

RDL-3100 Family

Broadband Wireless Systems

RDL-3100-RMA Radio Modules

Product Manual

1	Product Overview	6
2	Conditions of Use	7
3	Module Installation and Service	8
4	Final Product Requirements	11
5	Regulatory Notices	30

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TABLE OF CONTENTS

1	Product Overview	6
2	Conditions of Use	7
2.1	General Conditions	7
2.2	Country of Use	7
2.3	Product Labeling	8
2.3.1	Module Label	8
2.3.2	External Label	8
3	Module Installation and Service	8
3.1	Installation into a Final Product	8
3.2	Module Servicing	9
3.3	Professional Installation	10
3.4	Safety Precautions	10
3.5	Radio Frequency Safety	10
4	Final Product Requirements	11
4.1	Frequency Bands	11
4.1.1	Antenna Use and Transmit Power	11
4.1.2	Certified Antennas	11
4.1.3	Power & EIRP (MIMO Operation)	12
	4940-4990 MHz: FCC 47 CFR Part 90 Subpart Y and RSS-III	12
	5150-5250 MHz: FCC 47 CFR Part 15 Subpart E, §15.407	13
	5250-5350 MHz Band FCC Part 15 Subpart E and RSS-247 Issue 2	15
	5470-5725 MHz Band FCC Part 15 Subpart E and RSS-247 Issue 2	19
	5725-5850 MHz: FCC Part 15 Subpart E and RSS-247 Issue 1	23
5	Regulatory Notices	30
5.1.1	FCC Notices	30
5.1.2	ISED Notices	31

LIST OF TABLES

Table 1: Approved Antennas	11
Table 2: 4.9 GHz: Output Power: 10 MHz Channel, 10 dBi and 24 dBi Antennas	12
Table 3: 4.9 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna	12
Table 4: 4.9 GHz: Output Power: 20 MHz Channel, 10 dBi and 24 dBi Antennas	12
Table 5: 4.9 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna	12
Table 6: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna...	13
Table 7: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna...	13
Table 8: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna...	13
Table 9: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna...	13
Table 10: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna.	13
Table 11: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna.	14
Table 12: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna.	14
Table 13: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna.	14
Table 14: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna.	14
Table 15: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 10 dBi Antenna	15
Table 16: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 24 dBi Antenna	15
Table 17: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna	15
Table 18: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 10 dBi Antenna	15
Table 19: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 24 dBi Antenna	15
Table 20: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna	16
Table 21: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 10 dBi Antenna	16
Table 22: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 24 dBi Antenna	16
Table 23: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 32 dBi Antenna	16
Table 24: ISSED 5.25-5.35 GHz: Output Power: 10 MHz Channel, 10 dBi Antenna	16
Table 25: ISSED 5.25-5.35 GHz: Output Power: 10 MHz Channel, 24 dBi Antenna	17
Table 26: ISSED 5.25-5.35 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna	17
Table 27: ISSED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 10 dBi Antenna	17
Table 28: ISSED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 24 dBi Antenna	17
Table 29: ISSED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna	17
Table 30: ISSED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 10 dBi Antenna	18
Table 31: ISSED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 24 dBi Antenna	18
Table 32: ISSED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 32 dBi Antenna	18
Table 33: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 10 dBi Antenna	19
Table 34: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 24 dBi Antenna	19
Table 35: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 32 dBi Antenna	19
Table 36: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 10 dBi Antenna	19
Table 37: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 24 dBi Antenna	19
Table 38: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 32 dBi Antenna	20
Table 39: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 10 dBi Antenna	20
Table 40: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 24 dBi Antenna	20
Table 41: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 32 dBi Antenna	20
Table 42: ISSED 5.47-5.725 GHz Output Power: 10 MHz Channel, 10 dBi Antenna	21
Table 43: ISSED 5.47-5.725 GHz Output Power: 10 MHz Channel, 24 dBi Antenna	21
Table 44: ISSED 5.47-5.725 GHz Output Power: 10 MHz Channel, 32 dBi Antenna	21
Table 45: ISSED 5.47-5.725 GHz Output Power: 20 MHz Channel, 10 dBi Antenna	21
Table 46: ISSED 5.47-5.725 GHz Output Power: 20 MHz Channel, 24 dBi Antenna	21

Table 47: ISED 5.47-5.725 GHz Output Power: 20 MHz Channel, 32 dBi Antenna	22
Table 48: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 10 dBi Antenna	22
Table 49: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 24 dBi Antenna	22
Table 50: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 32 dBi Antenna	22
Table 51: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna.....	23
Table 52: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna.....	23
Table 53: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna.....	23
Table 54: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna.....	23
Table 55: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna.....	23
Table 56: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna.....	24
Table 57: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna.....	24
Table 58: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna.....	24
Table 59: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna.....	24
Table 60: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna.....	25
Table 61: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna.....	25
Table 62: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna.....	25
Table 63: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna.....	25
Table 64: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna.....	25
Table 65: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna.....	26
Table 66: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna.....	26
Table 67: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna.....	26
Table 68: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna.....	26
Table 69: FCC 5.8 GHz: Output Power: 10 MHz Channel, PTP 10 & 24 dBi Antenna ...	26
Table 70: FCC 5.8 GHz: Output Power: 10 MHz Channel, PTP 32 dBi Antenna	27
Table 71: FCC 5.8 GHz: Output Power: 20 MHz Channel, PTP 10 & 24 dBi Antenna ...	27
Table 72: FCC 5.8 GHz: Output Power: 20 MHz Channel, PTP 32 dBi Antenna	27
Table 73: FCC 5.8 GHz: Output Power: 40 MHz Channel, PTP 10 & 24 dBi Antenna ...	27
Table 74: FCC 5.8 GHz: Output Power: 40 MHz Channel, PTP 32 dBi Antenna	27
Table 75: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 10 dBi Antenna	28
Table 76: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 24 dBi Antenna	28
Table 77: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 32 dBi Antenna	28
Table 78: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 10 dBi Antenna	28
Table 79: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 24 dBi Antenna	28
Table 80: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 32 dBi Antenna	29
Table 81: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 10 dBi Antenna	29
Table 82: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 24 dBi Antenna	29
Table 83: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 32 dBi Antenna	29
Table 84: FCC: RDL-3100-RMA Recommended Safe Distances	30
Table 85: ISED: RDL-3100-RMA Recommended Safe Distances	31
Table 86: ISED: RDL-3100-RMA distances de sécurité recommandées.....	32

1 Product Overview

The RDL-3100-RMA radio module is comprised of a proprietary Media Access Control (MAC) protocol engine and Time Division Duplexing (TDD)/ Orthogonal Frequency Division Duplexing (OFDM) digital radio.

