

XS4 Original+ and XS4 One S KPP and Hilton extensions

**E2131
W40MH and W40T**
Antennas

Version	Date	Changes	Author
1.0	28/09/2023	First edition	U.T.

Table of contents

1 W40MH 3

RFID Antenna 4

Bluetooth LE Antenna 5

2 W40T 6

RFID Antenna 7

Bluetooth LE Antenna for the SoC solution 8

Bluetooth LE Antenna for the BLE BROKER module 8

Annex I 9

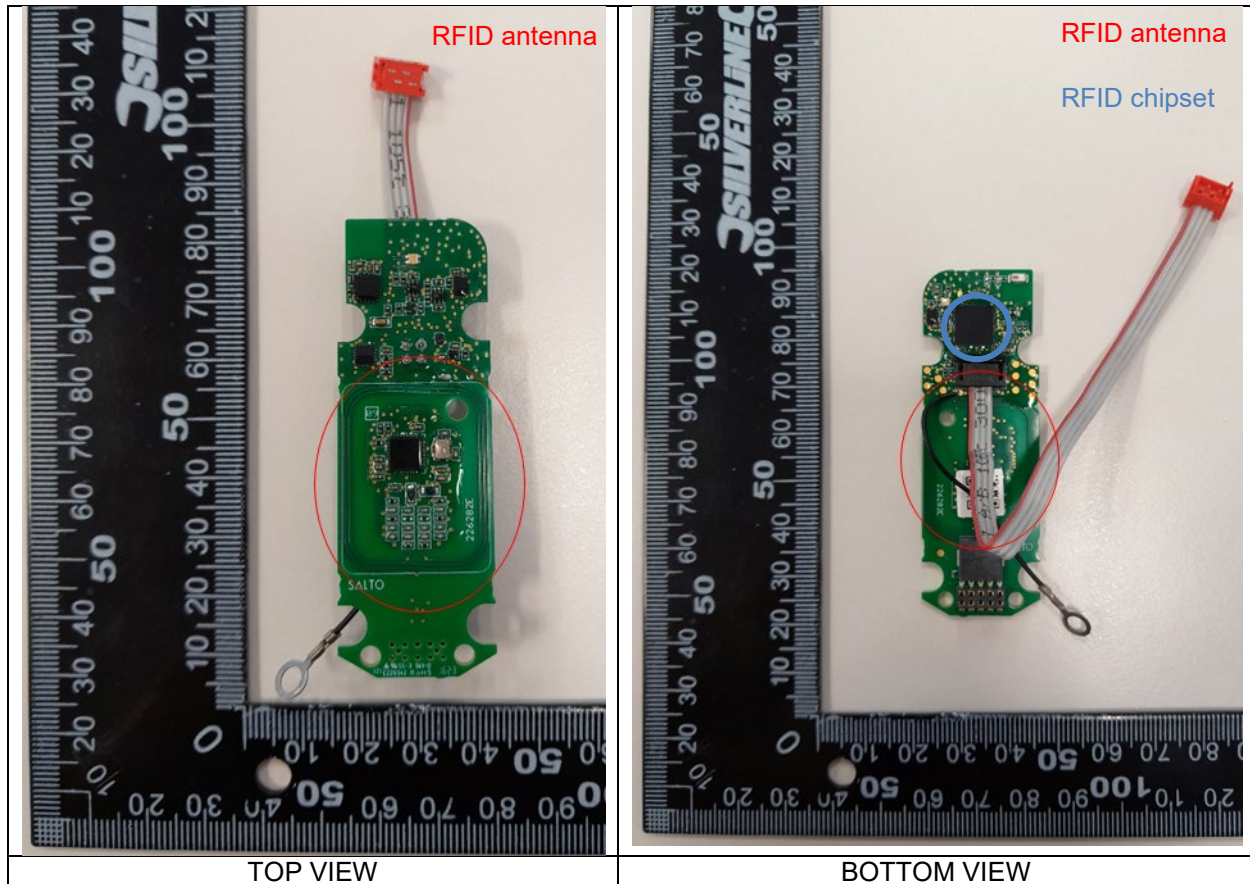
Annex II 10

1 W40MH

XS4 Original+ and XS4 One S E2131		W40MH
		MIFARE (1) + Bluetooth LE SoC (2)
Antennas	Number of antennas	2
	Manufacturer	1- SALTO Systems, S.L. 2- N\A
	Model number	1- W40M 2- N\A
	Type	1- Integral, PCB 2- Integral, Chip
	Gain	1- N\A 2- 0.5 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- 1 MHz at 1Mbps
