16 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2348            | 13.57               | 13.75               | 16.67                       | 16.00              | 32.67      | 63.00            | 30.33            |
|            | 2352.5          | 23.62               | 23.95               | 26.80                       | 16.00              | 42.80      | 63.00            | 20.20            |
|            | 2357.5          | 28.93               | 29.43               | 32.20                       | 16.00              | 48.20      | 63.00            | 14.80            |
|            | 2308            | 29.23               | 29.41               | 32.33                       | 16.00              | 48.33      | 63.00            | 14.67            |
|            | 2312.5          | 23.37               | 24.19               | 26.81                       | 16.00              | 42.81      | 63.00            | 20.19            |
|            | 2317            | 16.88               | 14.73               | 18.95                       | 16.00              | 34.95      | 63.00            | 28.05            |
| QPSK       | 2348            | 13.29               | 13.62               | 16.47                       | 16.00              | 32.47      | 63.00            | 30.53            |
|            | 2352.5          | 23.47               | 23.82               | 26.66                       | 16.00              | 42.66      | 63.00            | 20.34            |
|            | 2357.5          | 28.87               | 29.52               | 32.22                       | 16.00              | 48.22      | 63.00            | 14.78            |
|            | 2308            | 29.29               | 29.47               | 32.39                       | 16.00              | 48.39      | 63.00            | 14.61            |
|            | 2312.5          | 23.18               | 24.02               | 26.63                       | 16.00              | 42.63      | 63.00            | 20.37            |
|            | 2317            | 17.11               | 14.89               | 19.15                       | 16.00              | 35.15      | 63.00            | 27.85            |
| 16-QAM     | 2348            | 13.45               | 13.59               | 16.53                       | 16.00              | 32.53      | 63.00            | 30.47            |
|            | 2352.5          | 23.59               | 23.87               | 26.74                       | 16.00              | 42.74      | 63.00            | 20.26            |
|            | 2357.5          | 28.91               | 29.29               | 32.11                       | 16.00              | 48.11      | 63.00            | 14.89            |
|            | 2308            | 29.12               | 29.52               | 32.33                       | 16.00              | 48.33      | 63.00            | 14.67            |
|            | 2312.5          | 23.52               | 24.59               | 27.10                       | 16.00              | 43.10      | 63.00            | 19.90            |
|            | 2317            | 16.92               | 14.48               | 18.88                       | 16.00              | 34.88      | 63.00            | 28.12            |
| 64-QAM     | 2348            | 13.45               | 13.78               | 16.63                       | 16.00              | 32.63      | 63.00            | 30.37            |
|            | 2352.5          | 23.65               | 23.27               | 26.47                       | 16.00              | 42.47      | 63.00            | 20.53            |
|            | 2357.5          | 28.79               | 29.39               | 32.11                       | 16.00              | 48.11      | 63.00            | 14.89            |
|            | 2308            | 29.38               | 29.28               | 32.34                       | 16.00              | 48.34      | 63.00            | 14.66            |
|            | 2312.5          | 23.21               | 24.19               | 26.74                       | 16.00              | 42.74      | 63.00            | 20.26            |
|            | 2317            | 17.19               | 15.28               | 19.35                       | 16.00              | 35.35      | 63.00            | 27.65            |

