



Building Intelligent Supply Chains

433 MHz Radio Module User Guide

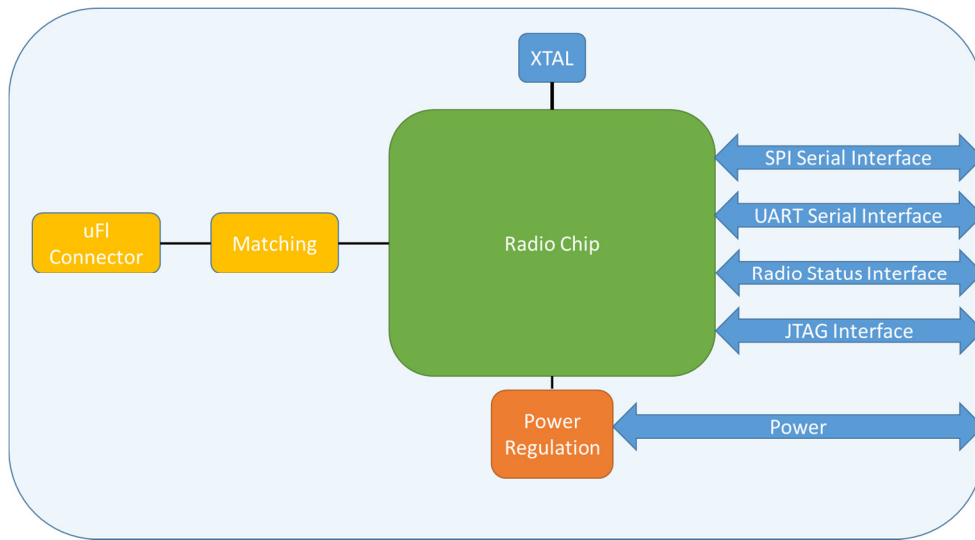
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1. INTRODUCTION

The RM433V2 radio module is a compact easy to use module to add Omni-ID proprietary RF functionality to any device. The module is targeted at development partners who need to add RF functionality to a device that will be used as part of an Omni-ID Proview system. The RM433V2 removes the need for expensive and lengthy development of custom RF board designs requiring expensive agency certifications.

MODULE BLOCK DIAGRAM



REGULATORY APPROVALS

The RM433V2 has been tested against the requirements of the following European standards.

- Radio EN 300 328 v1.7.1.
- EMC, EN 301 489-17 v2.1.1
- Basic Safety Assessment (BSA) EN 60950-1:2006

Additionally, the module has received FCC “Modular Approval”, in compliance with CFR 47 FCC part 15 regulations and in accordance to FCC Public notice DA00-1407. Appendix XX contains details on the conditions applying to this modular approval. The module is approved for use with a range of different antennas; further details of which can be found in section Appendix YY. The modular approval notice and test reports are available on request. The RM433V2 module is also compliant with Industry Canada RSS210 (Issue 8, Annex 8) and have Industry Canada modular approval.

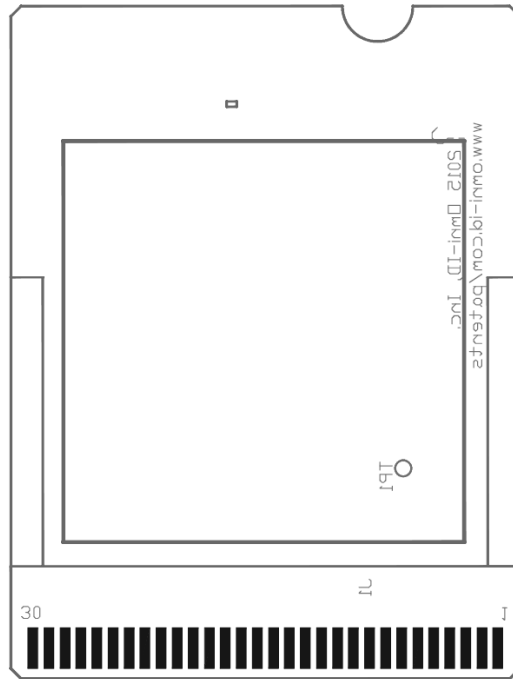
2. SPECIFICATIONS

RM433V2 SPECIFICATIONS

Typical DC Characteristics		Notes
Radio Transmit Current	20 mA	
Radio Receive Current	20 mA	
Center Frequency Accuracy	+/- 10ppm over temperature	Additional +/- 3 ppm ageing
Typical RF Characteristics		Notes
Rx Sensitivity	-100 dBm	Nominal for .1% BER
Tx Power	+5dBm	433.164 – 434.784 MHz
Max. Input Signal	10 dBm	
RSSI Range	-100 to -10 dBm	
RF Port Impedance	50 ohms	433.164 – 434.784 MHz
Rx Spurious Emissions	TBD	Conducted into 50ohms
Tx Spurious Emissions	TBD	Conducted into 50ohms
VSWR (max)	2:1	433.164 – 434.784 MHz
Mechanical Characteristics		Notes
Dimensions (mm)	41.91 x 31.75	
Dimensions (in)	1.65 x 1.25	

