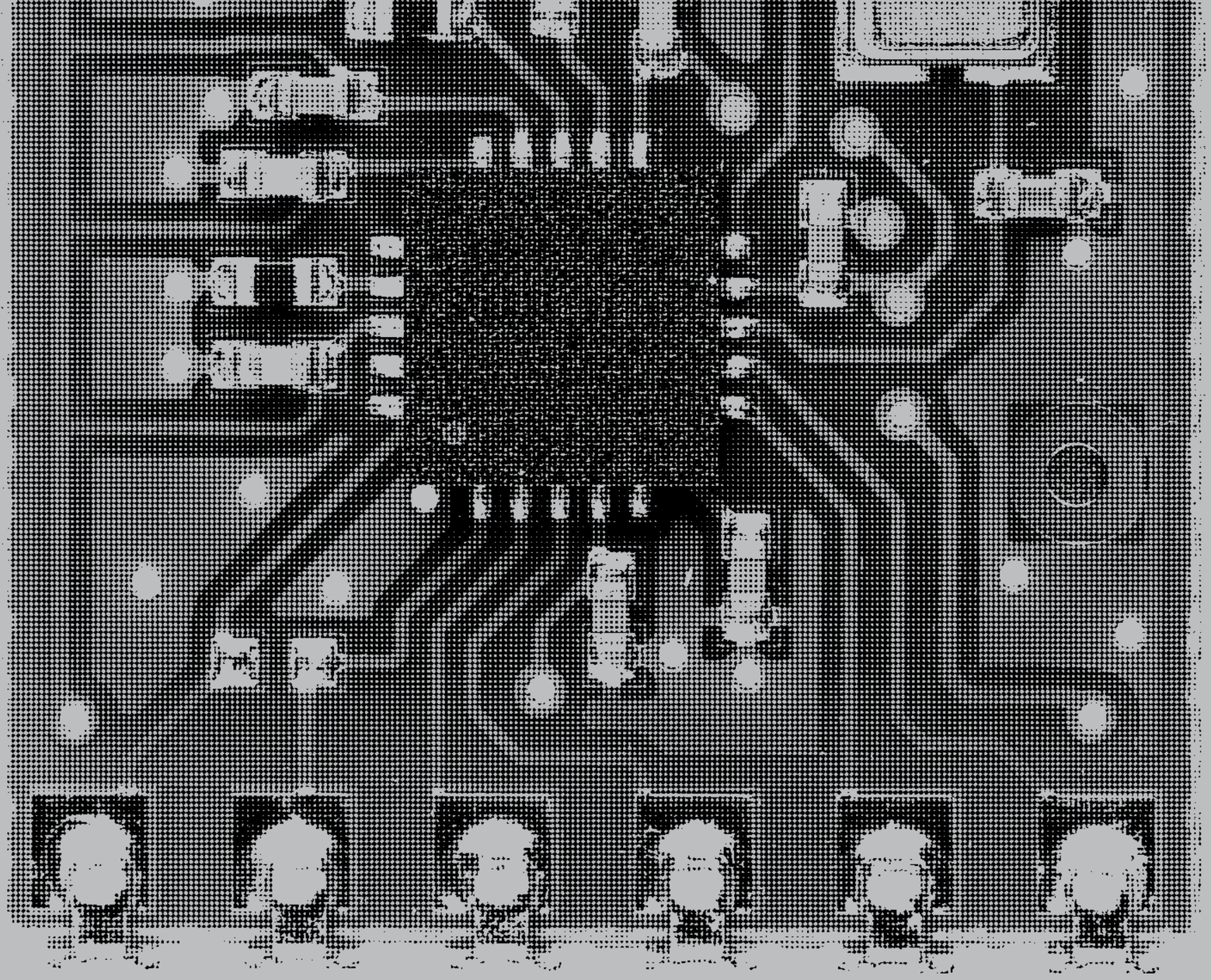
MIPOT

HI-TECH COMPANY



MIPOT

HI-TECH COMPANY



MIPOT DESIGNS, MANUFACTURES AND SELLS **RF MODULES IN THE ISM BANDS** FOR DIFFERENT MARKET SEGMENTS FROM THE INDUSTRY TO THE CONSUMER.