**Table 18: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 17 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2348            | 13.57               | 13.75               | 16.67                       | 17.00              | 33.67      | 63.00            | 29.33            |
|            | 2352.5          | 23.62               | 23.95               | 26.80                       | 17.00              | 43.80      | 63.00            | 19.20            |
|            | 2357.5          | 28.93               | 29.43               | 32.20                       | 17.00              | 49.20      | 63.00            | 13.80            |
|            | 2308            | 29.23               | 29.41               | 32.33                       | 17.00              | 49.33      | 63.00            | 13.67            |
|            | 2312.5          | 23.37               | 24.19               | 26.81                       | 17.00              | 43.81      | 63.00            | 19.19            |
|            | 2317            | 16.88               | 14.73               | 18.95                       | 17.00              | 35.95      | 63.00            | 27.05            |
| QPSK       | 2348            | 13.29               | 13.62               | 16.47                       | 17.00              | 33.47      | 63.00            | 29.53            |
|            | 2352.5          | 23.47               | 23.82               | 26.66                       | 17.00              | 43.66      | 63.00            | 19.34            |
|            | 2357.5          | 28.87               | 29.52               | 32.22                       | 17.00              | 49.22      | 63.00            | 13.78            |
|            | 2308            | 29.29               | 29.47               | 32.39                       | 17.00              | 49.39      | 63.00            | 13.61            |
|            | 2312.5          | 23.18               | 24.02               | 26.63                       | 17.00              | 43.63      | 63.00            | 19.37            |
|            | 2317            | 17.11               | 14.89               | 19.15                       | 17.00              | 36.15      | 63.00            | 26.85            |
| 16-QAM     | 2348            | 13.45               | 13.59               | 16.53                       | 17.00              | 33.53      | 63.00            | 29.47            |
|            | 2352.5          | 23.59               | 23.87               | 26.74                       | 17.00              | 43.74      | 63.00            | 19.26            |
|            | 2357.5          | 28.91               | 29.29               | 32.11                       | 17.00              | 49.11      | 63.00            | 13.89            |
|            | 2308            | 29.12               | 29.52               | 32.33                       | 17.00              | 49.33      | 63.00            | 13.67            |
|            | 2312.5          | 23.52               | 24.59               | 27.10                       | 17.00              | 44.10      | 63.00            | 18.90            |
|            | 2317            | 16.92               | 14.48               | 18.88                       | 17.00              | 35.88      | 63.00            | 27.12            |
| 64-QAM     | 2348            | 13.45               | 13.78               | 16.63                       | 17.00              | 33.63      | 63.00            | 29.37            |
|            | 2352.5          | 23.65               | 23.27               | 26.47                       | 17.00              | 43.47      | 63.00            | 19.53            |
|            | 2357.5          | 28.79               | 29.39               | 32.11                       | 17.00              | 49.11      | 63.00            | 13.89            |
|            | 2308            | 29.38               | 29.28               | 32.34                       | 17.00              | 49.34      | 63.00            | 13.66            |
|            | 2312.5          | 23.21               | 24.19               | 26.74                       | 17.00              | 43.74      | 63.00            | 19.26            |
|            | 2317            | 17.19               | 15.28               | 19.35                       | 17.00              | 36.35      | 63.00            | 26.65            |

**Table 19: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 14.5 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2350.5          | 12.3                | 12.95               | 15.65                       | 14.50              | 30.15      | 63.00            | 32.85            |
|            | 2355            | 19.3                | 19.89               | 22.62                       | 14.50              | 37.12      | 63.00            | 25.88            |
|            | 2310            | 19.8                | 18.61               | 22.27                       | 14.50              | 36.77      | 63.00            | 26.23            |
|            | 2314.5          | 13.3                | 12.75               | 16.04                       | 14.50              | 30.54      | 63.00            | 32.46            |
| QPSK       | 2350.5          | 12.3                | 12.78               | 15.55                       | 14.50              | 30.05      | 63.00            | 32.95            |
|            | 2355            | 19.2                | 19.92               | 22.58                       | 14.50              | 37.08      | 63.00            | 25.92            |
|            | 2310            | 19.9                | 18.59               | 22.32                       | 14.50              | 36.82      | 63.00            | 26.18            |
|            | 2314.5          | 13.3                | 12.69               | 16.01                       | 14.50              | 30.51      | 63.00            | 32.49            |
| 16-QAM     | 2350.5          | 12.3                | 12.91               | 15.62                       | 14.50              | 30.12      | 63.00            | 32.88            |
|            | 2355            | 19.3                | 19.97               | 22.64                       | 14.50              | 37.14      | 63.00            | 25.86            |
|            | 2310            | 19.8                | 18.59               | 22.24                       | 14.50              | 36.74      | 63.00            | 26.26            |
|            | 2314.5          | 13.5                | 12.82               | 16.16                       | 14.50              | 30.66      | 63.00            | 32.34            |
| 64-QAM     | 2350.5          | 12.3                | 12.87               | 15.60                       | 14.50              | 30.10      | 63.00            | 32.90            |
|            | 2355            | 19.4                | 19.92               | 22.68                       | 14.50              | 37.18      | 63.00            | 25.82            |
|            | 2310            | 19.9                | 18.59               | 22.29                       | 14.50              | 36.79      | 63.00            | 26.21            |
|            | 2314.5          | 13.4                | 12.82               | 16.10                       | 14.50              | 30.60      | 63.00            | 32.40            |