Type of Modulation		1- ISO 14443A: reader to card ASK 100%, card to reader OOK (subcarrier $f_c/16$) & ISO 15693: reader to card ASK 10% - 30%, card to reader OOK (subcarrier $f_c/32$) 2- GFSK 3- GFSK
Declared Nominal Output Power (Max.)		1- 25 dBm 2- 6 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

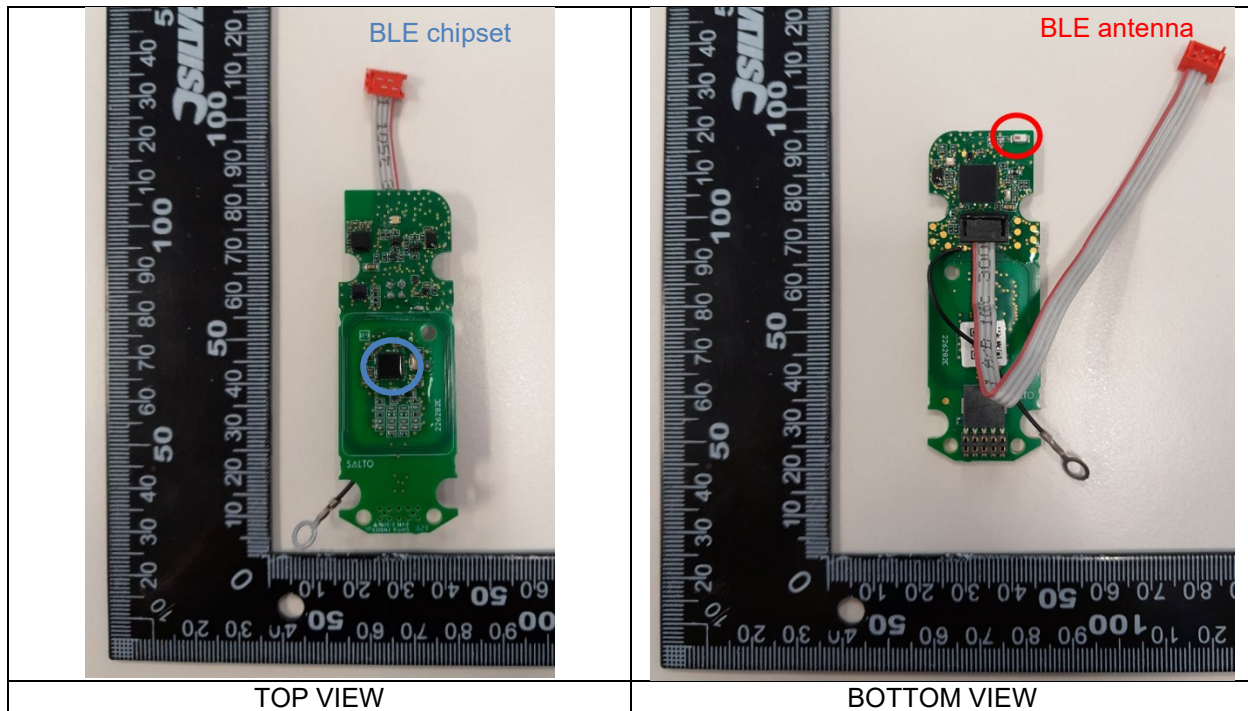
RFID Antenna

The RFID antenna was designed by Salto Systems, S.L. at Arkotz 9, Pol. Lanbarren 20180 Oiartzun (Gipuzkoa), Spain. The antenna model is W40M and it is located on the control circuit, 226282. The dimensions of the circuit and the antenna are shown in the following pictures.



Bluetooth LE Antenna

The Bluetooth LE antenna is the 2450AT18B100 model form Johanson Technology. The antenna is located on the bottom side of the control circuit, 226282. The following image shows the location of the antenna on the control circuit.