Mipot offers a full range of **RF modules developed in accordance with the technical regulations and laws applicable in different markets**. During the development of the module we solve all the technical issues related to the radio frequency. The quality of our products, along with the detailed documentation and very qualified and accessible technical support, enables a fast introduction of your products in the market.

Mipot offers the **newest wireless technology solutions** for Internet of Things (**IoT**), Machine to Machine (**M2M**) and other Low Power Wide Area Network applications (**LPWA**).

Mipot headquarters are located in Cormons (Gorizia), in the North-East of Italy**. Mipot** has been **active in the electronics industry since 1973**. This has made us a reliable supplier over the years. **Mipot** also serves the market by offering **high-quality EMS and ODM services** and is a one stop shop for all customers, offering not only product development but also mass production and all the services related to it, from the material procurement to the personalized logistics.

CUSTOMER ORIENTED. COMPETENCE. QUALITY.



RF WIRELESS MODULES

Mipot offers a wide portfolio of **transmitter, receiver and transceiver RF modules** suitable for all **short and long range applications** that meet the technical regulations and laws applicable in **different regions and market segments:** Home Automation, Alarm System, Industrial, Smart Metering, Thermoregulation, Lighting, Ambient assisted living, Renewable Energies.

Since the mid '80s **Mipot** has sold more than **30 million** of RF modules.

Mipot's RF modules are appreciated all over the world because they offer:

- easy access to latest technologies
- smooth integration
- inter-changeability to adapt your product for different frequencies and protocols
- cost competitive solutions

PRODUCT SELECTION

	RECEIVERS																TRANSMITTERS										TRANSCEIVERS									
	32001231	32001117 / 32001117V3	32001252	32001285 / 32001285V3	32001159 / 32001159V3	32001309B / 32001309M	32001309 / 32001309F	32001162 / 32001162A	32000887	32001204	32001367B	32001368F	32001207MIP	32001034HCS	33000145MIP	33000148MIP	32001387 / 32001387V3	32001387F / 3001387FV3	32001151 / 32001151V3	32001012 / 32001012V3	32001233	32001371	32001372	32001369A	32001369	32001320	32000985 / 32000985A	32001269	32001270	32001398	32001399	32001271	32001324	32001345	32001353	32001409
GATE CONTROL		●	●			●	●				●	●	●	●	●	●		●				●	●	●	●	●		●	●	●	●					
INDUSTRIAL						●		●			●	●					●		●	●		●	●					●	●	●	●	●	●	●	●	●
ALARM SYSTEM		●		●	●	●	●				●	●					●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●	●
AUTOMATIC METER READING																																	●	●	●	●
THERMOREGULATION		●		●	●		●	●					●	●			●	●	●	●		●	●				●	●	●	●	●	●	●	●	●	●
WINDOW BLINDS		●	●	●	●	●	●	●					●	●	●	●	●	●	●	●		●	●	●	●	●										
LIGHTING		●	●	●		●	●		●				●	●	●	●			●	●		●	●	●	●	●		●	●	●	●	●		●	●	●
WHITE GOODS			●										●	●					●			●	●				●	●	●	●	●	●				
RENEWABLE ENERGIES																																	●	●	●	●
SMART WASTE																																		●	●	●
AMBIENT ASSISTED LIVING										●	●										●													●	●	●