The module is not designed for stand-alone operation. The module is 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.

USA & Canada: 4900 to 5975 MHz

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

2 Conditions of Use

2.1 General Conditions

The RDL-3100-RMA module is not provided for sale to the general public. The module contains 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 this module 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.

A radio can be configured in either master or client mode of operation. A radio in client mode is always 'passive listener' and cannot initiate any transmission without receiving and decoding a valid authorization message from a licensed master. A radio in master mode (whether from start or after being switched from client mode) checks and controls all functionality of a given radio as a master - including full DFS capabilities as required - based on license key. The license key is issued to customers for every unit, based on geographic location of the unit (e.g., US), with all the required regulatory compliance parameters enabled to ensure compliance.

Operation in the United States

The RDL-3100-RMA module is certified with limited modular approval for use as an 'intentional radiator' in the United States as device FCC ID: QC8-RDL3100RMA.

Operation in Canada

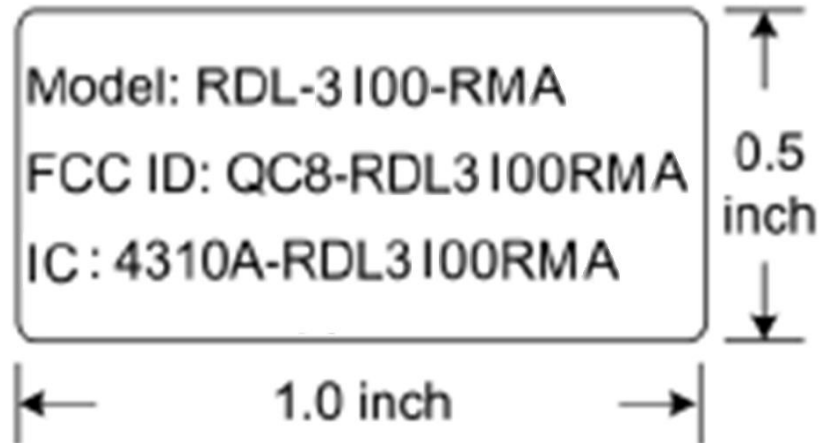
The RDL-3100-RMA module is certified with limited modular approval for use as an 'intentional radiator' in the Canada as IC: 4310A-RDL3100RMA.

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 IC registration number. An information label is applied directly to the modular transmitter (example shown below).

Do not to remove any labels from the module.



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.



3 Module Installation and Service

3.1 Installation into a Final Product

The module 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 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 module is 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 module is 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 the module 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
- Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website:
<https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html>

Refer to the regulatory statements included in this document.

4 Final Product Requirements

The following requirements apply to all final products incorporating an RDL-3100-RMA module.

4.1 Frequency Bands

Operation of the final product requires a software 'key' that is available exclusively from Redline. This key restricts device operation to the FCC/ISED 4940-4990 MHz, 5250-5350 MHz, 5470-5725 MHz (excluding 5600-5650 MHz in Canada), or 5725-5850 MHz Bands and the FCC 5150-5250 MHz Band. The professional installer and operator can not modify or otherwise circumvent these operational restrictions.

4.1.1 Antenna Use and Transmit Power

The module supports operation with 2 x 2 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 regulations.

4.1.2 Certified Antennas

This device has been designed to operate with the antennas listed in the following table. Any additional antennas will be used only after authorization is obtained through Class II permissive change.

Table 1: Approved Antennas

Manufacturer	Part #	Gain (dBi)	Frequency Range	4940-4990 MHz	5150-5250 MHz	5250-5360 MHz	5470-5725 MHz	5725-5850 MHz
Redline	AOD-DB-0512-02	10	4940-5875 MHz	PMP	PMP	PMP	PMP	PMP
L-Com	HG5158DP-10U	10	5100-5800 MHz	PMP	PMP	PMP	PMP	PMP
Redline	30-00362-00	24	4900-6100 MHz	PTP PMP	PMP	PTP PMP	PTP PMP	PTP PMP
Redline	A3FT3204LTPD	32	4900-5875 MHz	PTP PMP	PMP	PTP PMP	PTP PMP	PTP PMP

4.1.3 Power & EIRP (MIMO Operation)

4940-4990 MHz: FCC 47 CFR Part 90 Subpart Y and RSS-III

Table 2: 4.9 GHz: Output Power: 10 MHz Channel, 10 dBi and 24 dBi Antennas

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	4945.0	20.96	20.60	23.79	30.00	6.21
	4965.0	21.09	20.69	23.90	30.00	6.10
	4985.0	21.22	20.67	23.96	30.00	6.04
256-QAM	4945.0	21.00	20.57	23.80	30.00	6.20
	4965.0	21.05	20.72	23.90	30.00	6.10
	4985.0	20.23	20.65	23.46	30.00	6.54

Table 3: 4.9 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	4945.0	20.10	18.64	22.44	24.70	2.26
	4965.0	19.96	18.79	22.42	24.70	2.28
	4985.0	19.14	19.74	22.46	24.70	2.24
256-QAM	4945.0	20.14	18.65	22.47	24.70	2.23
	4965.0	19.92	18.82	22.42	24.70	2.28
	4985.0	19.08	19.75	22.44	24.70	2.26

Table 4: 4.9 GHz: Output Power: 20 MHz Channel, 10 dBi and 24 dBi Antennas

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	4950.0	21.38	21.18	24.29	33.00	8.71
	4965.0	21.37	21.16	24.28	33.00	8.72
	4980.0	21.49	21.25	24.38	33.00	8.62
256-QAM	4950.0	21.36	21.16	24.27	33.00	8.73
	4965.0	21.38	21.16	24.28	33.00	8.72
	4980.0	21.47	21.29	24.39	33.00	8.61