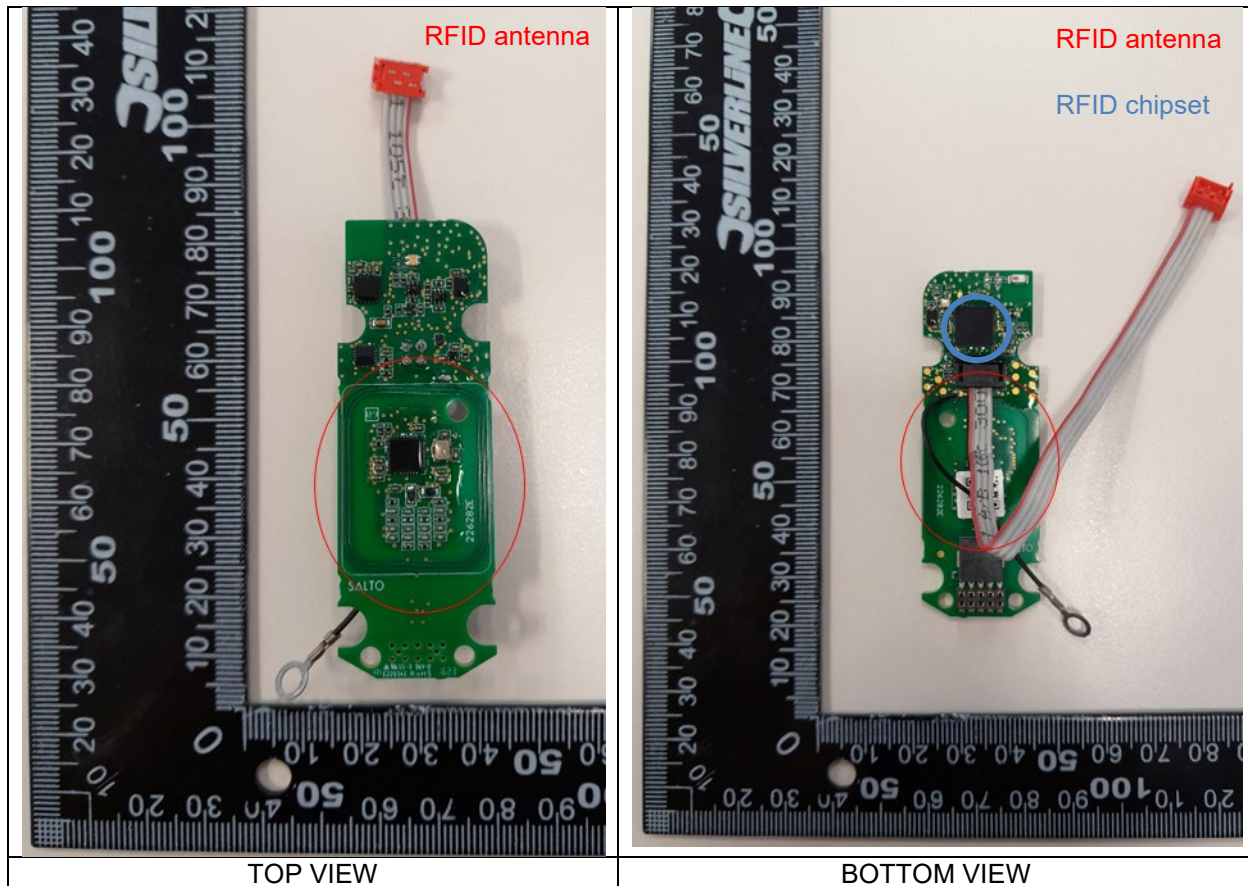
The remaining technical information of the antenna is described in the data sheet attached in Annex I.