RECEIVERS	PRODUCT CODE	FREQUENCY (MHz)	MODULATION	TYPE		SUPPLY VOLTAGE (V)	CURRENT CONSUMPTION (mA)	SENSITIVITY (dBm)	RF BANDWIDTH (KHz)	BAUD RATE Baud (Max)	START-UP (ms)	FORM FACTOR	DIMENSIONS H X L X D (mm)
ASK SUPER REGENERATIVE RECEIVER	32001231	433,92	ASK	Super Regenerative		5	2,9	-104	4000	2400	2500	THT	14x37x5
CASCODE PLUS RECEIVER	32001117 32001117V3	433,92	ASK	Super Regenerative		5 3	2,8 1,7	-105 -100	2000	4800	1500	THT	16x37x5
CASCODE NARROW BAND FRONT-END FILTER RECEIVER	32001252	433,92	ASK	Super Regenerative		5	2,1	-102	600	2400	3500	THT	16x37x5
ULTRA LOW CONSUMPTION RECEIVER	32001285 32001285V3	433,92	ASK	Super Regenerative		5 3	0,09	-95	2500	2400	1250	THT	16x37x3,5
	32001159 32001159V3	868,30	ASK	Super Regenerative		5 3	0,19	-93 -91	4000	2400	1100 900	THT	16X37X3,5
HIGH PERFORMANCE SUPER HETERODYNE ANTIGLITCH RECEIVER	32001309B 32001309M	433,92 868,30	ASK	Super Heterodyne		3 - 5	7,5	-116 -110	300 260	4800	6	THT	13,5x34,5x3
HIGH PERFORMANCE SUPER HETERODYNE ANTIGLITCH + FRONT END RECEIVER	32001309 32001309F	433,92 868,30	ASK	Super Heterodyne		3 - 5	8,5 8,0	-111 -107	300 260	4800	6	THT	13,5x34,5x3
SUPER HETERODYNE FSK RECEIVER	32001162 32001162A	433,92 868,30	FSK	Super Heterodyne		5	5,5	-103 -101	200	9600	150	THT	13,5x34,5x3
SOCIAL ALARMS CLASS 1 RECEIVER	32000887	869,2125	FSK	Super Heterodyne		3,3 - 5,5	25	-107	12,5	2400	80	THT	22x49,5x13
SOCIAL ALARMS CATEGORY 1 RECEIVER	32001204	869,2125	FSK	Super Heterodyne		3 - 5	17	-109	16	2400	35	THT	16x37x5
SMD HIGH PERFORMANCE SUPER HETERODYNE RECEIVER	32001367B	433,92	ASK	Super Heterodyne		3 - 5	7.5	-116	300	4800	6	SMD	15,5x26x3
SMD HIGH PERFORMANCE SUPER HETERODYNE + FRONT END RECEIVER	32001368F	868,30	FSK	Super Heterodyne		3 - 5	8.4	-102	280	19200	16	SMD	15,5x26x3
2 CHANNELS RECEIVER MODULE	32001207MIP	433,92	ASK	Super Heterodyne		5	11	-110	200	N.A.	N.A.	THT	20.5X34,5X4
2 CHANNELS RECEIVER	32001034HCS	433,92	ASK	Super Heterodyne		12 - 24	36 max	-105	200	N.A.	N.A.	THT	40,5x36,5x16
2 CHANNELS WIRELESS CONTROL SWITCH	33000145MIP	433,92	ASK	Super Heterodyne		230 AC	1.4 W max	-105	200	N.A.	N.A.	THT	21x42x36
16 AMPERE WIRELESS CONTROL SWITCH	33000148MIP	433,92	ASK	Super Heterodyne		230 AC	1.5 W max	-105	200	N.A.	N.A.	THT	21x42x36

MIPOT, RF WIRELESS MODULES

TRANSMITTERS	PRODUCT CODE	FREQUENCY (MHz)	MODULATION	SUPPLY VOLTAGE (V)		CURRENT CONSUMPTION (mA)	OUTPUT POWER (dBm)	BAUD RATE Baud (Max)	FREQ. ACCURACY (kHz)	START-UP (ms)	FORM FACTOR	DIMENSIONS H X L X D (mm)
OOK SAW TRANSMITTER	32001387 32001387V3	433,92	OOK	5 3		6 8,5	10	9600	±100	-	THT	13,8x39,5x3
	32001387F 3001387FV3	868,30	OOK	5 3		14 18	14	9600	±150	-	THT	13,8x39,5x3
OOK SAW COMPACT TRANSMITTER	32001151 32001151V3	433,92	OOK	5 3		5,5 7,5	10	9600	±100	-	THT	12,5x26x3
	32001012 32001012V3	868,30	OOK	5 3		22,5 15	10 9	9600	±150	-	THT	12,5x26x3
SOCIAL ALARMS GFSK NARROW BAND TRANSMITTER	32001233	869,2125	GFSK	3		28	+11	2400	±2,5	27	THT	13,7x38,2x3
SMD OOK PLL TRANSMITTER	32001371	433,92	OOK	3		9	+10	9600	±20	1.2	SMD	9x17x2
SMD FSK PLL TRANSMITTER	32001372	868,30	FSK	3		16	+10	38.4K	±30	1.3	SMD	9x17x2