Table 5: 4.9 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	4950.0	21.38	21.18	24.29	27.70	3.41
	4965.0	21.37	21.16	24.28	27.70	3.42
	4980.0	21.49	21.25	24.38	27.70	3.32
256-QAM	4950.0	21.36	21.16	24.27	27.70	3.43
	4965.0	21.38	21.16	24.28	27.70	3.42
	4980.0	21.47	21.29	24.39	27.70	3.31

5150-5250 MHz: FCC 47 CFR Part 15 Subpart E, §15.407

Table 6: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5160.0	11.22	11.04	14.14	26.70	12.56
	5200.0	19.47	18.42	21.99	26.70	4.71
	5245.0	18.77	18.45	21.62	26.70	5.08
256-QAM	5165.0	12.11	11.59	14.87	26.70	11.83
	5200.0	19.50	18.45	22.02	26.70	4.68
	5245.0	18.83	18.48	21.67	26.70	5.03

Table 7: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5160.0	5.13	4.91	8.03	12.70	4.67
	5200.0	5.13	4.92	8.04	12.70	4.66
	5245.0	4.23	5.00	7.64	12.70	5.06
256-QAM	5160.0	4.92	4.92	7.93	12.70	4.77
	5200.0	5.14	4.95	8.06	12.70	4.64
	5245.0	4.28	5.00	7.67	12.70	5.03

Table 8: FCC 5.15-5.25 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5160.0	-3.11	-3.13	-0.11	4.70	4.81
	5200.0	-3.01	-3.55	-0.26	4.70	4.96
	5245.0	-3.90	-3.02	-0.43	4.70	5.13
256-QAM	5160.0	-3.22	-3.44	-0.32	4.70	5.02
	5200.0	-3.37	-3.48	-0.41	4.70	5.11
	5245.0	-3.89	-3.28	-0.56	4.70	5.26

Table 9: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	12.28	12.11	15.21	26.70	11.49
	5200.0	21.75	21.56	24.67	26.70	2.03
	5240.0	18.75	19.53	22.17	26.70	4.53
256-QAM	5175.0	12.47	13.22	15.87	26.70	10.83
	5200.0	21.80	21.56	24.69	26.70	2.01
	5240.0	18.66	19.48	22.10	26.70	4.60

Table 10: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	7.31	7.09	10.21	12.70	2.49
	5200.0	7.48	7.35	10.43	12.70	2.27
	5240.0	7.47	7.28	10.39	12.70	2.31
256-QAM	5170.0	7.31	7.11	10.22	12.70	2.48
	5200.0	7.45	7.34	10.41	12.70	2.29
	5240.0	7.47	7.30	10.40	12.70	2.30

Table 11: FCC 5.15-5.25 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	-0.82	-0.51	2.35	4.70	2.35
	5200.0	-0.95	-0.84	2.12	4.70	2.58
	5240.0	-0.89	-1.01	2.06	4.70	2.64
256-QAM	5170.0	-0.82	-0.30	2.46	4.70	2.24
	5200.0	-0.67	-0.90	2.23	4.70	2.47
	5240.0	-0.69	-0.94	2.20	4.70	2.50

Table 12: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	-3.08	-3.09	-0.07	26.70	26.77
	5200.0	22.01	21.97	25.00	26.70	1.70
	5230.0	18.71	17.45	21.14	26.70	5.56
256-QAM	5185.0	13.44	13.26	16.36	26.70	10.34
	5200.0	22.01	21.89	24.96	26.70	1.74
	5230.0	18.56	18.41	21.50	26.70	5.20

Table 13: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	9.04	8.93	12.00	12.70	0.70
	5200.0	9.02	8.91	11.98	12.70	0.72
	5230.0	8.95	8.84	11.91	12.70	0.79
256-QAM	5170.0	8.84	8.76	11.81	12.70	0.89
	5200.0	9.00	8.96	11.99	12.70	0.71
	5230.0	8.96	9.00	11.99	12.70	0.71

Table 14: FCC 5.15-5.25 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5170.0	0.80	0.85	3.84	4.70	0.86
	5200.0	0.78	0.73	3.77	4.70	0.93
	5230.0	0.68	0.63	3.67	4.70	1.03
256-QAM	5170.0	0.57	0.60	3.60	4.70	1.10
	5200.0	0.77	0.74	3.77	4.70	0.93
	5230.0	0.67	0.64	3.67	4.70	1.03

5250-5350 MHz Band FCC Part 15 Subpart E and RSS-247 Issue 2

Table 15: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	12.83	12.8	15.83	17.37	1.55
	5300	12.91	12.94	15.94	17.38	1.44
	5342.5	12.82	12.95	15.90	17.34	1.45
256-QAM	5255	12.88	12.76	15.83	17.32	1.49
	5300	12.89	12.96	15.94	17.33	1.40
	5342.5	12.81	12.99	15.91	17.38	1.47

Table 16: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	-0.51	-0.58	2.47	3.37	0.91
	5300	-0.47	-0.42	2.57	3.38	0.81
	5342.5	-0.49	-0.38	2.58	3.34	0.77
256-QAM	5255	-0.54	-0.56	2.46	3.32	0.86
	5300	-0.46	-0.42	2.57	3.33	0.76
	5342.5	-0.48	-0.36	2.59	3.38	0.79

Table 17: FCC 5.25-5.35 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	-8.51	-8.61	-5.55	-4.63	0.92
	5300	-8.48	-8.44	-5.45	-4.62	0.83
	5342.5	-8.49	-8.39	-5.43	-4.66	0.77
256-QAM	5255	-8.55	-8.57	-5.55	-4.68	0.87
	5300	-8.48	-8.46	-5.46	-4.67	0.79
	5342.5	-8.48	-8.37	-5.41	-4.62	0.79

Table 18: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	16.24	16.18	19.22	20.43	1.20
	5300	16.15	16.17	19.17	20.34	1.17
	5337.5	14.28	14.28	17.29	20.33	3.04
256-QAM	5260	16.12	16.04	19.09	20.38	1.29
	5300	16.18	16.18	19.19	20.34	1.15
	5337.5	14.30	14.25	17.29	20.33	3.05