2 W40T

XS4 Original+ and XS4 One S E2131		W40T
		MIFARE (1) + Bluetooth LE SoC (2) + BLE (3)
Antennas	Number of antennas	3
	Manufacturer	1- SALTO Systems, S.L. 2- N\A 3- N\A
	Model number	1- W40M 2- N\A 3- N\A
	Type	1- Integral, PCB 2- Integral, Chip 3- Integral, Chip
	Gain	1- N\A 2- 0.5 dBi 3- 1.5 dBi
	Frequency of Operation	1- 13.553 - 13.567 MHz 2- 2400 - 2483.5 MHz 3- 2400 - 2483.5 MHz
Channels	Number of channels	1- N\A 2- 40 3- 40
	Spacing	1- N\A 2- 2 MHz 3- 2 MHz
	Bandwidth	1- N\A 2- 1 MHz at 1Mbps 3- 1 MHz at 1Mbps
Type of Modulation		1- ISO 14443A: reader to card ASK 100%, card to reader OOK (subcarrier $f_c/16$) & ISO 15693: reader to card ASK 10% - 30%, card to reader OOK (subcarrier $f_c/32$) 2- GFSK 3- GFSK
Declared Nominal Output Power (Max.)		1- 25 dBm 2- 6 dBm 3- 3 dBm
ITU Emission Designator		1- K1D 2- F1D 3- F1D
Equipment Configuration for frequency Stability: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s 3- 1 Mbit/s
Equipment Configuration for Field Strenght Measurement: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s 3- 1 Mbit/s

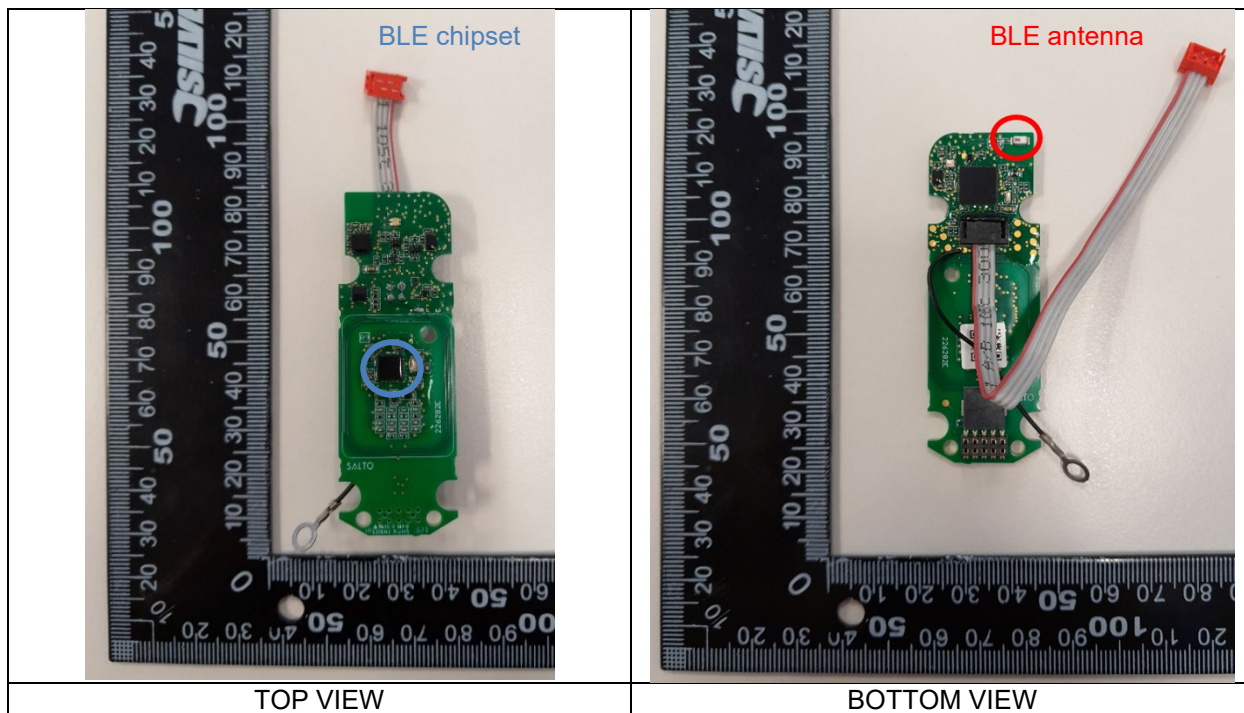
RFID Antenna

The RFID antenna was designed by Salto Systems, S.L. at Arkotz 9, Pol. Lanbarren 20180 Oiartzun (Gipuzkoa), Spain. The antenna model is W40M and it is located on the control circuit, 226282. The dimensions of the circuit and the antenna are shown in the following pictures.