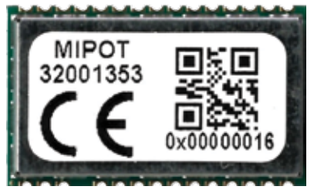
TRANSCEIVERS	PRODUCT CODE	FREQUENCY (MHz)	MODULATION	CHANNELS		SUPPLY VOLTAGE (V)	CURRENT CONSUMPTION TX (mA)	CURRENT CONSUMPTION RX (mA)	OUTPUT POWER (dBm)	SENSITIVITY (dBm)	BAUD RATE Baud (Max)	FORM FACTOR	DIMENSIONS H X L X D (mm)
FSK PROGRAMMABLE TRANSCEIVER	32000985 32000985A	434 868	FSK	up to 15 up to 12		3	30 35	18	+10	-108 -107	500k	THT	15,6x21,5x4,2
DUAL MODE TRANSPARENT TRANSCEIVER	32001269	434	OOK	2		3	18	14	+10	-110	4800	THT	12,5x25,6x3
	32001270	868	FSK	2		3	25	15	+11	-104	4800	THT	12,5x25,6x3
SMD DUAL MODE TRANSPARENT TRANSCEIVER	32001398	434	OOK	2		3	18	14	+10	-110	4800	SMD	15.5x26x3.2
	32001399	868	FSK	2		3	25	15	+11	-104	4800	SMD	15.5x26x3.2
2,4 GHz DUAL MODE TRANSPARENT TRANSCEIVER	32001271	2400	DSSS	2		3	16	14	+4	-104	250K	THT	18,5x25,6x3
WIRELESS M-BUS TRANSCEIVER	32001324	868	2FSK - GFSK	1		3	37	25	+13	-112	N.A.	SMD	15.5x26x3.2
LoRa™ MIPOT NETWORK TRANSCEIVER	32001345	868	LoRa™	1		3	65	14	+14	-124	N.A.	SMD	15.5x26x3.2
LoRaWAN™ TRANSCEIVER	32001353	868	LoRa™	up to 16		3	70	15	+14	-137	N.A.	SMD	15.5x26x3.2
	32001409	915	LoRa™	up to 72		3	125	14	+18	-137	N.A.	SMD	15.5x26x3.2

LoRaWAN™ compliant transceiver

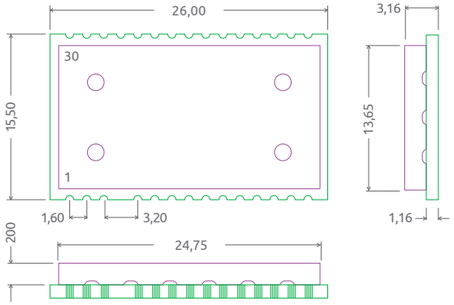
The **Mipot** LoRaWAN™ transceivers integrate the **LoRaWAN™ protocol** operating in the **868MHz or 915MHz SRD Bands.** They are optimized for **long range, low consumption applications**, suitable for **Low Power Wide Area Networks** (LPWA). Based on LoRa™ RF Technology and LoRaWAN™ protocol they provide ultra-long range spread spectrum communication and high interference immunity. The transceivers are dedicated for battery operated devices and allow a low-cost secure two-way communication for the Internet of Things.

MAIN CHARACTERISTICS:

- 868MHz (**Mipot PN 32001353**) or 915MHz (**Mipot PN 32001409**)
- **Embedded LoRaWAN™ stack**
- Small form factor (only 15.5x26 mm)
- **Industrial temperature range -40/+85°C**
- Communication and module parameters configuration handled via UART interface
- Certified according to **RED 2014/53/EU** (PN 32001353) or **FCC Part 15** (PN 32001409)
- Compliant with the REACH and RoHS directives
- **LoRa Alliance Certified™**



The LoRaWAN™ transceivers access LoRaWAN™ networks and are suitable for all applications where a long range capability is needed. The modules can be used for a large number of Internet of Things (IoT) and Machine to Machine (M2M) applications, security systems, alarms, sensor networks, metering, smart buildings, smart waste, agriculture, supply chain, street lighting, fleet tracking, GPS tracking.