Table 19: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	2.80	2.70	5.76	6.43	0.66
	5300	2.73	2.75	5.75	6.34	0.59
	5337.5	2.68	2.80	5.75	6.33	0.58
256-QAM	5260	2.67	2.65	5.67	6.38	0.71
	5300	2.72	2.76	5.75	6.34	0.59
	5337.5	2.70	2.80	5.76	6.33	0.57

Table 20: FCC 5.25-5.35 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	-5.42	-5.35	-2.37	-1.57	0.80
	5300	-5.30	-5.28	-2.28	-1.66	0.62
	5337.5	-5.33	-5.26	-2.28	-1.67	0.62
256-QAM	5260	-5.34	-5.39	-2.35	-1.62	0.73
	5300	-5.29	-5.28	-2.27	-1.66	0.62
	5337.5	-5.32	-5.25	-2.27	-1.67	0.61

Table 21: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	17.53	17.13	20.34	20.70	0.36
	5300	17.53	17.21	20.38	20.70	0.32
	5327.5	16.18	16.21	19.21	20.70	1.49
256-QAM	5270	17.52	17.12	20.33	20.70	0.37
	5300	17.55	17.22	20.40	20.70	0.30
	5327.5	16.20	16.23	19.23	20.70	1.47

Table 22: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	2.94	2.66	5.81	6.70	0.89
	5300	2.95	2.78	5.88	6.70	0.82
	5327.5	2.72	2.78	5.76	6.70	0.94
256-QAM	5270	2.93	2.67	5.81	6.70	0.89
	5300	2.96	2.76	5.87	6.70	0.83
	5327.5	2.73	2.80	5.78	6.70	0.92

Table 23: FCC 5.25-5.35 GHz: Output Power: 40 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	-5.07	-5.38	-2.21	-1.30	0.91
	5300	-5.02	-5.31	-2.15	-1.30	0.85
	5327.5	-5.31	-5.25	-2.27	-1.30	0.97
256-QAM	5270	-5.07	-5.38	-2.21	-1.30	0.91
	5300	-5.03	-5.28	-2.14	-1.30	0.84
	5327.5	-5.28	-5.26	-2.26	-1.30	0.96

Table 24: ISD 5.25-5.35 GHz: Output Power: 10 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	6.18	6.08	9.14	16.83	7.69
	5300	10.33	10.37	13.36	16.83	3.47
	5342.5	10.32	10.43	13.39	16.83	3.45
256-QAM	5255	6.15	6.07	9.12	16.83	7.71
	5300	10.35	10.38	13.38	16.83	3.46
	5342.5	10.33	10.41	13.38	16.84	3.46

Table 25: ISED 5.25-5.35 GHz: Output Power: 10 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	-7.92	-8.01	-4.95	2.83	7.78
	5300	-3.64	-3.85	-0.73	2.83	3.57
	5342.5	-3.89	-3.79	-0.83	2.83	3.66
256-QAM	5255	-7.92	-8.02	-4.96	2.83	7.79
	5300	-3.89	-3.82	-0.84	2.83	3.68
	5342.5	-3.83	-3.79	-0.80	2.84	3.64

Table 26: ISED 5.25-5.35 GHz: Output Power: 10 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5255	-14.92	-15.01	-11.95	-5.17	6.78
	5300	-8.48	-8.44	-5.45	-5.17	0.28
	5342.5	-8.49	-8.39	-5.43	-5.17	0.26
256-QAM	5255	-14.92	-14.99	-11.94	-5.17	6.78
	5300	-8.48	-8.46	-5.46	-5.17	0.29
	5342.5	-8.48	-8.37	-5.41	-5.16	0.25

Table 27: ISED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	6.48	6.32	9.41	19.84	10.43
	5300	10.63	10.65	13.65	19.84	6.19
	5337.5	10.63	10.45	13.55	19.84	6.29
256-QAM	5260	6.44	6.33	9.40	19.84	10.45
	5300	10.65	10.61	13.64	19.84	6.20
	5337.5	10.61	10.55	13.59	19.84	6.25

Table 28: ISED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	-7.63	-7.78	-4.69	5.84	10.54
	5300	-3.58	-3.64	-0.60	5.84	6.44
	5337.5	-3.59	-3.78	-0.67	5.84	6.51
256-QAM	5260	-7.64	-7.78	-4.70	5.84	10.54
	5300	-3.59	-3.59	-0.58	5.84	6.42
	5337.5	-3.61	-3.78	-0.68	5.84	6.53

Table 29: ISED 5.25-5.35 GHz: Output Power: 20 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5260	-14.62	-14.78	-11.69	-2.16	9.53
	5300	-5.30	-5.28	-2.28	-2.16	0.12
	5337.5	-5.33	-5.26	-2.28	-2.16	0.13
256-QAM	5260	-14.62	-14.77	-11.68	-2.16	9.53
	5300	-5.29	-5.28	-2.27	-2.16	0.12
	5337.5	-5.32	-5.25	-2.27	-2.16	0.12

Table 30: ISED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	6.50	6.40	9.46	20.70	11.24
	5300	10.69	10.64	13.68	20.70	7.02
	5327.5	10.62	10.65	13.65	20.70	7.05
256-QAM	5270	6.51	6.40	9.47	20.70	11.23
	5300	10.71	10.63	13.68	20.70	7.02
	5327.5	10.72	10.64	13.69	20.70	7.01

Table 31: ISED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	-7.59	-7.69	-4.63	6.70	11.33
	5300	-3.52	-3.59	-0.54	6.70	7.24
	5327.5	-3.53	-3.57	-0.54	6.70	7.24
256-QAM	5270	-7.58	-7.67	-4.61	6.70	11.31
	5300	-3.51	-3.62	-0.55	6.70	7.25
	5327.5	-3.53	-3.56	-0.53	6.70	7.23

Table 32: ISED 5.25-5.35 GHz: Output Power: 40 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5270	-14.58	-14.7	-11.63	-1.30	10.33
	5300	-5.02	-5.31	-2.15	-1.30	0.85
	5327.5	-5.31	-5.25	-2.27	-1.30	0.97
256-QAM	5270	-14.56	-14.68	-11.61	-1.30	10.31
	5300	-5.03	-5.28	-2.14	-1.30	0.84
	5327.5	-5.28	-5.26	-2.26	-1.30	0.96