**Table 20: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 15 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2350.5          | 12.3                | 12.95               | 15.65                       | 15.00              | 30.65      | 63.00            | 32.35            |
|            | 2355            | 19.3                | 19.89               | 22.62                       | 15.00              | 37.62      | 63.00            | 25.38            |
|            | 2310            | 19.8                | 18.61               | 22.27                       | 15.00              | 37.27      | 63.00            | 25.73            |
|            | 2314.5          | 13.3                | 12.75               | 16.04                       | 15.00              | 31.04      | 63.00            | 31.96            |
| QPSK       | 2350.5          | 12.3                | 12.78               | 15.55                       | 15.00              | 30.55      | 63.00            | 32.45            |
|            | 2355            | 19.2                | 19.92               | 22.58                       | 15.00              | 37.58      | 63.00            | 25.42            |
|            | 2310            | 19.9                | 18.59               | 22.32                       | 15.00              | 37.32      | 63.00            | 25.68            |
|            | 2314.5          | 13.3                | 12.69               | 16.01                       | 15.00              | 31.01      | 63.00            | 31.99            |
| 16-QAM     | 2350.5          | 12.3                | 12.91               | 15.62                       | 15.00              | 30.62      | 63.00            | 32.38            |
|            | 2355            | 19.3                | 19.97               | 22.64                       | 15.00              | 37.64      | 63.00            | 25.36            |
|            | 2310            | 19.8                | 18.59               | 22.24                       | 15.00              | 37.24      | 63.00            | 25.76            |
|            | 2314.5          | 13.5                | 12.82               | 16.16                       | 15.00              | 31.16      | 63.00            | 31.84            |
| 64-QAM     | 2350.5          | 12.3                | 12.87               | 15.60                       | 15.00              | 30.60      | 63.00            | 32.40            |
|            | 2355            | 19.4                | 19.92               | 22.68                       | 15.00              | 37.68      | 63.00            | 25.32            |
|            | 2310            | 19.9                | 18.59               | 22.29                       | 15.00              | 37.29      | 63.00            | 25.71            |
|            | 2314.5          | 13.4                | 12.82               | 16.10                       | 15.00              | 31.10      | 63.00            | 31.90            |

**Table 21: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 16 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2350.5          | 12.3                | 12.95               | 15.65                       | 16.00              | 31.65      | 63.00            | 31.35            |
|            | 2355            | 19.3                | 19.89               | 22.62                       | 16.00              | 38.62      | 63.00            | 24.38            |
|            | 2310            | 19.8                | 18.61               | 22.27                       | 16.00              | 38.27      | 63.00            | 24.73            |
|            | 2314.5          | 13.3                | 12.75               | 16.04                       | 16.00              | 32.04      | 63.00            | 30.96            |
| QPSK       | 2350.5          | 12.3                | 12.78               | 15.55                       | 16.00              | 31.55      | 63.00            | 31.45            |
|            | 2355            | 19.2                | 19.92               | 22.58                       | 16.00              | 38.58      | 63.00            | 24.42            |
|            | 2310            | 19.9                | 18.59               | 22.32                       | 16.00              | 38.32      | 63.00            | 24.68            |
|            | 2314.5          | 13.3                | 12.69               | 16.01                       | 16.00              | 32.01      | 63.00            | 30.99            |
| 16-QAM     | 2350.5          | 12.3                | 12.91               | 15.62                       | 16.00              | 31.62      | 63.00            | 31.38            |
|            | 2355            | 19.3                | 19.97               | 22.64                       | 16.00              | 38.64      | 63.00            | 24.36            |
|            | 2310            | 19.8                | 18.59               | 22.24                       | 16.00              | 38.24      | 63.00            | 24.76            |
|            | 2314.5          | 13.5                | 12.82               | 16.16                       | 16.00              | 32.16      | 63.00            | 30.84            |
| 64-QAM     | 2350.5          | 12.3                | 12.87               | 15.60                       | 16.00              | 31.60      | 63.00            | 31.40            |
|            | 2355            | 19.4                | 19.92               | 22.68                       | 16.00              | 38.68      | 63.00            | 24.32            |
|            | 2310            | 19.9                | 18.59               | 22.29                       | 16.00              | 38.29      | 63.00            | 24.71            |
|            | 2314.5          | 13.4                | 12.82               | 16.10                       | 16.00              | 32.10      | 63.00            | 30.90            |