Bluetooth LE Antenna for the SoC solution

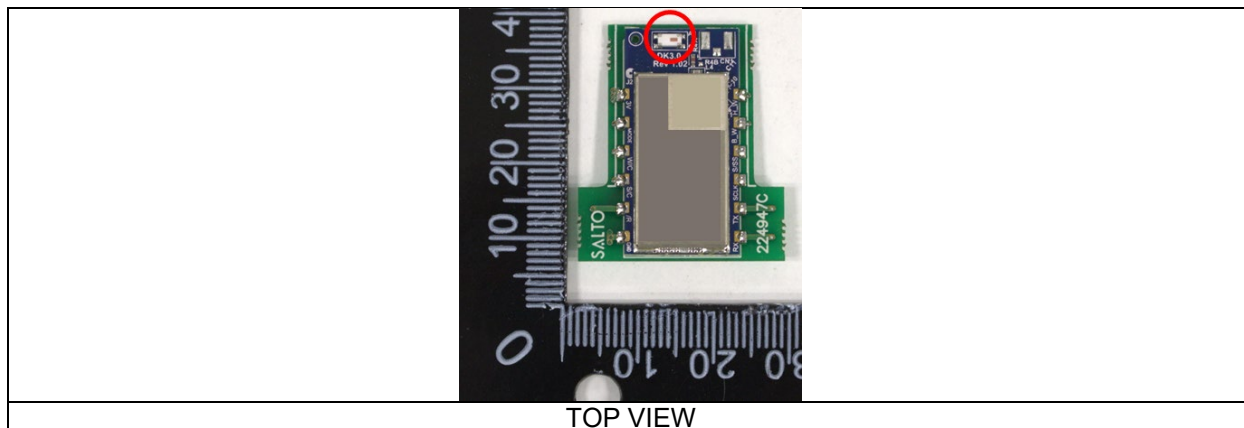
The Bluetooth LE antenna for the SoC solution is the 2450AT18B100 model form Johanson Technology. The antenna is located on the bottom side of the control circuit, 226282. The following image shows the location of the antenna on the control circuit.



The remaining technical information of the antenna is described in the data sheet attached in Annex I.

Bluetooth LE Antenna for the BLE BROKER module

The Bluetooth LE antenna for the DirectKey certified module from SUPRA is the 2450AT18D0100E model form Johanson Technology. The antenna is located on the bottom side of the control circuit, 226282. The following image shows the location of the antenna on the control circuit.



The remaining technical information of the antenna of the module is described in the data sheet attached in Annex II.

Annex I

"High Frequency Ceramic Solutions"

2450 MHz Antenna

Detail Specification: 08/10/09

P/N 2450AT18B100

Page 1 of 3

General Specifications

Part Number	2450AT18B100	Input Power	3W max.
Frequency Range	2400 - 2500 MHz	Impedance	50 Ω
Peak Gain	0.5 dBi typ. (XZ-V)	Operating Temperature	-40 to +85°C
Average Gain	-0.5 dBi typ. (XZ-V)	Reel Quantity	3,000
Return Loss	9.5 dB min.		

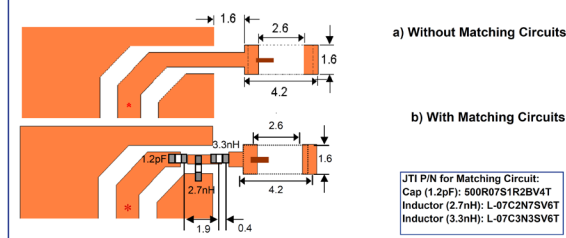
P/N Suffix	Packaging	Bulk	Suffix = S	Eg. 2450AT18B100S
	Style	T & R	Suffix = E	Eg. 2450AT18B100E
	Termination	100% Tin	Suffix = None	Eg. 2450AT18B100(E or S)
	Style	Tin / Lead	Please consult Factory	

Mechanical Dimensions

	In	mm
L	0.126 $\pm$ 0.008	3.20 $\pm$ 0.20
W	0.063 $\pm$ 0.008	1.60 $\pm$ 0.20
T	0.051 $\pm$ 0.004/-0.008	1.30 $\pm$ 0.1/-0.2
a	0.020 $\pm$ 0.012	0.50 $\pm$ 0.30

Mounting Considerations

Mount these devices with brown mark facing up. Units: mm
Line width should be designed to provide 50 Ω impedance matching characteristics.



