

Panel XS Reader, Mullion XS Reader and Glass XS Reader

P1825 and P1826 WRDP0M, WRDM0M

Antennas

Version	Date	Changes	Author
1.0	24/10/2022	First edition	M.U.

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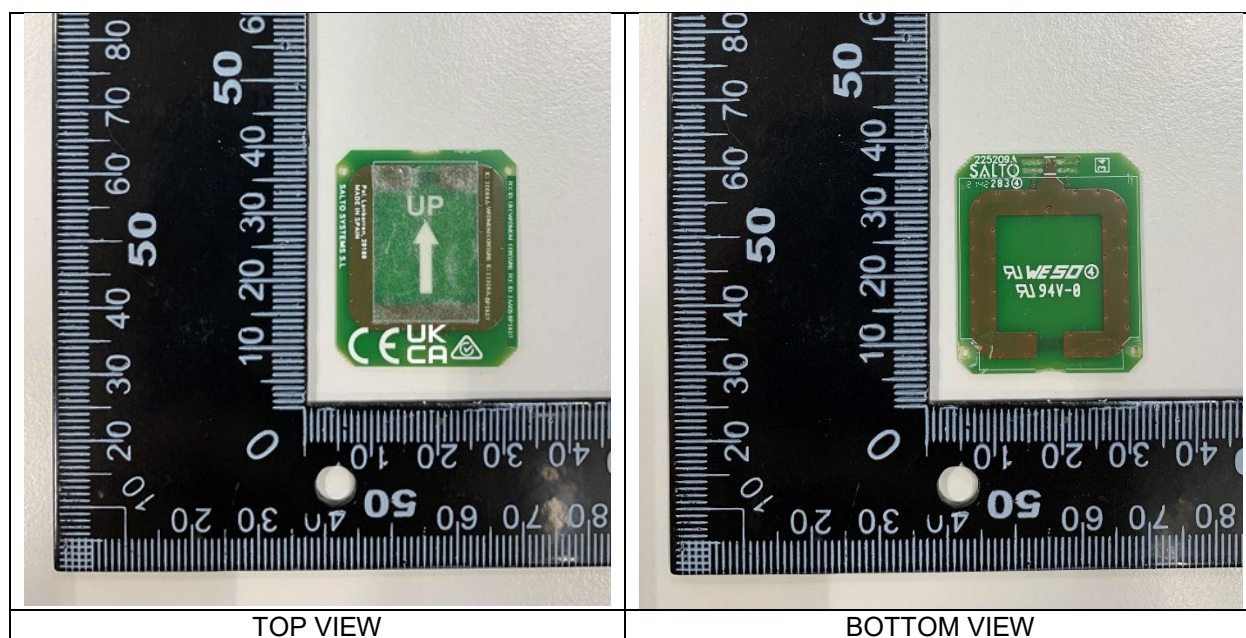
Annex I 7

1 WRDP0M

Panel XS Reader P1825		WRDP0M
		MIFARE (1) + Bluetooth LE (2)
Antennas	Number of antennas	2
	Manufacturer	1- SALTO Systems, S.L. 2- N/A
	Model number	1- WRDP0M 2- N/A
	Type	1- Integral, PCB 2- Integral, Chip
	Gain	1- N/A 2- 0.6 dBi
	Frequency of Operation	1- 13.553 - 13.567 MHz 2- 2400 - 2483.5 MHz
Channels	Number of channels	1- N/A 2- 40
	Spacing	1- N/A 2- 2 MHz
	Bandwidth	1- N/A 2- 2 MHz
Type of Modulation		1- <u>ISO 14443A</u> : ASK 100%, OOK (subcarrier $f_c/16$) & <u>ISO 15693</u> : ASK 10% - 30%, OOK (subcarrier $f_c/32$) 2- GFSK
Declared Nominal Output Power (Max.)		1- 25 dBm 2- 8.5 dBm
ITU Emission Designator		1- K1D 2- F1D
Equipment Configuration for frequency Stability: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s
Equipment Configuration for Field Strenght Measurement: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s