**Table 22: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 17 dBi antenna for IC**

| Modulation | Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|------------|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| BPSK       | 2350.5          | 12.3                | 12.95               | 15.65                       | 17.00              | 32.65      | 63.00            | 30.35            |
|            | 2355            | 19.3                | 19.89               | 22.62                       | 17.00              | 39.62      | 63.00            | 23.38            |
|            | 2310            | 19.8                | 18.61               | 22.27                       | 17.00              | 39.27      | 63.00            | 23.73            |
|            | 2314.5          | 13.3                | 12.75               | 16.04                       | 17.00              | 33.04      | 63.00            | 29.96            |
| QPSK       | 2350.5          | 12.3                | 12.78               | 15.55                       | 17.00              | 32.55      | 63.00            | 30.45            |
|            | 2355            | 19.2                | 19.92               | 22.58                       | 17.00              | 39.58      | 63.00            | 23.42            |
|            | 2310            | 19.9                | 18.59               | 22.32                       | 17.00              | 39.32      | 63.00            | 23.68            |
|            | 2314.5          | 13.3                | 12.69               | 16.01                       | 17.00              | 33.01      | 63.00            | 29.99            |
| 16-QAM     | 2350.5          | 12.3                | 12.91               | 15.62                       | 17.00              | 32.62      | 63.00            | 30.38            |
|            | 2355            | 19.3                | 19.97               | 22.64                       | 17.00              | 39.64      | 63.00            | 23.36            |
|            | 2310            | 19.8                | 18.59               | 22.24                       | 17.00              | 39.24      | 63.00            | 23.76            |
|            | 2314.5          | 13.5                | 12.82               | 16.16                       | 17.00              | 33.16      | 63.00            | 29.84            |
| 64-QAM     | 2350.5          | 12.3                | 12.87               | 15.60                       | 17.00              | 32.60      | 63.00            | 30.40            |
|            | 2355            | 19.4                | 19.92               | 22.68                       | 17.00              | 39.68      | 63.00            | 23.32            |
|            | 2310            | 19.9                | 18.59               | 22.29                       | 17.00              | 39.29      | 63.00            | 23.71            |
|            | 2314.5          | 13.4                | 12.82               | 16.10                       | 17.00              | 33.10      | 63.00            | 29.90            |

**Operation at 2400-2483.5 MHz Band (Canada Only)****Table 23: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 14.5 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2402.5          | 17.8                | 17.9                | 20.86                       | 14.5               | 35.36      | 36               | 0.64             |
| 2442            | 17.8                | 17.8                | 20.81                       | 14.5               | 35.31      | 36               | 0.69             |
| 2481            | 17.9                | 17.9                | 20.91                       | 14.5               | 35.41      | 36               | 0.59             |

**Table 24: 2.5 GHz: RF Power & EIRP: 5 MHz channel: 17 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2402.5          | 15.8                | 15.9                | 18.86                       | 17                 | 35.86      | 36               | 0.14             |
| 2442            | 15.8                | 15.8                | 18.81                       | 17                 | 35.81      | 36               | 0.19             |
| 2481            | 15.8                | 15.9                | 18.86                       | 17                 | 35.86      | 36               | 0.14             |

