Make your application wireless

Sub 1 GHz RF solutions

www.infineon.com/wirelesscontrol

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Wireless control is an indispensable part of everyday life. From garage door openers through intrusion and fire alarms to smart metering systems, wireless devices are a cost-efficient, robust and proven way to control the widest variety of applications.

Many of these applications are based on simple point-to-point connections with low data rate requirements (below 100 kbit/s) or simple nodes that collect and transmit a limited volume of data to a central controller. For this application spectrum, sub-GHz radios offer a number of benefits over 2.4 GHz wireless standards.

Optimum energy efficiency
– It's all down to physics: At lower frequencies, it takes less power to achieve the same range as higher frequencies.

Longest range
– Again, it's all down to physics: Due to environmental path loss, the communication range at 434 MHz is around 5.5 times greater than at 2.4 GHz when transmitting signals using the same output power.
– What's more, sub-GHz signals penetrate concrete, walls and humid environments much more effectively.

Less interference
– The 2.4 GHz spectrum is crowded and subject to significant interference from Wi-Fi devices, bluetooth nodes, PC peripherals, video surveillance systems and microwave ovens.

Lowest cost
– A proprietary protocol can reduce system cost significantly by streamlining implementation and minimizing the processor resources required. It also eliminates the costs of compliance testing and logo licensing.
– Sub-GHz solutions support simple, one-way applications by enabling low-cost transmitter and receiver products. In contrast, 2.4 GHz standards always require a more costly two-way transceiver.

The benefits of sub-GHz frequencies mentioned above make sub-GHz solutions an extremely attractive proposition for end users looking for reliable, low-cost wireless connections with long battery lifetimes. Beside the cost pressure, quality and reliability are priorities for any wireless control application as well:
– After all, a remote control is the interface between a human user and a consumer device such as a television or set-top box. It directly influences the consumer's overall product experience and, most importantly, whether he or she likes or dislikes the product.
– In the case of wireless alarm systems and fire or smoke detectors, automotive RKE (Remote Keyless Entry) or smart metering systems, the wireless application must be designed to the highest levels of quality and reliability.

Infineon, as market leader in automotive RF, has an answer to this. With over 20 years of experience in sub-GHz radio and more than 1 billion devices shipped, we have what it takes to meet today's sub-GHz wireless application requirements. Our wireless control products set the standard, delivering outstanding, automotive-proven quality with nearly zero dpm (defects per million). That is what we aim for in all of our products and what underpins our commitment to reliability across the specified temperature and supply voltage ranges. We back up this commitment with long-term product availability and worldwide technical support.

Target applications
– Remote Keyless Entry (RKE)
– Tire Pressure Monitoring (TPMS)
– Smart metering
– Intrusion alarms
– Fire & smoke detectors
– Home automation & building control
– Lighting control
– Appliance control
– Gate & garage door openers
– Consumer remotes
– Set top boxes
– Access control
– Industrial control
– Replacement of wireline connections
– Any kind of wireless application that only needs a low data rate

500 m

90 m

Sub 1 GHz

2.4 GHz
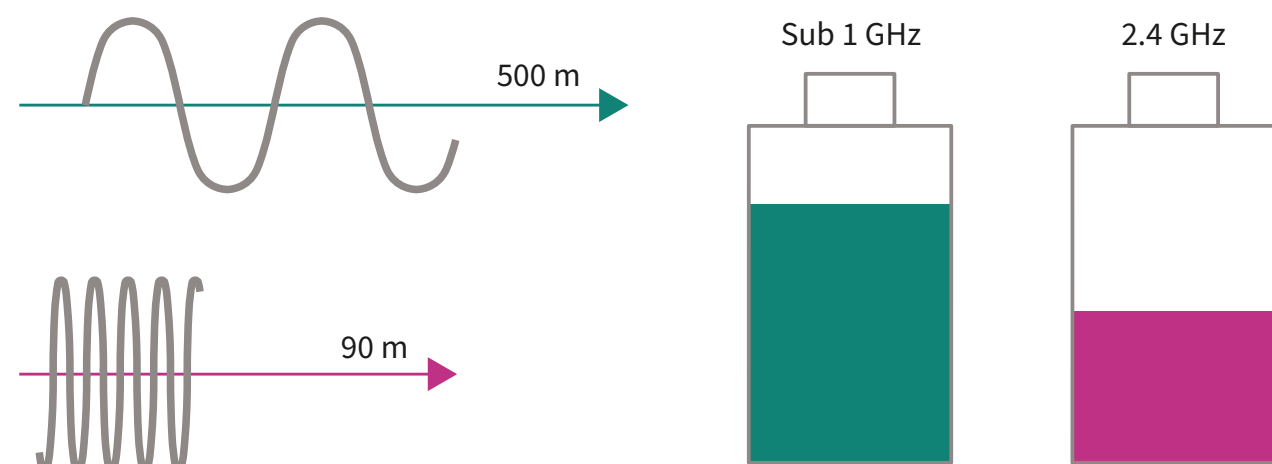
Contact us or visit www.infineon.com/wirelesscontrol to find the right product for your application.

The right product every time

We offer a product portfolio of receiver products for the major sub-GHz frequency bands. Our two major product families meet the functionality, performance and cost requirements of different markets and applications. The standard family targets less complex applications with the TDA5 series products. The SmartLEWIS™ product family is aimed at more complex systems and higher performance requirements.