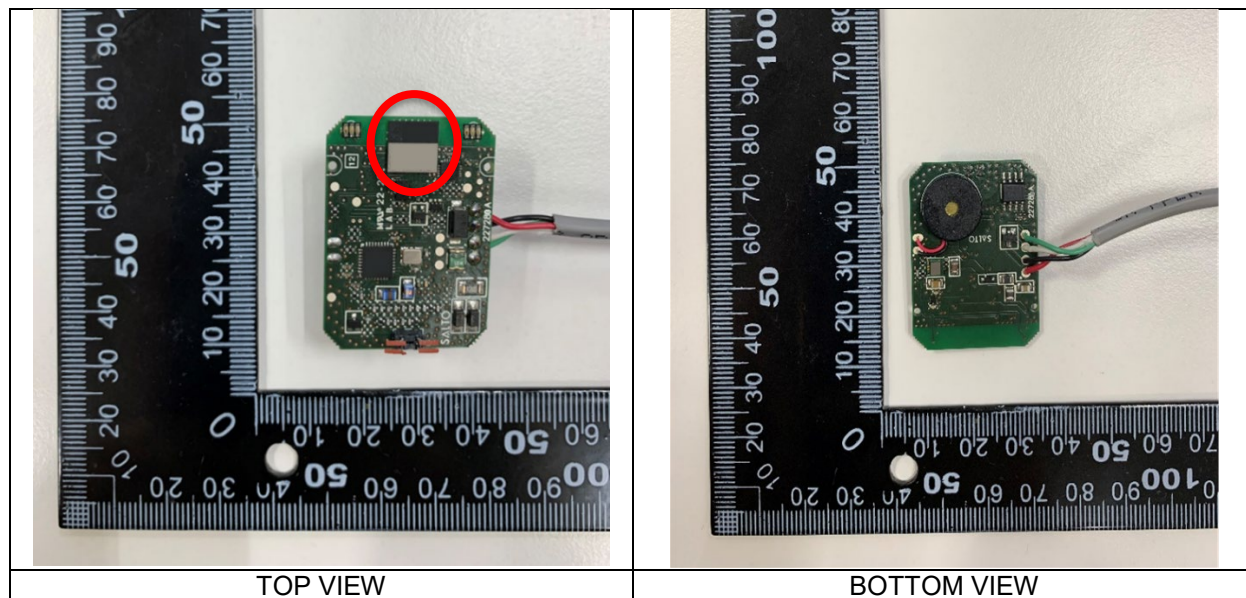
RFID Antenna

The RFID antenna was designed by Salto Systems, S.L. Arkotz 9, Pol. Lanbarren 20180, Oiartzun (Gipuzkoa), Spain. The antenna model is WRDP0M and it is located on the antenna circuit, 225209. The dimensions of the circuit and the antenna are shown in the following image.



Bluetooth LE Antenna

The antenna used for Bluetooth LE is a built-in antenna integrated in the ISP1807-LR certified module from Insight. The ISP1807-LR module is located on the top the circuit, 227280. The following image shows the location and dimensions of the antenna on the circuit.



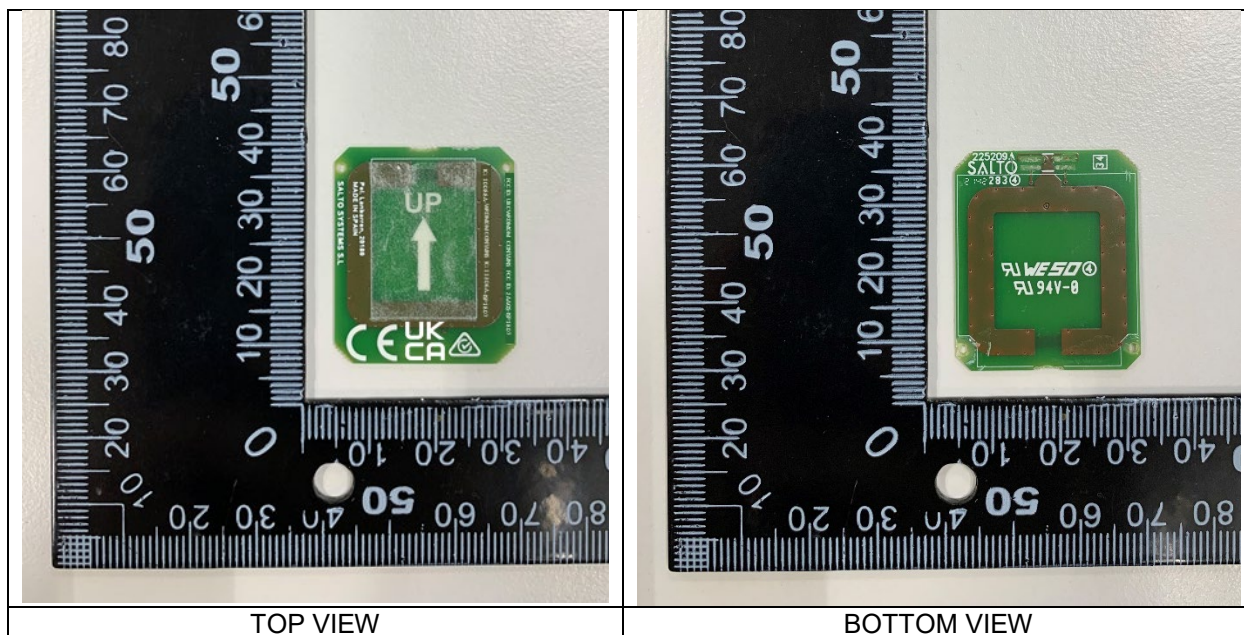
The remaining technical information of the antenna is described in the datasheet included in Annex I.