**Table 25: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 14.5 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2405            | 17.7                | 17.8                | 20.76                       | 14.5               | 35.26      | 36               | 0.74             |
| 2442            | 17.8                | 17.8                | 20.81                       | 14.5               | 35.31      | 36               | 0.69             |
| 2478.5          | 17.7                | 17.9                | 20.81                       | 14.5               | 35.31      | 36               | 0.69             |

**Table 26: 2.5 GHz: RF Power & EIRP: 10 MHz channel: 17 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2405            | 15.8                | 15.8                | 18.81                       | 17                 | 35.8       | 36               | 0.19             |
| 2442            | 15.8                | 15.9                | 18.86                       | 17                 | 35.86      | 36               | 0.14             |
| 2478.5          | 15.8                | 15.9                | 18.86                       | 17                 | 35.86      | 36               | 0.14             |

**Table 27: 2.5 GHz: RF Power & EIRP: 20 MHz channel: 14.5 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2410            | 17.6                | 17.7                | 20.66                       | 14.5               | 35.16      | 36               | 0.84             |
| 2442            | 17.7                | 17.8                | 20.76                       | 14.5               | 35.26      | 36               | 0.74             |
| 2473.5          | 17.7                | 17.8                | 20.76                       | 14.5               | 35.26      | 36               | 0.74             |

**Table 28: 2.5 GHz: RF Power & EIRP: 20 MHz channel: 17 dBi antenna for IC**

| Frequency (MHz) | Power at RF-1 (dBm) | Power at RF-2 (dBm) | Combined output power (dBm) | Antenna gain (dBi) | EIRP (dBm) | EIRP limit (dBm) | EIRP margin (dB) |
|-----------------|---------------------|---------------------|-----------------------------|--------------------|------------|------------------|------------------|
| 2410            | 15.7                | 15.8                | 18.76                       | 17                 | 35.76      | 36               | 0.24             |
| 2442            | 15.7                | 15.8                | 18.76                       | 17                 | 35.76      | 36               | 0.24             |
| 2473.5          | 15.8                | 15.9                | 18.86                       | 17                 | 35.86      | 36               | 0.14             |

## 5 Regulatory Notices

### 5.1.1 FCC Notices

#### Deployment in USA

The following notices about deployment in the USA are included in training and documentation provided to professional installers and operators of the final product:

1. The final product must be professionally installed.
2. WARNING -- FCC RF Exposure Warnings

To satisfy FCC RF exposure requirements for RF transmitting devices, the following distances should be maintained between the antenna of this device and persons during device operation:

**Table 29: FCC: RDL-3000-RME Recommended Safe Distances**

| Frequency (MHz) | Separation Distance     |
|-----------------|-------------------------|
| 2496-2690       | 150 cm (5.9 in) or more |

To ensure compliance, operation at closer than these distances is not recommended. The antenna used for this transmitter must not be collocated in conjunction with any other antenna or transmitter.

3. FCC Information to Users @ FCC 15.105:

NOTE: 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 or more 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.

Where DFS is required by regional regulations, this function is permanently enabled at the factory and can not be disabled by the installer or end-user.

4. FCC Information to Users @ FCC 15.19:

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.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

#### 5. FCC Information to Users @ FCC 15.21:

Warning: Changes or modifications not expressly approved by Redline Communications could void the user's authority to operate the equipment.

Frequency selection is regulated by a regional code integrated into each options key. This feature enforces compliance to regional regulatory statutes. Each options key is keyed to the unique MAC address of an RDL-3000 radio platform. Options keys can be generated only by Redline and its authorized agents. End-users can not generate or modify options keys (to obtain or alter regional codes).

Redline provides technical training programs and information covering network design and installation for Redline distributors, value added resellers, installers, and other partners. This program is intended in part to train participants to a level of understanding where they are competent to order, setup and configure the Redline wireless equipment to be in compliance with regulatory requirements in the region where this equipment is installed. Redline sales order processing is also trained to verify that regional codes are consistent with the intended deployment location as documented in the sales order.