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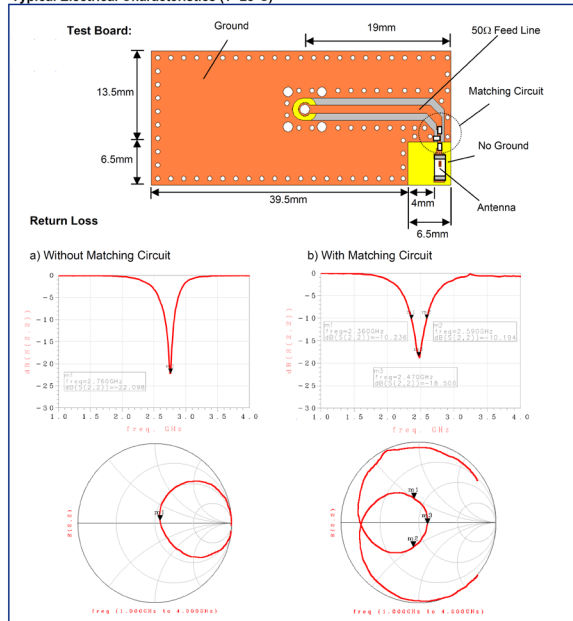
2450 MHz Antenna

Detail Specification: 08/10/09

P/N 2450AT18B100

Page 2 of 3

Typical Electrical Characteristics (T=25°C)



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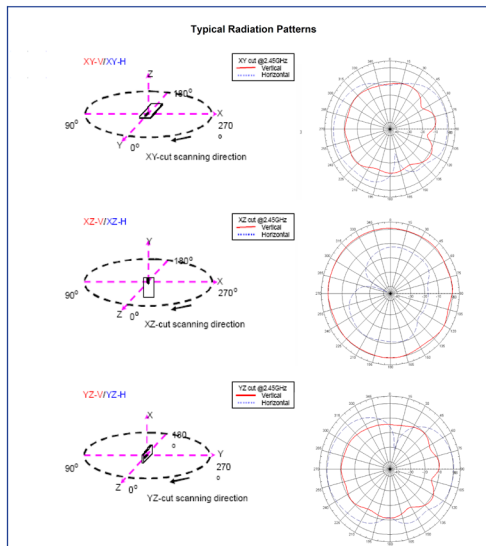
"High Frequency Ceramic Solutions"

2450 MHz Antenna

Detail Specification: 08/10/09

P/N 2450AT18B100

Page 3 of 3



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Annex II

"High Frequency Ceramic Solutions"

2.45 GHz SMD Antenna, EIA 1210, Detuning resilient, Edge Mount Design P/N 2450AT18D0100
Detail Specification: 9/17/2015 Page 1 of 6

This antenna is optimal for edge middle mounting; rectangular and circular PCB shape applications, go to pages 2-4 for more info.

General Specifications	
Part Number	2450AT18D0100
Frequency (MHz)	2400 - 2500
Peak Gain	1.5 dBi typ. (XZ-total)
Average Gain	-1.0 dBi typ. (XZ-total)
Return Loss	10.0 dB min.
Operating Temperature	-40 to +125°C
Input/Output Power	2W max. (CW)
Impedance	50 Ω
Reel Quantity	3,000
Storage Temp	-40 to +85°C
Total Radiation Efficiency ¹	72%

¹Efficiency measured on 2450AT18D0100-EB1SMA 40x20mm EVB on page 2

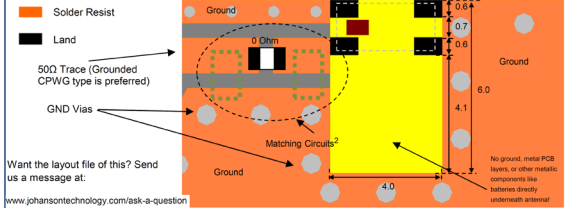
No	Terminal Function	4	3
1	Feeding Point	3	GND
2	GND	4	GND

Mechanical Specifications	
In	mm
L	0.126 ± 0.008
W	0.063 ± 0.008
T	0.047 ± 0.008
a	0.012 ± 0.004/-0.008
b	0.020 ± 0.008

Need help designing the antenna in? Use our antenna design services! www.johansontechnology.com/ipcantennaservice

²Free layout reviews and if you need us to tune and characterize our antenna on your design (anechoic chamber) we can do that too (lab fee may apply for the latter).