TDA5 Series	SmartLEWIS™
	Smart **L**ow **E**nergy **W**ireless **S**ystem
The **TDA5 series** comprises proven, automotive-qualified products. Family members of the TDA5 series are designed for harsh environments with temperatures up to +105°C.	SmartLEWIS™ stands for Smart Low Energy Wireless Systems. The family is aimed at next-generation wireless control products that deliver the highest levels of integration and functionality to intelligently reduce system complexity and current consumption.

All of our products are designed to ensure that the applications meet ETSI and FCC regulations for sub-GHz RF.

TDA523x/TDA5240

SmartLEWIS™ Rx+ – autonomous receiver family

The SmartLEWIS™ receiver family heralds a new era of functionality. These highly integrated receiver ICs provide a host of features including multi-channel capability, multiple protocol handling and digital baseband processing with self-polling. An all-round package that ensures highest sensitivity, lowest current consumption and the best automotive quality.

Highest functionality and performance
– Autonomous receive: SmartLEWIS™ receivers provide fully recovered payload data to the microcontroller, which stays in sleep mode while receiving the data. The receiver only wakes up the microcontroller once a valid message is detected. In a crowded environment, this can reduce system current consumption by over 80 percent. It also significantly reduces microcontroller workload.
– Multi-protocol handling: SmartLEWIS™ receivers can handle completely different RF protocols autonomously; a single receiver can thus support several applications (for example, RKE + TPMS + remote start)
– High-resolution Sigma-Delta fractional-N PLL (SmartLEWIS™ Rx+) to cover all frequencies with one device and one crystal

Low system cost
– Integrated LNA and IF filter (external filter can also be used)
– Host microcontroller load and development effort significantly reduced

Reliability & quality
– Excellent blocking performance and multi-channel capabilities
– Highest automotive quality standards and long-term availability

Easy design
– Highly sophisticated development tooling with easy-to-use configuration software
– Quick-start protocol examples for evaluation and development

SmartLEWIS™ Rx+ selection guide

Type	High sensitivity	Integrated IF filter	Multi-channel	Autonomous receive
TDA5225	●	●	●	–
TDA5235	●	●	–	●
TDA5240	●	●	●	●

Type	Frequency[1] [MHz]	Sensitivity[2] [dBm]	I_s receive [mA]	I_s pwrdwn [nA]	Modulation	V_s [V]	Temperature [°C]	Package
SmartLEWIS™ Rx+ for automotive, consumer & industrial								
TDA5225	300–320	-116/-118	10.5	0.8	ASK/FSK	3.0 … 3.6 4.5 … 5.5	-40 … +105	TSSOP-28
TDA5235	425–450 863–870	-116/-118	10.5	0.8	ASK/FSK		-40 … +105	TSSOP-28
TDA5240	902–928	-116/-118	10.5	0.8	ASK/FSK		-40 … +105	TSSOP-28

1) Over specified temperature range
2) ASK/FSK (Manchester encoded data rate 4 kbit/s, refer to the datasheet for more detailed conditions)

Development tooling

We offer a variety of receiver boards for different frequencies. For easy identification, the board and kit names contain the name of the product and the frequency. The tools in the lists below are first sorted by frequency.

SmartLEWIS™ Rx+ boards/kits

Board/kit type	Rx/Tx/MCU	Frequency [MHz]	Output power [dBm]	Modulation	Order code
TDA5240_315_5_BOARD	Rx	315	–	ASK/FSK	SP000535296
TDA5235_315_5_BOARD	Rx	315	–	ASK/FSK	SP000640510
TDA5225_315_5_BOARD	Rx	315	–	ASK/FSK	SP000643648
TDA5240_434_5_BOARD	Rx	434	–	ASK/FSK	SP000535300
TDA5235_434_5_BOARD	Rx	434	–	ASK/FSK	SP000640514
TDA5225_434_5_BOARD	Rx	434	–	ASK/FSK	SP000643654
TDA5240_868_5_BOARD	Rx	868	–	ASK/FSK	SP000535304
TDA5235_868_5_BOARD	Rx	868	–	ASK/FSK	SP000640518
TDA5225_868_5_BOARD	Rx	868	–	ASK/FSK	SP000643658
TDA5240_915_5_BOARD	Rx	915	–	ASK/FSK	SP000799568
TDA5235_915_5_BOARD	Rx	915	–	ASK/FSK	SP000799564
TDA5225_915_5_BOARD	Rx	915	–	ASK/FSK	SP000775162
SmartLEWIS™ SIB BOARD	Interface	Universal	–	–	SP000409156

A full TDA5240/35/25 evaluation kit comprises the RF board with the required frequency and the system interface board (SmartLEWIS™ SIB board), which must be ordered separately.

Protocol and software examples

We offer pre-defined protocol examples for SmartLEWIS™ receiver products to enable out-of-the-box development. The configuration files can be easily uploaded with the development tooling. Users can immediately start product evaluation or customize the files for their final application.

Additional support

We also support your design and product evaluation efforts with the following:

– Comprehensive application notes
– Highly technical FAQs
– Crystal recommendation lists
– Easy access documentation: Quick links for all products help you find what you need fast. When you click on "documents" a pop-up window appears containing all available documents and tooling software for the product you need: www.infineon.com/[product_name] e.g. www.infineon.com/tda5240

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Direct access	+49 89 234-0 (interconnection fee, German/English)

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