2 WRDM0M

Mullion XS Reader and Glass XS Reader P1826		WRDM0M
		MIFARE (1) + Bluetooth LE (2)
Antennas	Number of antennas	2
	Manufacturer	1- SALTO Systems, S.L. 2- N/A
	Model number	1- WRDM0M 2- N/A
	Type	1- Integral, PCB 2- Integral, Chip
	Gain	1- N/A 2- 0.6 dBi
	Frequency of Operation	1- 13.553 - 13.567 MHz 2- 2400 - 2483.5 MHz
Channels	Number of channels	1- N/A 2- 40
	Spacing	1- N/A 2- 2 MHz
	Bandwidth	1- N/A 2- 2 MHz
Type of Modulation		1- <u>ISO 14443A</u> : ASK 100%, OOK (subcarrier $f_c/16$) & <u>ISO 15693</u> : ASK 10% - 30%, OOK (subcarrier $f_c/32$) 2- GFSK
Declared Nominal Output Power (Max.)		1- 25 dBm 2- 8.5 dBm
ITU Emission Designator		1- K1D 2- F1D
Equipment Configuration for frequency Stability: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s
Equipment Configuration for Field Strenght Measurement: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s

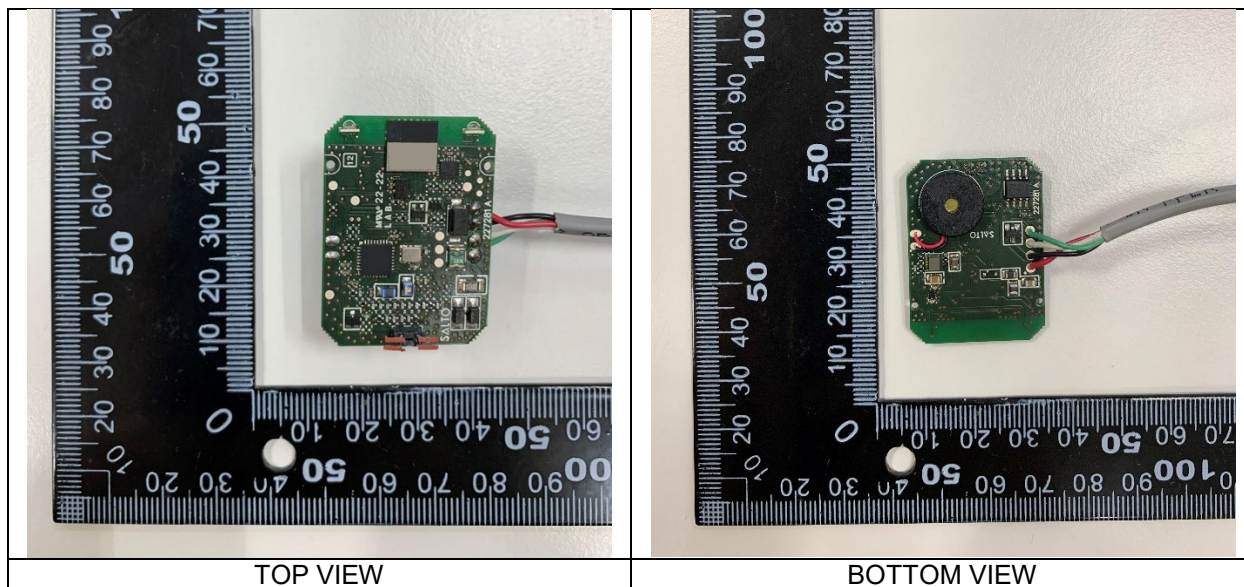
RFID Antenna

The RFID antenna was designed by Salto Systems, S.L. Arkotz 9, Pol. Lanbarren 20180, Oiartzun (Gipuzkoa), Spain. The antenna model is WRDP0M and it is located on the antenna circuit, 225209. The dimensions of the circuit and the antenna are shown in the following image.