## 5.2 Industry Canada Notices: Deployment in Canada

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

The following notices about deployment in Canada are included in training and documentation provided to professional installers and operators of the final product:

1. The final product must be professionally installed.
2. WARNING -- IC RF Exposure Warnings

To satisfy IC RF exposure requirements for RF transmitting devices, the following distances should be maintained between the antenna of this device and persons during device operation:

**Table 30: IC: RDL-3000-RME Recommended Safe Distances**

| Frequency (MHz)            | Deployment | Separation Distance   |
|----------------------------|------------|-----------------------|
| 2305 - 2320<br>2345 - 2360 | PMP        | 85 cm (33.5") or more |
| 2400 - 2483.5              | PMP        | 23 cm (9") or more    |

To ensure compliance, operation at closer than these distances is not recommended. The antenna used for this transmitter must not be collocated in conjunction with any other antenna or transmitter.

The equipment has been designed to operate with an antenna having a maximum gain of 17 dBi. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

This device has been designed to ensure that radio frequency emissions are maintained within the band of operation under all normal operating conditions listed in this manual.

IC regulations governing operation in the 2305-2320 MHz and 2345-2360 MHz bands are subject to licensing, pursuant to subsection 4(1) of the Radiocommunication Act.

This equipment complies to RSS-195 in the frequency bands 2305-2320 MHz and 2345-2360 MHz and RSS-210 Annex 8 in the frequency band 2400-2483.5 MHz.

This device complies with Industry Canada license-exempt RSS standard(s). 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.

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 required for successful communication.

## Déploiement aux le Canada

Cet appareil Digitale de Classe B rencontre toutes les normes du Canadian Règlement Brouilleur Équipement.

Les avis suivants à propos du déploiement au Canada sont inclus dans la formation et la documentation fournies aux installateurs professionnels et les opérateurs du produit final:

1. Le produit final doit être installé par un professionnel.
2. AVERTISSEMENT - IC avertissements d'exposition RF

Pour satisfaire les exigences d'IC en ce qui a trait aux expositions aux RF pour RF dispositifs de transmission, les distances suivantes doit être maintenue entre l'antenne de ce dispositif et des personnes pendant le fonctionnement du dispositif:

**Table 31: IC: RDL-3000-RME distances de sécurité recommandées**

| Fréquence (MHz)            | Déploiement | Distance de Séparation |
|----------------------------|-------------|------------------------|
| 2305 - 2320<br>2345 - 2360 | PMP         | 85 cm (33.5") ou plus  |
| 2400 - 2483.5              | PMP         | 23 cm (9") ou plus     |

Pour assurer la conformité , l'opération à une distance moindre que celles-ci n'est pas recommandé. L'antenne utilisée pour ce transmetteur ne doit pas être co-localisé avec une autre antenne ou transmetteur.

Cet équipement a été conçu pour fonctionner avec une antenne ayant un gain maximal de 17 dBi. Antenne ayant un gain plus élevé est strictement interdite par les règlements d'Industrie Canada. L'impédance d'antenne requise est de 50 ohms.

Ce dispositif a été conçu pour veiller à ce que les émissions de radiofréquences sont maintenus dans la bande de fonctionnement dans toutes les conditions normales de fonctionnement figurant dans ce manuel.

Règlements qui régissent le fonctionnement IC dans la bandes 2305-2320 MHz et 2345-2360 MHz sont soumises à autorisation en vertu du paragraphe 4 (1) de la Loi sur la radiocommunication.

Cet équipement est conforme à RSS-195 dans la bandes de fréquences 2305-2320 MHz et 2345-2360 MHz, et RSS-210 annexe 8 dans la bande de fréquences 2400-2483.5 MHz.

Cet appareil est conforme la norme d'Industrie Canada exempts de licence RSS (s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne peut pas causer d'interférences, et
2. Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

Pour réduire le potentiel d'interférence radio sur d'autres utilisateurs, le type d'antenne et son gain doivent être choisies tel que la Puissance Isotrope Rayonnée Equivalente (PIRE) ne dépasse pas le niveau nécessaire pour une communication efficace.

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