5470-5725 MHz Band FCC Part 15 Subpart E and RSS-247 Issue 2

Table 33: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	5.92	5.81	8.88	17.33	8.46
	5570	13.99	13.54	16.78	17.36	0.58
	5720	7.18	6.73	9.97	17.34	7.37
256-QAM	5475	5.93	5.83	8.89	17.44	8.55
	5570	14.01	13.51	16.78	17.33	0.55
	5720	7.18	6.74	9.98	17.33	7.35

Table 34: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	-8.19	-8.29	-5.23	3.33	8.56
	5570	-0.38	-0.99	2.34	3.36	1.02
	5720	-6.84	-7.22	-4.02	3.34	7.36
256-QAM	5475	-8.18	-8.25	-5.20	3.44	8.65
	5570	-0.37	-0.98	2.35	3.33	0.98
	5720	-6.82	-7.29	-4.04	3.33	7.37

Table 35: FCC 5.47-5.725 GHz Output Power: 10 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	-16.09	-16.19	-13.13	-4.67	8.46
	5570	-8.41	-9.00	-5.68	-4.64	1.04
	5720	-14.81	-15.22	-12.00	-4.66	7.34
256-QAM	5475	-16.08	-16.19	-13.12	-4.56	8.56
	5570	-8.42	-9.01	-5.69	-4.67	1.02
	5720	-14.80	-15.26	-12.01	-4.67	7.34

Table 36: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	8.18	8.13	11.17	20.32	9.16
	5570	16.38	15.81	19.11	20.32	1.21
	5715	9.42	8.96	12.21	20.33	8.12
256-QAM	5480	8.14	8.12	11.14	20.34	9.2
	5570	16.37	15.79	19.1	20.34	1.24
	5715	9.45	8.95	12.22	20.35	8.14

Table 37: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	-4.98	-5.02	-1.99	6.32	8.31
	5570	2.79	2.31	5.57	6.32	0.76
	5715	-3.60	-4.26	-0.91	6.33	7.24
256-QAM	5480	-4.94	-5.02	-1.97	6.34	8.31
	5570	2.79	2.29	5.56	6.34	0.78
	5715	-3.62	-4.22	-0.90	6.35	7.25

Table 38: FCC 5.47-5.725 GHz Output Power: 20 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	-12.94	-13.02	-9.97	-1.68	8.29
	5570	-5.24	-5.70	-2.45	-1.68	0.78
	5715	-11.58	-12.21	-8.87	-1.67	7.20
256-QAM	5480	-12.92	-13.02	-9.96	-1.66	8.30
	5570	-5.24	-5.72	-2.46	-1.66	0.80
	5715	-11.59	-12.19	-8.87	-1.65	7.22

Table 39: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	10.45	10.28	13.38	20.70	7.32
	5570	17.58	16.99	20.31	20.70	0.39
	5705	11.61	11.13	14.39	20.70	6.31
256-QAM	5490	10.48	10.26	13.38	20.70	7.32
	5570	17.58	16.96	20.29	20.70	0.41
	5705	11.55	11.12	14.35	20.70	6.35

Table 40: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	-3.83	-4.03	-0.92	6.70	7.62
	5570	2.86	2.31	5.60	6.70	1.1
	5705	-2.69	-3.22	0.06	6.70	6.64
256-QAM	5490	-3.81	-4.01	-0.90	6.70	7.6
	5570	2.82	2.30	5.58	6.70	1.12
	5705	-2.68	-3.23	0.06	6.70	6.64

Table 41: FCC 5.47-5.725 GHz Output Power: 40 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	-11.88	-12.03	-8.94	-1.30	7.64
	5570	-5.19	-5.71	-2.43	-1.30	1.13
	5705	-10.68	-11.20	-7.92	-1.30	6.62
256-QAM	5490	-11.88	-12.01	-8.93	-1.30	7.63
	5570	-5.21	-5.70	-2.44	-1.30	1.14
	5705	-10.68	-11.19	-7.92	-1.30	6.62

Table 42: ISED 5.47-5.725 GHz Output Power: 10 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	5.92	5.81	8.88	16.83	7.96
	5570	13.99	13.54	16.78	16.83	0.05
	5720	7.18	6.73	9.97	16.83	6.86
256-QAM	5475	5.93	5.83	8.89	16.83	7.94
	5570	14.01	13.51	16.78	16.83	0.06
	5720	7.18	6.74	9.98	16.83	6.86

Table 43: ISED 5.47-5.725 GHz Output Power: 10 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	-8.19	-8.29	-5.23	2.83	8.06
	5570	-0.38	-0.99	2.34	2.83	0.5
	5720	-6.84	-7.22	-4.02	2.83	6.85
256-QAM	5475	-8.18	-8.25	-5.2	2.83	8.04
	5570	-0.37	-0.98	2.35	2.83	0.49
	5720	-6.82	-7.29	-4.04	2.83	6.87

Table 44: ISED 5.47-5.725 GHz Output Power: 10 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5475	-16.09	-16.19	-13.13	-5.17	7.96
	5570	-8.41	-9	-5.68	-5.17	0.52
	5720	-14.81	-15.22	-12	-5.17	6.83
256-QAM	5475	-16.08	-16.19	-13.12	-5.17	7.96
	5570	-8.42	-9.01	-5.69	-5.17	0.53
	5720	-14.8	-15.26	-12.01	-5.17	6.85

Table 45: ISED 5.47-5.725 GHz Output Power: 20 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	8.18	8.13	11.17	19.84	8.68
	5570	16.38	15.81	19.11	19.84	0.73
	5715	9.42	8.96	12.21	19.84	7.64
256-QAM	5480	8.14	8.12	11.14	19.84	8.7
	5570	16.37	15.79	19.1	19.84	0.74
	5715	9.45	8.95	12.22	19.84	7.63