3. PIN CONFIGURATIONS

PIN ASSIGNMENTS



PIN DESCRIPTIONS

Pin No	Pin Function	Signal Type	Description
1	GND	0V	Digital Ground
2	RFGDO1	CMOS	RF Test Pin
3	RFDGO0	CMOS	RF Test Pin
4	RFGDO2	CMOS	RF Test Pin
5	RM MISO	CMOS	SPI Master In Slave Out
6	RM MOSI	CMOS	SPI Slave Master Out Slave In Input
7	RM SCLK	CMOS	SPI Master Clock Output
8	GND	0V	Digital Ground
9	RXD	CMOS	UART RX
10	TXD	CMOS	UART TX
11	RM_CS	CMOS	SPI Module Select line
12	GND	0V	Digital Ground
13	TX_IN_PROGRESS	CMOS	Radio transmitting a packet
14	CONFIG_MOD	CMOS	Enable Module Configuration mode
15	MSG_PENDING	CMOS	Receive Message Pending
16	RX_IN_PROGRESS	CMOS	Radio receiving a packet
17	GND	0V	Digital Ground
18	RST	CMOS	Reset Input
19	TEST	CMOS	JTAG Test Input
20	TCK	CMOS	JTAG CLK Input
21	TMS	CMOS	JTAG Mode Select Input
22	TDI	CMOS	JTAG Data Input
23	TDO	CMOS	JTAG Data Output
24	GND	0V	Digital Ground
25	PWR_OFF	CMOS	Module Power Enable Input
26	VIN	3.4V-5.0V	Supply Voltage
27	VIN	3.4V-5.0V	Supply Voltage
28	GND	0V	Digital Ground
29	GND	0V	Digital Ground
30	GND	0V	Digital Ground

4. ELECTRICAL CHARACTERISTICS

MAXIMUM RATINGS

Exceeding these conditions will result in damage to the device.

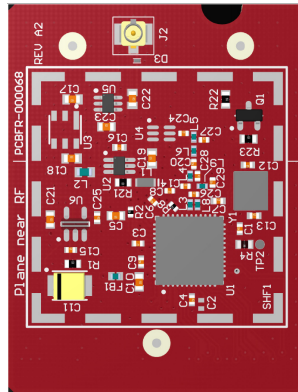
Parameter	Min	Max
Device Supply Voltage	-0.3V	5.0V
All Pins	-0.3V	3.3V
Storage Temperature	-40°C	85°C

OPERATING CONDITIONS

Supply	Min	Max
VIN	3.4V	5.0V
Ambient Temperature Range	-40°C	85°C

5. APPENDIX A ADDITIONAL INFORMATION

MODULE DRAWING



FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

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

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

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

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

ANTENNAS APPROVED BY FCC FOR USE WITH RM433V2 MODULE

	Brand	Model Number	Description	Gain (dBi)
1	COMTELCO	BS450S-B	Vertical Base Station Antenna	4.65
2	COMTELCO	Y2243-B	YAGI ANTENNA	9.15
3	Antenna Factor	ANT-433-CW-RH	Helical Whip Antenna	-5.6
4	Antenna Factor	ANT-433-MHW-SMA	Dipole Antenna	1.2
5	Omni-ID, Inc.	CP10636	Horizontal Polarized Dipole Antenna	2.15

FCC END PRODUCT LABELLING

The final 'end product' should be labelled in a visible area with the following: "Contains TX FCC ID: N74-RM433V2"

INDUSTRY CANADA STATEMENT

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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (e.i.r.p.) is not more than that permitted for successful communication.

INDUSTRY CANADA END PRODUCT LABELLING

For end devices that will be sold or used in Canada the following text should appear on the product label.

“Contains Industry Canada ID IC: 10336A-RM433V2”

EUROPEAN R&TTE DIRECTIVE 1999/5/EC STATEMENT

The RM433V2 module listed in this datasheet is compliant with ETSI EN 300 328 V1.7.1 (2006-10), EMC, EN 301 489-17 v2.1.1 (2009-02) and the Basic Safety Assessment (BSA) EN 60950-1:2006 (2006-06) and is subject to a Notified Body Opinion. The modules are approved for use with the antennas listed in the following table.

	Brand	Model Number	Description	Gain (dBi)
1	COMTELCO	BS450S-B	Vertical Base Station Antenna	4.65
2	COMTELCO	Y2243-B	YAGI ANTENNA	9.15
3	Antenna Factor	ANT-433-CW-RH	Helical Whip Antenna	-5.6
4	Antenna Factor	ANT-433-MHW-SMA	Dipole Antenna	1.2
5	Omni-ID, Inc.	CP10636	Horizontal Polarized Dipole Antenna	2.15

ROHS COMPLIANCE

The RM433V2 module meets the requirements of Directive 2002/95/EC of the European Parliament and of the Council on the Restriction of Hazardous Substance (RoHS).

DISCLAIMERS

The contents of this document are subject to change without notice. OMNI-ID, inc. reserves the right to make changes, without notice, in the products, including circuits and/or software, described or contained therein. Information contained in this document regarding device applications and the like is intended through suggestion only and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

CUSTOMER SUPPORT

Information about Omni-ID's complete line of RFID products can be found on our website: www.omni-id.com.

Additional support is available by phone: **+1 (585) 713-1000** or email: support@omni-id.com.