Bluetooth LE Antenna

The antenna used for Bluetooth LE is a built-in antenna integrated in the ISP1807-LR certified module from Insight. The ISP1807-LR module is located on the top the circuit, 227281. The following image shows the location and dimensions of the antenna on the circuit.



The remaining technical information of the antenna is described in the datasheet included in Annex I.

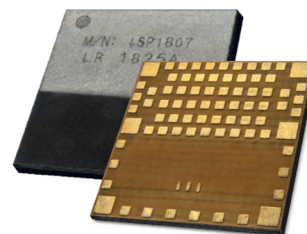
Annex I

ISP1807 Data Sheet



Built-in Antenna Low Energy Module BT 5 Long Range, Zigbee, Thread, Matter, ANT+

This ultra-small LGA module, 8 x 8 x 1 mm, is based on the nRF52840 Chip. Its powerful Cortex™ M4 CPU, flash and RAM memory combined with an optimized antenna offers the perfect solution for Bluetooth connectivity. The solution is best in class for RF performance and low power consumption. Long range and multiple digital and analogue interfaces give optimum flexibility for sensor integration.



Key Features

- 2.4GHz Ultra Low Power RF Transceiver
- Full Bluetooth 5 – long range stack
ANT/ANT+ stack
2.4 GHz proprietary stack
- BT Mesh, Zigbee, Thread, Matter stacks available
- NFC-A Tag for OOB pairing
- Fully integrated RF matching and Antenna
- Integrated 32 MHz & 32kHz Clock
- DC/DC converter with loading circuit
- Based on Nordic Semiconductor nRF52
- 32-bit ARM Cortex M4F CPU
- ARM CryptoCell 310
- 1 MB Flash / 256 kB SRAM
- Configurable 46 GPIOs including 8 ADC
- Many interfaces USB, SPI, UART, PDM, I2C
- Power supply 1.7 to 3.6V, USB supply 5V
- Very small size 8.0 x 8.0 x 1.0 mm
- Temperature -40 to +85 °C
- Pin to Pin compatible with ISP1507

Applications

- Advanced Wearables: watches, fitness devices, wireless payment wearables, connected health, augmented reality applications ...
- Smart Home sensors and controllers
- Industrial IoT sensors and controllers
- Advanced remote controls
- Remote & Gaming controllers
- Beacons



Certifications

- Bluetooth SIG certified
- CE certified
- UKCA certified
- FCC, IC certified
- TELEC, KCC certified
- RoHS and Reach compliant

ISP1807

Data Sheet



2.4. Power Consumption

Parameter	Min	Typ	Max	Unit
Peak Current, Transmitter +8 dBm, VCC 3V + DCDC		16.4		mA
Peak Current, Transmitter 0 dBm, VCC 3V + DCDC		6.4		mA
Peak Current, Receiver 1 Mbps, VCC 3V + DCDC		6.26		mA
System OFF, no RAM retention		0.4		μA
System ON, no RAM retention, wake on RTC		1.5		μA
Additional RAM retention current per 4 KB block		30		nA

2.5. Clock Sources

Parameter	Min	Typ	Max	Unit
Internal High Frequency Clock for RF Stability: 32 MHz Crystal Frequency Tolerance ⁽¹⁾			+/- 40	ppm
Internal Low Frequency Clock for BLE Synchronization: 32.768 kHz Crystal Frequency Tolerance ⁽¹⁾			+/- 40	ppm
Internal Low Frequency Clock for BLE Synchronization: RC Oscillator ⁽²⁾			+/- 250	ppm
RF Frequency Tolerance for BLE Operation			+/- 40	ppm

(1) including initial tolerance, drift, aging, and frequency pulling

(2) Frequency tolerance after calibration

2.6. Radio Specifications

Parameter	Min	Typ	Max	Unit
Frequency Range	2402		2480	Mhz
Maximum Output Power		+8	+8.5	dBm
Rx Sensitivity Level, BLE1 Mbps		-95		dBm
Rx Sensitivity Level, BLE Long Range 125 kbps		-103		dBm
Antenna Gain		0.6		dBi
EIRP	-19.4		8.6	dBm
Data Rate	125		2000	kbps



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Data Sheet



2.7. Range Measurement

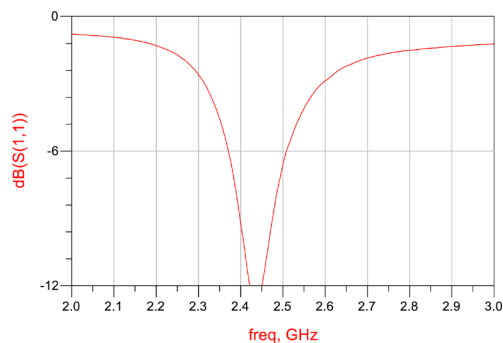
Range measurement between ISP1807-LR test board (configured as Central) and ISP1807-LR test board (configured as Peripheral).