Table 46: ISED 5.47-5.725 GHz Output Power: 20 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	-4.98	-5.02	-1.99	5.84	7.83
	5570	2.79	2.31	5.57	5.84	0.27
	5715	-3.6	-4.26	-0.91	5.84	6.75
256-QAM	5480	-4.94	-5.02	-1.97	5.84	7.81
	5570	2.79	2.29	5.56	5.84	0.29
	5715	-3.62	-4.22	-0.9	5.84	6.74

Table 47: ISED 5.47-5.725 GHz Output Power: 20 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5480	-12.94	-13.02	-9.97	-2.16	7.81
	5570	-5.24	-5.7	-2.45	-2.16	0.29
	5715	-11.58	-12.21	-8.87	-2.16	6.72
256-QAM	5480	-12.92	-13.02	-9.96	-2.16	7.8
	5570	-5.24	-5.72	-2.46	-2.16	0.31
	5715	-11.59	-12.19	-8.87	-2.16	6.71

Table 48: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	10.45	10.28	13.38	20.7	7.32
	5570	17.58	16.99	20.31	20.7	0.39
	5705	11.61	11.13	14.39	20.7	6.31
256-QAM	5490	10.48	10.26	13.38	20.7	7.32
	5570	17.58	16.96	20.29	20.7	0.41
	5705	11.55	11.12	14.35	20.7	6.35

Table 49: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	-3.83	-4.03	-0.92	6.7	7.62
	5570	2.86	2.31	5.6	6.7	1.1
	5705	-2.69	-3.22	0.06	6.7	6.64
256-QAM	5490	-3.81	-4.01	-0.9	6.7	7.6
	5570	2.82	2.3	5.58	6.7	1.12
	5705	-2.68	-3.23	0.06	6.7	6.64

Table 50: ISED 5.47-5.725 GHz Output Power: 40 MHz Channel, 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5490	-3.81	-4.01	-0.9	6.7	7.6
	5570	2.82	2.3	5.58	6.7	1.12
	5705	-2.68	-3.23	0.06	6.7	6.64
256-QAM	5490	-11.88	-12.01	-8.93	-1.3	7.63
	5570	-5.21	-5.7	-2.44	-1.3	1.14
	5705	-10.68	-11.19	-7.92	-1.3	6.62

5725-5850 MHz: FCC Part 15 Subpart E and RSS-247 Issue 1

Table 51: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	22.38	22.27	25.34	26.70	1.36
	5790.0	22.30	22.44	25.38	26.70	1.32
	5845.0	21.97	22.21	25.10	26.70	1.60
256-QAM	5730.0	22.27	22.24	25.27	26.70	1.43
	5790.0	22.37	22.40	25.40	26.70	1.30
	5845.0	22.07	22.26	25.18	26.70	1.52

Table 52: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	8.82	8.75	11.80	12.70	0.90
	5790.0	8.10	9.14	11.66	12.70	1.04
	5845.0	8.57	9.04	11.82	12.70	0.88
256-QAM	5730.0	9.09	8.83	11.97	12.70	0.73
	5790.0	8.06	9.21	11.68	12.70	1.02
	5845.0	8.71	9.01	11.87	12.70	0.83

Table 53: FCC 5.8 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	0.67	0.72	3.71	4.70	0.99
	5790.0	1.13	1.03	4.09	4.70	0.61
	5845.0	0.31	1.00	3.68	4.70	1.02
256-QAM	5730.0	0.82	0.61	3.73	4.70	0.97
	5790.0	1.08	1.00	4.05	4.70	0.65
	5845.0	0.25	1.04	3.67	4.70	1.03

Table 54: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	22.49	22.37	25.44	26.70	1.26
	5790.0	22.64	22.47	25.57	26.70	1.13
	5840.0	22.29	22.34	25.33	26.70	1.37
256-QAM	5735.0	22.63	22.34	25.50	26.70	1.20
	5790.0	22.57	22.50	25.55	26.70	1.15
	5840.0	22.26	22.36	25.32	26.70	1.38

Table 55: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	8.27	9.02	11.67	12.70	1.03
	5790.0	9.36	8.40	11.92	12.70	0.78
	5840.0	9.02	8.23	11.65	12.70	1.05
256-QAM	5735.0	8.10	9.03	11.60	12.70	1.10
	5790.0	9.25	8.41	11.86	12.70	0.84
	5840.0	8.91	9.06	12.00	12.70	0.70

Table 56: FCC 5.8 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	1.06	0.79	3.94	4.70	0.76
	5790.0	1.35	1.26	4.32	4.70	0.38
	5840.0	0.68	0.87	3.79	4.70	0.91
256-QAM	5735.0	0.93	0.79	3.87	4.70	0.83
	5790.0	1.40	1.23	4.33	4.70	0.37
	5840.0	0.64	0.91	3.79	4.70	0.91

Table 57: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	22.61	22.49	25.56	26.70	1.14
	5790.0	22.63	22.70	25.68	26.70	1.02
	5830.0	22.47	22.45	25.47	26.70	1.23
256-QAM	5745.0	22.70	22.50	25.61	26.70	1.09
	5790.0	22.64	22.74	25.70	26.70	1.00
	5830.0	22.44	22.49	25.48	26.70	1.22

Table 58: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	9.07	8.80	11.95	12.70	0.75
	5790.0	8.30	9.40	11.90	12.70	0.80
	5830.0	8.98	8.28	11.65	12.70	1.05
256-QAM	5745.0	9.15	8.77	11.97	12.70	0.73
	5790.0	8.24	9.36	11.85	12.70	0.85
	5830.0	9.00	8.06	11.57	12.70	1.13

Table 59: FCC 5.8 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	0.78	0.60	3.70	4.70	1.00
	5790.0	1.07	1.17	4.13	4.70	0.57
	5830.0	0.78	0.90	3.85	4.70	0.85
256-QAM	5745.0	0.83	0.57	3.71	4.70	0.99
	5790.0	1.11	1.20	4.17	4.70	0.53
	5830.0	0.75	0.91	3.84	4.70	0.86

Table 60: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	16.72	15.30	19.08	26.70	7.62
	5790.0	22.30	22.44	25.38	26.70	1.32
	5845.0	16.19	15.80	19.01	26.70	7.69
256-QAM	5730.0	16.73	15.29	19.08	26.70	7.62
	5790.0	22.37	22.40	25.40	26.70	1.30
	5845.0	16.14	15.81	18.99	26.70	7.71

