DATASHEET

Gen 3 IoT Pixels

Battery-free Bluetooth sensors with dual-band harvesting, for better performance at a lower cost.



DUAL BAND INLAY

DATASHEET
IOT PIXELS · GEN 3

Gen 3 IoT Pixels are the successor to Gen 2, with dual-band antennas: one 2.4 GHz antenna for broadcasting, plus a 2.4 GHz antenna for close-range energizing and a sub-1 GHz antenna for energizing over longer distances.

OVERVIEW

ENERGIZING & BROADCAST RANGE			
40m+	**3.3×6.0 cm** Size	**2.4 GHz** + 902–928 MHz harvesting	**Cardboard** Application surface

BATTERY-FREE SENSING

IoT Pixels harvest RF energy from “Works with Wiliot” bridges and broadcast encrypted, standard Bluetooth Low Energy packets that any Bluetooth 4.0+ device can read. Each Pixel senses location, motion, temperature, humidity and light. Wiliot also provides reference designs for inlay manufacturers and converters; visit community.wiliot.com to learn more.

40 m	Sub-1 GHz energizing
3 m	2.4 GHz energizing
40 m	Broadcast range
±0.08°C	Temp. repeatability (1σ)

OPERATIONAL RANGE

Range depends on harvesting enough energy, then broadcasting to a bridge or gateway in range. Values in optimal conditions.

MODE	FREQUENCY	RANGE	NOTES
Energizing · sub-1 GHz	915 MHz	40 meters	Linear polarization. Latency rises at the edge of range.
Energizing · 2.4 GHz	2.48 GHz	3 meters	Linear polarization, for close-range energizing.
Broadcasting	2.4 GHz · BLE 5.2	40 meters	Encrypted, non-connectable Bluetooth advertising packets.
Sensing rate	Sub-1 GHz field	5 · 10 · 20 m	~2 s · ~4 s · ~16 s between sensing packets.

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Specifications

FUNCTIONALITY

Common uses	Asset tracking, inventory, temperature compliance & cold chain
Sensing families	Temperature, humidity, light, location, motion
Supported products	Works with Wiliot bridges and gateways
Security	AES-128, encryption and authentication
Application surfaces	Cardboard (antenna 179)
Operable temperature	−40 to 85 °C

ENERGIZING

Sub-1 GHz range	40 meters (bridge to pixel)
2.4 GHz range	3 meters (bridge to pixel)
Harvesting polarization	Linear, parallel to wide edge
Harvesting band	2402–2483.5 MHz, 902–928 MHz

RADIO · BROADCAST

Calibration	3 BLE advertisements (CH 37, 38, 39) every 90 ms (default)
Broadcast protocol	Bluetooth® Low Energy (BLE) 5.2
Signal strength	EIRP −20 dBm @ 2.402 GHz
Broadcast packet	Standard BLE packet (PDU); payload: Wiliot Ephemeral ID (WEID)
Channel and PHY	Ch 37 @ 1 MHz; channels 10 and 21 @ 2 MHz
Broadcast polarization	Linear, parallel to wide edge
Broadcast range	40 meters
Broadcast frequency	1 – 90+ seconds (depending on energy harvesting)

CONSTRUCTION & DELIVERY

Chip	V3
Face sheet	Varies
Antenna material	Aluminum
Size	3.3 × 6.0 cm
Serialization	Unique ID in data packet; more supported over API
Roll core	76.2 mm (3 inch) inner diameter cardboard core

TEMPERATURE ACCURACY

TEMP RANGE	ACCURACY
−40 to −20 °C	± 1.5 °C
−20 to 60 °C	± 1 °C
60 to 85 °C	± 1.5 °C

±0.08°C

Temperature sensor repeatability (1σ)

Raw temperature values can be optimized by the Wiliot Physical AI Platform's data models for improved accuracy.

BLUETOOTH PACKET & PAYLOAD

IoT Pixels transmit non-connectable, unidirectional Bluetooth Low Energy advertising PDUs. The payload, the Wiliot Ephemeral IDentity (WEID), is encrypted and can only be interpreted in the Wiliot Cloud. Because Pixels comply with the latest Bluetooth Core Specification, any Bluetooth device configured to listen for Wiliot beacons can act as a gateway to the cloud.

RF CERTIFICATION

CERTIFICATION	REGION	ID
FCC	USA	2AXVQ-WILIOT3
CE / RED	EU	CS37145
IC / ISED	Canada	26623-WILIOT3

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