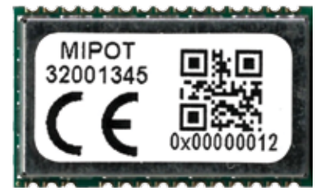
TECHNICAL CHARACTERISTICS			32001353	32001409	
	PARAMETER		TYP.	TYP.	UNIT
	Supply Voltage (Vcc)		3.3	3.3	Volt
	Current consumption	Tx mode	70	125	mA
		Rx mode	15	14	mA
		Sleep	1.3	1.3	mA
	Operating frequency		868	915	MHz
	Sensitivity		-137	-137	dBm
	Output Power (on 50 Ohm load)		+14	+18	dBm
	Modulation		LoRa™	LoRa™	
	UART Interface Datarate		115.2	115.2	kbps
	Operating Temperature		-40 / +85	-40 / +85	°C

LoRa™ MIPOT NETWORK transceiver

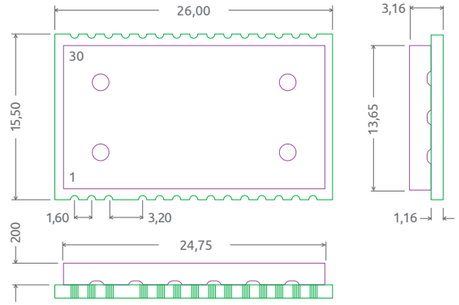
The LoRa™ **MIPOT** NETWORK transceiver is a **LoRa™ Technology-based** transceiver operating in the **868MHz SRD Band**. It's optimized for **long range, low consumption applications**, suitable for low power networks. In addition to its unparalleled range, spread spectrum modulation also allows great immunity to interferers.

MAIN CHARACTERISTICS:

- 868MHz (**Mipot PN 32001345**)
- **Embedded proprietary stack** implementing physical, MAC and network layers
- Small form factor (only 15.5x26 mm)
- **Industrial temperature range -40/+85°C**
- Distance covered in open air: **15 km line-of-sight**
- Network configurations: **Star Network**, 255 end nodes
- Communication and module parameters configuration handled via UART interface
- Certified according to **RED 2014/53/EU** and compliant with the REACH and RoHS directives.



The LoRa™ MIPOT NETWORK transceiver allows easy setup of private Low Power Wide Area Networks (LPWA) and is suitable for all applications where a long range capability is needed. The modules can be used for a large number of Internet of Things (IoT) and Machine to Machine (M2M) applications, security systems, alarms, sensor networks, metering, smart buildings, smart waste, agriculture, supply chain, street lighting, fleet tracking, GPS tracking.



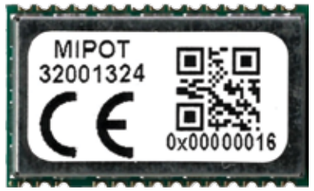
TECHNICAL CHARACTERISTICS	PARAMETER		TYP.	UNIT
	Supply Voltage (Vcc)		3.3	Volt
	Current consumption	Tx mode	65	mA
		Rx mode	14	mA
		Sleep	1.3	µA
	Operating frequency range		868	MHz
	Sensitivity		-124	dBm
	Output Power (on 50 Ohm load)		+14	dBm
	Modulation		LoRa™	
	UART Interface Datarate		115.2	kbps
	Operating Temperature		-40 / +85	°C

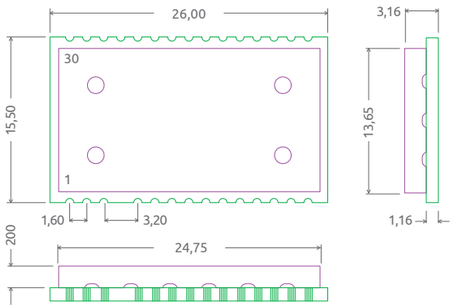
Wireless **M-BUS** transceiver

The **Mipot Wireless M-Bus** transceiver operates in the **868MHz SRD Band**. Thanks to its **small LCC form factor** and **low power consumption** this module allows the **implementation of highly integrated low power** (battery operated) **solutions for water, gas, heat or electricity metering applications**, both on meter or concentrator devices.