Table 61: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	2.31	1.77	5.06	12.70	7.64
	5790.0	8.10	9.14	11.66	12.70	1.04
	5845.0	1.94	2.28	5.12	12.70	7.58
256-QAM	5730.0	2.29	1.76	5.04	12.70	7.66
	5790.0	8.06	9.21	11.68	12.70	1.02
	5845.0	1.91	2.27	5.10	12.70	7.60

Table 62: ISED 5.8 GHz: Output Power: 10 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	-6.15	-6.66	-3.39	4.70	8.09
	5790.0	1.13	1.03	4.09	4.70	0.61
	5845.0	-6.59	-6.04	-3.30	4.70	8.00
256-QAM	5730.0	-6.38	-6.63	-3.49	4.70	8.19
	5790.0	1.08	1.00	4.05	4.70	0.65
	5845.0	-6.57	-6.37	-3.46	4.70	8.16

Table 63: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	17.06	16.82	19.95	26.70	6.75
	5790.0	22.64	22.47	25.57	26.70	1.13
	5840.0	16.61	16.87	19.75	26.70	6.95
256-QAM	5735.0	17.02	16.75	19.90	26.70	6.80
	5790.0	22.57	22.50	25.55	26.70	1.15
	5840.0	16.66	16.89	19.79	26.70	6.91

Table 64: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	3.80	3.22	6.53	12.70	6.17
	5790.0	9.36	8.40	11.92	12.70	0.78
	5840.0	3.14	3.31	6.24	12.70	6.46
256-QAM	5735.0	3.78	3.18	6.50	12.70	6.20
	5790.0	9.25	8.41	11.86	12.70	0.84
	5840.0	3.11	3.30	6.22	12.70	6.48

Table 65: ISED 5.8 GHz: Output Power: 20 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	-5.01	-5.26	-2.12	4.70	6.82
	5790.0	1.35	1.26	4.32	4.70	0.38
	5840.0	-5.37	-4.80	-2.07	4.70	6.77
256-QAM	5735.0	-5.01	-5.17	-2.08	4.70	6.78
	5790.0	1.40	1.23	4.33	4.70	0.37
	5840.0	-5.32	-4.75	-2.02	4.70	6.72

Table 66: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	17.14	16.96	20.06	26.70	6.64
	5790.0	22.63	22.70	25.68	26.70	1.02
	5830.0	16.75	17.04	19.91	26.70	6.79
256-QAM	5745.0	17.13	16.97	20.06	26.70	6.64
	5790.0	22.64	22.74	25.70	26.70	1.00
	5830.0	16.80	17.07	19.95	26.70	6.75

Table 67: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	4.54	3.41	7.02	12.70	5.68
	5790.0	8.30	9.40	11.90	12.70	0.80
	5830.0	4.23	3.46	6.87	12.70	5.83
256-QAM	5745.0	4.48	3.41	6.99	12.70	5.71
	5790.0	8.24	9.36	11.85	12.70	0.85
	5830.0	4.24	3.44	6.87	12.70	5.83

Table 68: ISED 5.8 GHz: Output Power: 40 MHz Channel, PMP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	-3.66	-3.86	-0.75	4.70	5.45
	5790.0	1.07	1.17	4.13	4.70	0.57
	5830.0	-3.78	-3.59	-0.67	4.70	5.37
256-QAM	5745.0	-3.66	-3.77	-0.70	4.70	5.40
	5790.0	1.11	1.20	4.17	4.70	0.53
	5830.0	-3.76	-3.86	-0.80	4.70	5.50

Table 69: FCC 5.8 GHz: Output Power: 10 MHz Channel, PTP 10 & 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	22.38	22.27	25.34	30.00	4.66
	5790.0	22.30	22.44	25.38	30.00	4.62
	5845.0	21.97	22.21	25.10	30.00	4.90
256-QAM	5730.0	22.27	22.24	25.27	30.00	4.73
	5790.0	22.37	22.40	25.40	30.00	4.60
	5845.0	22.07	22.26	25.18	30.00	4.82

Table 70: FCC 5.8 GHz: Output Power: 10 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	19.53	19.44	22.50	30.00	7.50
	5790.0	21.60	21.57	24.60	30.00	5.40
	5845.0	18.34	18.48	21.42	30.00	8.58
256-QAM	5730.0	19.67	19.52	22.61	30.00	7.39
	5790.0	21.65	21.53	24.60	30.00	5.40
	5845.0	18.26	18.47	21.38	30.00	8.62

Table 71: FCC 5.8 GHz: Output Power: 20 MHz Channel, PTP 10 & 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	22.49	22.37	25.44	30.00	4.56
	5790.0	22.64	22.47	25.57	30.00	4.43
	5840.0	22.29	22.34	25.33	30.00	4.67
256-QAM	5735.0	22.63	22.34	25.50	30.00	4.50
	5790.0	22.57	22.50	25.55	30.00	4.45
	5840.0	22.26	22.36	25.32	30.00	4.68

Table 72: FCC 5.8 GHz: Output Power: 20 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	18.07	17.95	21.02	30.00	8.98
	5790.0	20.99	21.17	24.09	30.00	5.91
	5840.0	17.47	18.34	20.94	30.00	9.06
256-QAM	5735.0	18.11	19.92	22.12	30.00	7.88
	5790.0	20.91	21.26	24.10	30.00	5.90
	5840.0	17.74	18.32	21.05	30.00	8.95

Table 73: FCC 5.8 GHz: Output Power: 40 MHz Channel, PTP 10 & 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	22.61	22.49	25.56	30.00	4.44
	5790.0	22.63	22.70	25.68	30.00	4.32
	5830.0	22.47	22.45	25.47	30.00	4.53
256-QAM	5745.0	22.70	22.50	25.61	30.00	4.39
	5790.0	22.64	22.74	25.70	30.00	4.30
	5830.0	22.44	22.49	25.48	30.00	4.52

Table 74: FCC 5.8 GHz: Output Power: 40 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	15.95	15.81	18.89	30.00	11.11
	5790.0	21.90	21.84	24.88	30.00	5.12
	5830.0	15.79	16.01	18.91	30.00	11.09
256-QAM	5745.0	15.90	15.84	18.88	30.00	11.12
	5790.0	21.63	21.80	24.73	30.00	5.27
	5830.0	15.74	16.11	18.94	30.00	11.06

