

Partial list of wireless short-range data communications technologies that are used for IOT

Many appliances for the home are being made for the purposes of IOT or are being made with IOT as a secondary function. Some appliances are exempt from FCC authorization procedures. A list of these exempt appliances can be found on [FCC KDB 772105](http://www.fcc.gov/om/electronic/fcc_kdb_772105). Appliances not on this list and containing digital electronics, or digital electronics in appliance in which the digital electronics are for other than the basic functioning of the appliance are subject to the requirements of Part 15 Subpart B. The wireless communications function of the appliance is never exempt and must be certified prior to placing the appliance on the market. Similar ISED Canada exemptions exist currently, but that will soon change. The EU does not exempt appliances from EMC compliance testing.

There are a variety of wireless technologies that are used for Internet of Things wireless communication. Below is a list of some of the more commonly used technologies, their typical uses, operating range, and applicable FCC regulatory compliance Rule parts.

Technology (frequency band)	Typical uses	Typical Indoor Range	Description	FCC compliance typical standards	ISED Canada typical standards	EU typical standards
NFC (13.56MHz) Near Field Communication	Payment, access control, healthcare, IOT	<30cm	Point-to Point. short ranged wireless communication technology that allows two devices to connect and exchange information across a secure link.	Part 15.225	RSS-210 RSS-GEN	EN 300 330 EN 301 489-3
RFID (125kHz, 13.56MHz, 902-928MHz* & 2.4GHz ISM Bands)	Tracking, inventory, access control, IOT	<1m	Makes use of passive or active tags or chips to communicate with reader devices. Tags may be embedded in labels, clothing, packaging, etc.	Part 15.209 Part 15.225 Part 15.247 Part 15.249	RSS-210 RSS-GEN	EN 300 330 EN 301 489-3 EN 300 440 EN 300 328 EN 301 489-17
Bluetooth (V1 – 2.1) 2.4GHz ISM band	Personal Area Network, headsets, printers, PC's, gaming controllers, IOT	Up to 100m	Low power, low bandwidth data communication	Part 15.247	RSS-247 RSS-GEN	EN 300 328 EN 301 489-17
Bluetooth Low Energy (BLE/Bluetooth Smart) 2.4GHZ ISM Band	Health, wearable sport & fitness devices, smart home, PC peripherals, mobile phones, IOT	BT 4.0 up to 100m BT 5 up to 400m	Significantly low power, low bandwidth, small data transfer data communication	Part 15.247 Part 15.249	RSS-210 RSS-247 RSS-GEN	EN 300 328 EN 301 489-17

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IEEE 802.15.4): ZigBee 2.4GHz ISM Band	home automation, monitoring networks, wireless controls and sensors, IOT	<30M	Low power, low bandwidth data communication. Larger network capability than Bluetooth	Part 15.247	RSS-247 RSS-GEN	EN 300 328 EN 301 489-17
Z-Wave 908.42 MHz* ISM Band	Networked residential light commercial monitoring, control, and status reading devices, IOT		Low Powered RF communications technology that supports full mesh networks Networked devices located in fixed locations.	Part 15.247	RSS-247 RSS-GEN	N/A
Wi-Fi/WLAN (IEEE 802.11a,b,g,n,ac) 2.4 & 5GHz ISM bands	Routers, Networks, PC's, PDA's	<20m	Provides wireless connection of multiple computers or devices through a Local Area Network	Part 15.247 Part 15.249	RSS-247 RSS-GEN	EN 300 328 EN 301 489-17 EN 301 893 EN 302 502
Ultra-Wideband (UWB) 3.1 GHz to 10.6 GHz	Consumer electronics, mobile devices, PC peripheral devices		Provides very high data-rate while consuming very little battery power. Each radio channel can have a bandwidth of more than 500 MHz depending upon its center frequency. Due to such a large signal bandwidth, FCC has put severe broadcast power restrictions.	Part 15, Subpart F	RSS-220	EN 302 065 EN 301 489-33
Momentary Operated devices	Garage door openers, Key FOB's, alarm systems, remote controls	Variable, Typically <30m	Periodic operation (>70MHz) No pre-determined transmission intervals, low field strength	Part 15.231	RSS-210	EN 300 330 EN 301 489-3 EN 300 440

* Use restricted in the EU

As you review and envision how these various communications might work with your product, feel free to call D.L.S. Electronic Systems, Inc. at 847-530-6400 to discuss your needs.