MAIN CHARACTERISTICS:

- 868MHz (**Mipot PN 32001324**)
- **Embedded stack implemented** according to **EN13757-4 Standard** provides the physical access to the Wireless M-Bus communication.
- Small form factor (only 15.5x26 mm)
- **Industrial temperature range -40/+85°C**
- **Various operating modes (S, T, R, C)** to meet the requirements of one-way and two-way data communication in stationary and mobile systems.
- SPI and UART allow integration flexibility and easy development of customer products.
- Certified according to **RED 2014/53/EU** and compliant with the REACH and RoHS directives.





The **Wireless M-Bus transceiver** is suitable for water, gas, heat and electricity metering applications.

TECHNICAL CHARACTERISTICS	PARAMETER		TYP.	UNIT
	Supply Voltage (Vcc)		3.3	Volt
	Current consumption	Tx mode	37	mA
		Rx mode	25	mA
		Sleep UART	1.6	µA
		Sleep SPI	90	µA
	Operating frequency range		868	MHz
	Operating modes sensitivity		S: -105	dBm
			T: -103	
			R: -112	
			C: -103	
	Output Power (on 50 Ohm load)		+13	dBm
	UART Interface Datarate		115.2	kbps
	SPI Interface Datarate		1	MHz
	Operating Temperature		-40 / +85	°C

EVALUATION KIT

All features of the **Wireless M-Bus** and **LoRa™** modules can be tested with our **dedicated Evaluation Kit**. The board provides easy access to module pin out, power supply pins and SMA antenna connector; usage flexibility is given by several power supply modes.

To reduce the time to market and ease the user application SW development, the Evaluation Kit comes with a **built in microcontroller**. Access pins on the board allow SW development to be managed by an external microcontroller and custom SW development environment.

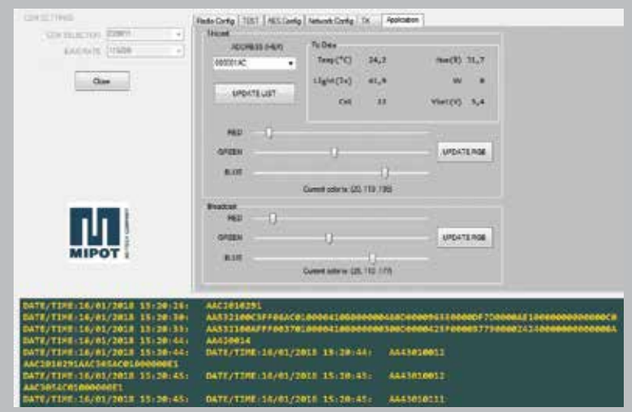


AVAILABLE EVALUATION KITS:

33000159 for the LoRaWAN™ 32001353 transceiver

33000158 for the LoRa™ Mipot Network 32001345 transceiver

33000151 for the Wireless M-Bus 32001324 transceiver



WIRELESS AUTOMATION PLATFORM (**WAP**)



Mipot Wireless Automation Platform (WAP) is a **WiFi-SRD based system**. It allows an **easy connection between SRD devices and sensors and the Internet**.

Mipot WAP is designed for **home, business and industrial applications**. It creates a bridge between all Security & Home Automation applications based on SRD systems and Internet. It also integrates and controls several applications such as access control, temperature and thermoregulation, lighting, energy management, window blinds and alarm systems through a Smartphone, Tablet and PC.

Mipot WAP system **can be installed in new or existing buildings** and **controlled by your personal devices**.

"Mipot WAP, the simple step to the Internet of Things".

MAIN FEATURES

- Web Interface, OS independent
- Open Source Linux Base system
- Dedicated Mipot low level driver modules built in
- Virtually unlimited controllable devices

AVAILABLE COMPONENTS OF THE WIRELESS AUTOMATION PLATFORM (**WAP**)

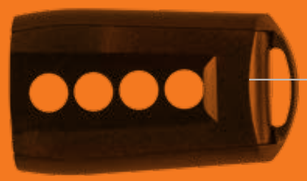


RX Module 33000145MIP

- Extremely compact receiver module with two output channels (2 x 5A relay)
- powered directly from the 110/230 V, 50/60 Hz mains
- OOK / ASK at 433,92 MHz super heterodyne receiver with digital noise filter
- remote-controls decoding and self-learning functions
- integrated buzzer to support programming
- directly drives loads e.g. lights or electric motors.