Table 75: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	16.72	15.30	19.08	30.00	10.92
	5790.0	22.30	22.44	25.38	30.00	4.62
	5845.0	16.19	15.80	19.01	30.00	10.99
256-QAM	5730.0	16.73	15.29	19.08	30.00	10.92
	5790.0	22.37	22.40	25.40	30.00	4.60
	5845.0	16.14	15.81	18.99	30.00	11.01

Table 76: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	2.31	1.77	5.06	30.00	24.94
	5790.0	22.30	22.44	25.38	30.00	4.62
	5845.0	1.94	2.28	5.12	30.00	24.88
256-QAM	5730.0	2.29	1.76	5.04	30.00	24.96
	5790.0	22.37	22.40	25.40	30.00	4.60
	5845.0	1.91	2.27	5.10	30.00	24.90

Table 77: ISED 5.8 GHz: Output Power: 10 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5730.0	-6.15	-6.66	-3.39	30.00	33.39
	5790.0	21.60	21.57	24.60	30.00	5.40
	5845.0	-6.59	-6.04	-3.30	30.00	33.30
256-QAM	5730.0	-6.38	-6.63	-3.49	30.00	33.49
	5790.0	21.65	21.53	24.60	30.00	5.40
	5845.0	-6.57	-6.37	-3.46	30.00	33.46

Table 78: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	17.06	16.82	19.95	30.00	10.05
	5790.0	22.64	22.47	25.57	30.00	4.43
	5840.0	16.61	16.87	19.75	30.00	10.25
256-QAM	5735.0	17.02	16.75	19.90	30.00	10.10
	5790.0	22.57	22.50	25.55	30.00	4.45
	5840.0	16.66	16.89	19.79	30.00	10.21

Table 79: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	3.80	3.22	6.53	30.00	23.47
	5790.0	22.64	22.47	25.57	30.00	4.43
	5840.0	3.14	3.31	6.24	30.00	23.76
256-QAM	5735.0	3.78	3.18	6.50	30.00	23.50
	5790.0	22.57	22.50	25.55	30.00	4.45
	5840.0	3.11	3.30	6.22	30.00	23.78

Table 80: ISED 5.8 GHz: Output Power: 20 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5735.0	-5.01	-5.26	-2.12	30.00	32.12
	5790.0	20.99	21.17	24.09	30.00	5.91
	5840.0	-5.37	-4.80	-2.07	30.00	32.07
256-QAM	5735.0	-5.01	-5.17	-2.08	30.00	32.08
	5790.0	20.91	21.26	24.10	30.00	5.90
	5840.0	-5.32	-4.75	-2.02	30.00	32.02

Table 81: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 10 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	17.14	16.96	20.06	30.00	9.94
	5790.0	22.63	22.70	25.68	30.00	4.32
	5830.0	16.75	17.04	19.91	30.00	10.09
256-QAM	5745.0	17.13	16.97	20.06	30.00	9.94
	5790.0	22.64	22.74	25.70	30.00	4.30
	5830.0	16.80	17.07	19.95	30.00	10.05

Table 82: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 24 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	4.54	3.41	7.02	30.00	22.98
	5790.0	22.63	22.70	25.68	30.00	4.32
	5830.0	4.23	3.46	6.87	30.00	23.13
256-QAM	5745.0	4.48	3.41	6.99	30.00	23.01
	5790.0	22.64	22.74	25.70	30.00	4.30
	5830.0	4.24	3.44	6.87	30.00	23.13

Table 83: ISED 5.8 GHz: Output Power: 40 MHz Channel, PTP 32 dBi Antenna

Modulation	Frequency, MHz	Power at RF-1 (dBm)	Power at RF-2 (dBm)	Combined output power (dBm)	Output power limit (dBm)	Output Power Margin (dB)
BPSK	5745.0	-3.66	-3.86	-0.75	30.00	30.75
	5790.0	21.90	21.84	24.88	30.00	5.12
	5830.0	-3.78	-3.59	-0.67	30.00	30.67
256-QAM	5745.0	-3.66	-3.77	-0.70	30.00	30.70
	5790.0	21.63	21.80	24.73	30.00	5.27
	5830.0	-3.76	-3.86	-0.80	30.00	30.80

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 84: FCC: RDL-3100-RMA Recommended Safe Distances

Frequency (MHz)	Deployment	Separation Distance
4900	PMP/PTP	220 cm (86.6") or more
5200	PMP	20 cm (7.8") or more
5300	PMP/PTP	20 cm (7.8") or more
5400	PMP/PTP	20 cm (7.8") or more
5800	PMP	20 cm (7.8") or more
5800	PTP	220 cm (86.6") 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.

5.1.2 ISED Notices

Deployment in Canada

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

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 -- ISED RF Exposure Warnings

To satisfy ISED 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 85: ISED: RDL-3100-RMA Recommended Safe Distances

Frequency (MHz)	Deployment	Separation Distance
4900	PMP/PTP	220 cm (86.6") or more
5300	PMP/PTP	20 cm (7.8") or more
5400	PMP/PTP	20 cm (7.8") or more
5800	PMP	20 cm (7.8") or more
5800	PTP	220 cm (86.6") 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 RDL-3100-RMA has been designed to operate with an antenna having a maximum gain of 32 dBi. Antenna having a higher gain is strictly prohibited per regulations of ISED. 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.

This device complies with ISED 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 numérique de la classe B est conforme à la norme NMB-003 du Canada.

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 - ISED avertissements d'exposition RF

Pour satisfaire les exigences d'ISED 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 86: ISED: RDL-3100-RMA distances de sécurité recommandées

Frequency (MHz)	Deployment	Separation Distance
4900	PMP/PTP	220 cm (86.6") ou plus
5300	PMP/PTP	20 cm (7.8") ou plus
5400	PMP/PTP	20 cm (7.8") ou plus
5800	PMP	20 cm (7.8") ou plus
5800	PTP	220 cm (86.6") ou plus

maximal de 32 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.

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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