Mounting Considerations 1: Standard Rectangular Layout
Mount these devices with the red square mark facing up. Otherwise, the antenna will not operate as intended.



¹It is recommended that the designer leave available slots for a "pi" (or shunt-series-shunt) network, even if all slots won't be used, this will prepare the PCB for the final mass production values of the matching circuit. The antenna matching network values above are used when antenna is mounted on Johanson's evaluation board. The matching values on client's PCB will be different. Go to: <http://johansontechnology.com/tuning> and see how to obtain the new values yourself if you have a network analyzer.



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"High Frequency Ceramic Solutions"

2.45 GHz SMD Antenna, EIA 1210, Detuning resilient, Edge Mount Design P/N 2450AT18D0100
Detail Specification: 04/04/12 Page 2 of 6

This antenna is optimal for edge middle mounting; rectangular and circular PCB shape applications, go to pages 2-4 for more info.

Mounting Considerations 1: Standard Rectangular Layout (continued)

Orderable EVB p/n (comes with 1 female SMA connector mounted on the opposite side): 2450AT18D0100-EB1SMA

We offer 2 free layout reviews as well as antenna tuning and characterization services (lab fee may apply). For more info go to: www.johansontechnology.com/ipcantennaservice

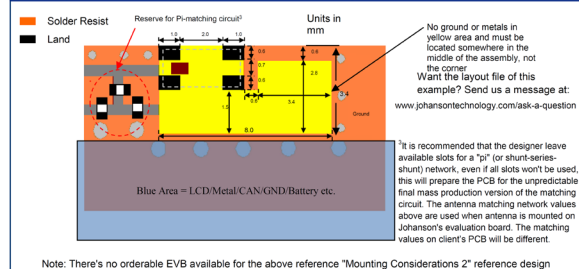
Want the layout file of the above? Send us a message at: www.johansontechnology.com/ask-a-question

To order a pre-tuned 50Ω EVB with a female SMA connector you see above Click here: www.johansontechnology.com/request-a-sample
Reference p/n: 2450AT18D0100-EB1SMA

Want the layout file of the above? Send us a message at: www.johansontechnology.com/ask-a-question

To order a pre-tuned 50Ω EVB with a female SMA connector you see above Click here: www.johansontechnology.com/request-a-sample
Reference p/n: 2450AT18D0100-EB1SMA

Mounting Considerations 2: Small clearance or "thin edge" applications



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2.45 GHz SMD Antenna, EIA 1210, Detuning resilient, Edge Mount Design P/N 2450AT18D0100
Detail Specification: 04/04/12 Page 3 of 6

This antenna is optimal for edge middle mounting; rectangular and circular PCB shape applications, go to pages 2-4 for more info.

Mounting Considerations 3: Thin Edge + Circular PCB applications

Legend:
 50Ω Trace (Grounded CPWG type is preferred)
 Ground

Want the layout file of this example? Send us a message at: www.johansontechnology.com/ask-a-question

Note: There's no orderable EVB available for the above reference "Mounting Considerations 3" reference design

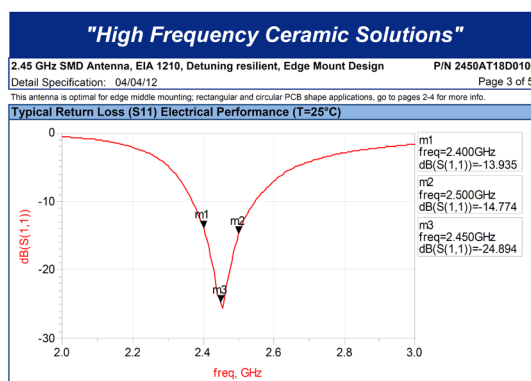
Mounting Considerations 4: Chip antenna fed from the right

Legend:
 Ground Plane
 Matching Circuits: It is recommended that the designer leave available slots for a "pi" (or shunt-series-shunt) network, even if all slots won't be used, this will prepare the PCB for the final mass production values of the antenna matching securing

Note: There's no orderable EVB available for the above reference "Mounting Considerations 4" reference design



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