RX Module 33000148MIP

- Extremely compact receiver module with one output channel (16A relay)
- powered directly from the 110/230 V, 50/60 Hz mains
- OOK / ASK at 433,92 MHz super heterodyne receiver with digital noise filter
- remote-controls decoding and self-learning functions
- integrated buzzer to support programming
- directly drives loads e.g. lights, electric motors boilers, dishwashers, washing machines.



TX Remote control 32001369A-32001369

- 2-4 channels HCS rolling code RF transmitter
- Ideal for remote control application.
- LED indicator with low battery detection and indication.

TX Module 32001320

- 2 channels HCS rolling code RF transmitter
- buzzer, button and LED for an easy programming.

CUSTOMER SUPPORT.

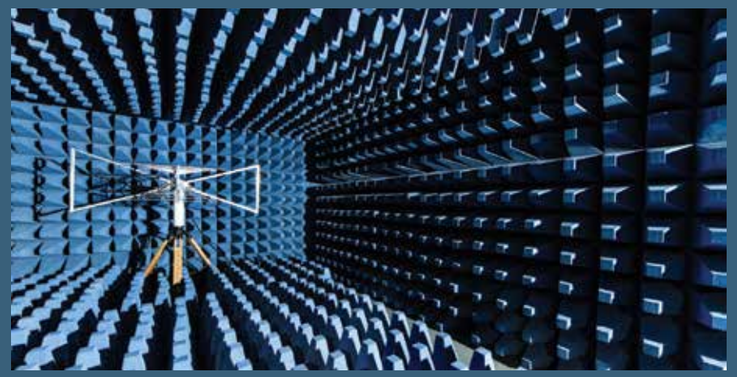
MIPOT ENSURES REDUCED TIME TO MARKET THROUGH QUALIFIED SUPPORT FOR INTEGRATION OF THE MODULES IN YOUR FINAL PRODUCT.

With its **experienced and highly motivated technical staff** and **testing facilities**, **Mipot supports its customers in all the stages of their product development.** Starting with the selection of the most appropriate devices from a performance and cost point of view as well as the evaluation of the radio link budget. Following this, a joint review of the schematic and PCBs.

A very important aspect of the development process is the **testing in accordance with applicable regulations and standards**. For compliance, the specific requirements of spurious emissions and electromagnetic compatibility must be considered.

Although all **Mipot**'s RF Wireless modules are tested and comply with applicable regulations, the standards require that the **final product** is also **tested to demonstrate regulation compliance**.

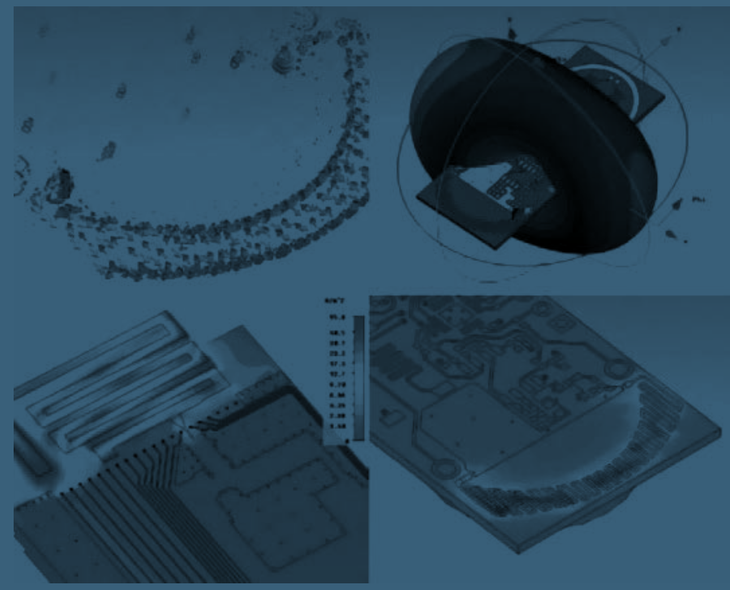
Mipot can **support** you **through the entire approval process** with their **experienced and skilled engineers** and its **own testing facilities**.



ANTENNA DESIGN.