Parameter	Min	Typ	Max	Unit
Range Open field @1m height (0 dBm, 1 Mbps)		150		m
Range Open field @1m height (0 dBm, 125 Kbps)		175		m
Range Open field @1m height (8 dBm, 1 Mbps)		230		m
Range Open field @1m height (8 dBm, 125 Kbps)		450		m

2.8. Antenna Performance

Typical Antenna Return Loss

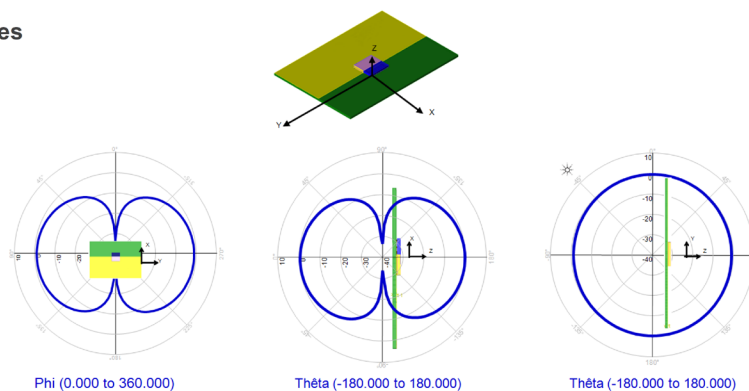
Module mounted on a USB dongle ground plane



Radiation Pattern in 3 planes

Module mounted on a USB dongle ground plane

Gain measurement in dBi in the BLE band from 2.4 to 2.5 GHz.



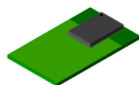
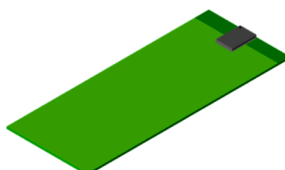
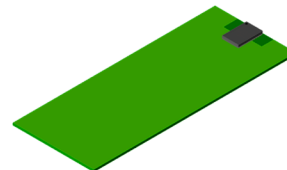
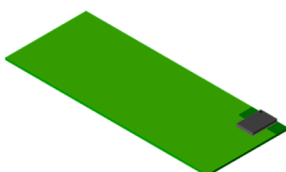
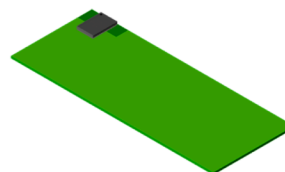
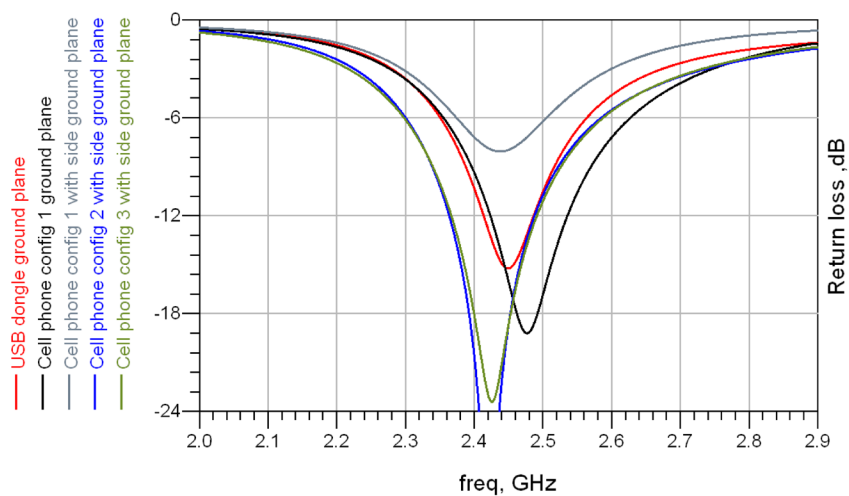
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 Data Sheet

Ground Plane Effect Simulation

 USB dongle
 ground plane
 (size: 18 x 30 mm²)

 Cell phone config 1
 ground plane
 (size: 40 x 100 mm²)

 Cell phone config 1 with
 side ground plane
 (size: 40 x 100 mm²)

 Cell phone config 2 with
 side ground plane
 (size: 40 x 100 mm²)

 Cell phone config 3 with
 side ground plane
 (size: 40 x 100 mm²)

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