A POWERFUL TRANSMITTER AND A SENSITIVE RECEIVER ARE NOT ENOUGH FOR AN EFFICIENT COMMUNICATION SYSTEM. A SUITABLE ANTENNA IS ALSO REQUIRED.

Mipot supports customers in the **design and verification of various types of antennas**. With decades of experience, **Mipot**'s technical staff have acquired a particular **ability to quickly find the best antenna solution** using modern **simulation tools**, **advanced instrumentation** and specifically, the **anechoic chamber**.



CUSTOM PRODUCTS.

RF WIRELESS PRODUCTS ON CUSTOMER SPECIFICATIONS

If you cannot find the solution you need from our portfolio, Mipot has a skilled and qualified R&D team who can develop products according to your specifications.

The development of a wireless communication system requires specific skills to:
- define the system
- identify the most appropriate components (from a functional and cost point of view)
- design and develop prototypes
- validate and certify the product.

Mipot has all the necessary **simulation tools** and, most importantly, a **team of highly qualified engineers** to **reduce your time to market** and **achieve results in line with your expectations**.

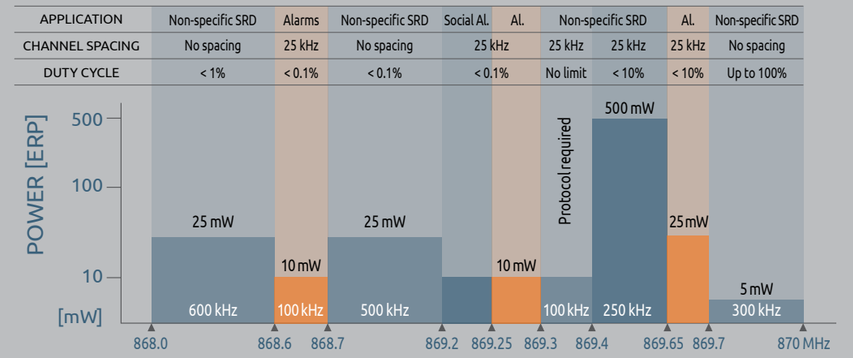
Mipot is a **one stop shop** for all customers, offering not only **product development**, but also **mass production** and all the services related to it, from **material procurement** to **personalized logistics**.

Get in touch now to see how we can help your business.



TECHNICAL SPECIFICATION

CEPT/ERC REC 70-03, 869 MHz BAND PLAN



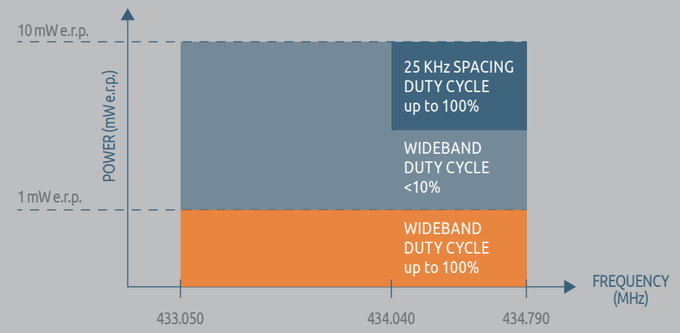
PATH LOSS CALCULATOR

FREE SPACE RANGE	PATH LOSS AT FREQUENCY (MHz)	
	433.92	869
m	dB	dB
1	25.2	31.2
5	39.2	45.2
10	45.2	51.2
15	48.7	54.7
20	51.2	57.2
25	53.1	59.2
30	54.7	60.8
50	59.2	65.2
100	65.2	71.2
200	71.2	77.2
300	74.7	80.8

FIELD STRENGHT VS EIRP

EIRP		FIELD STRENGHT AT 3 M	
	dBm		dBuWm
1 nW	- 60.0	58 uV	35.2
10 nW	- 50.0	183 uV	45.2
100 nW	- 40.0	577 uV	55.2
1 uW	- 30.0	1.8 mV	65.2
10 uW	- 20.0	5.8 mV	75.2
100 uW	- 10.0	18 mV	85.2
1 mW	0.0	58 mV	95.2
10 mW	10.0	183 mV	105.2
100 mW	20.0	577 mV	115.2

BAND PLAN 434 MHz



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