

# **XS4 Original+ and XS4 One S KPP and Hilton extensions**

## **E2131 W60MH and W60T Antennas**

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

# Table of contents

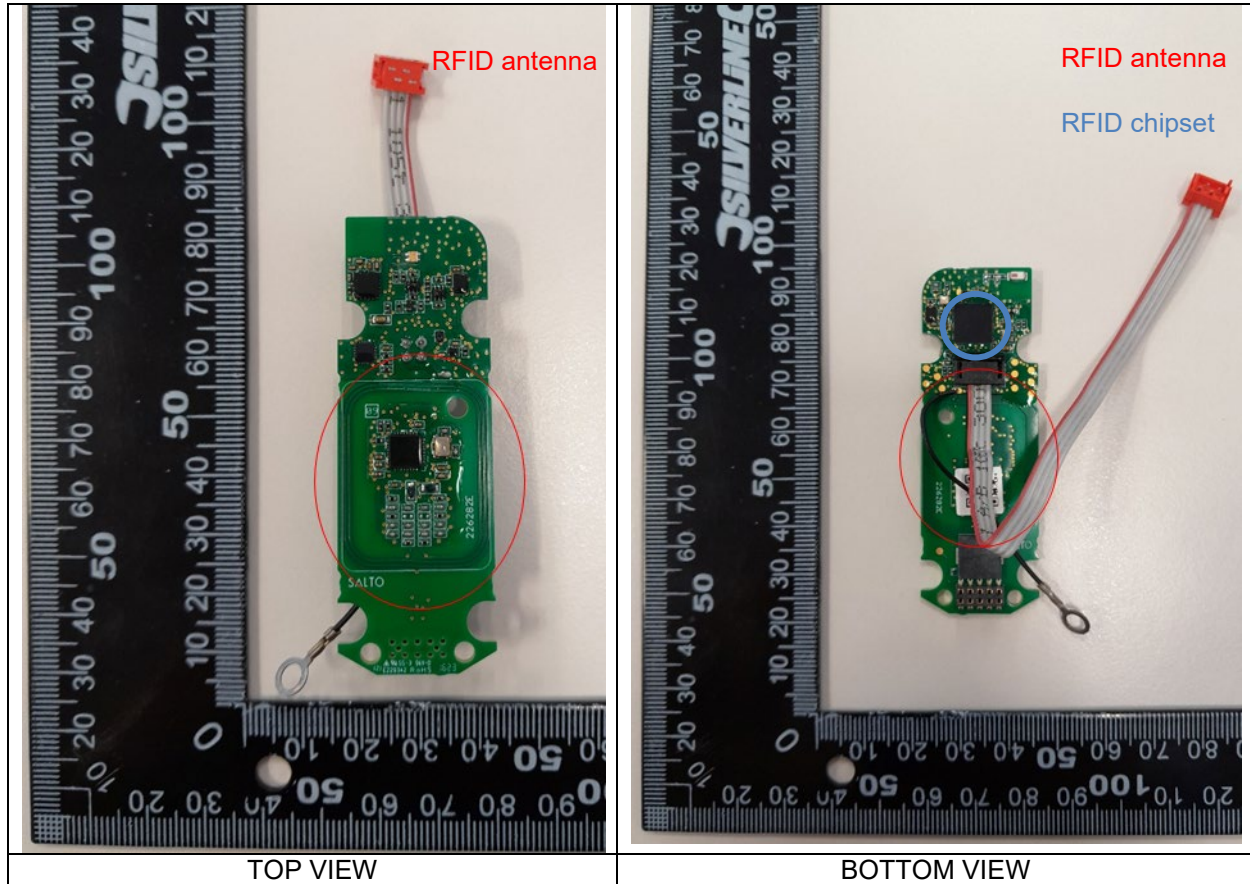
<b>1</b>	<b>W60MH</b> .....	<b>3</b>
	RFID Antenna .....	4
	Bluetooth LE Antenna .....	5
<b>2</b>	<b>W60T</b> .....	<b>6</b>
	RFID Antenna .....	7
	Bluetooth LE Antenna for the SoC solution .....	7
	Bluetooth LE Antenna for the BLE BROKER module .....	8
	<b>Annex I</b> .....	<b>9</b>
	<b>Annex II</b> .....	<b>10</b>

# 1 W60MH

XS4 Original+ and XS4 One S E2131		W60MH
		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- 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 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

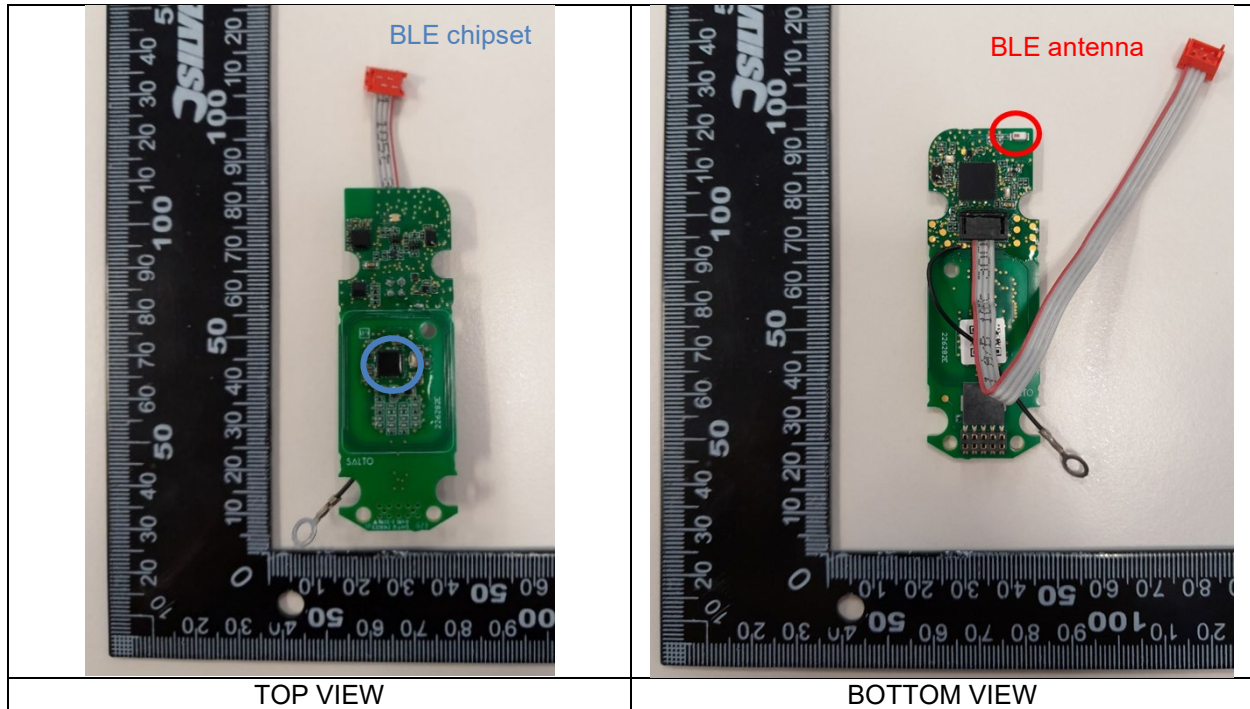
## RFID Antenna

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.



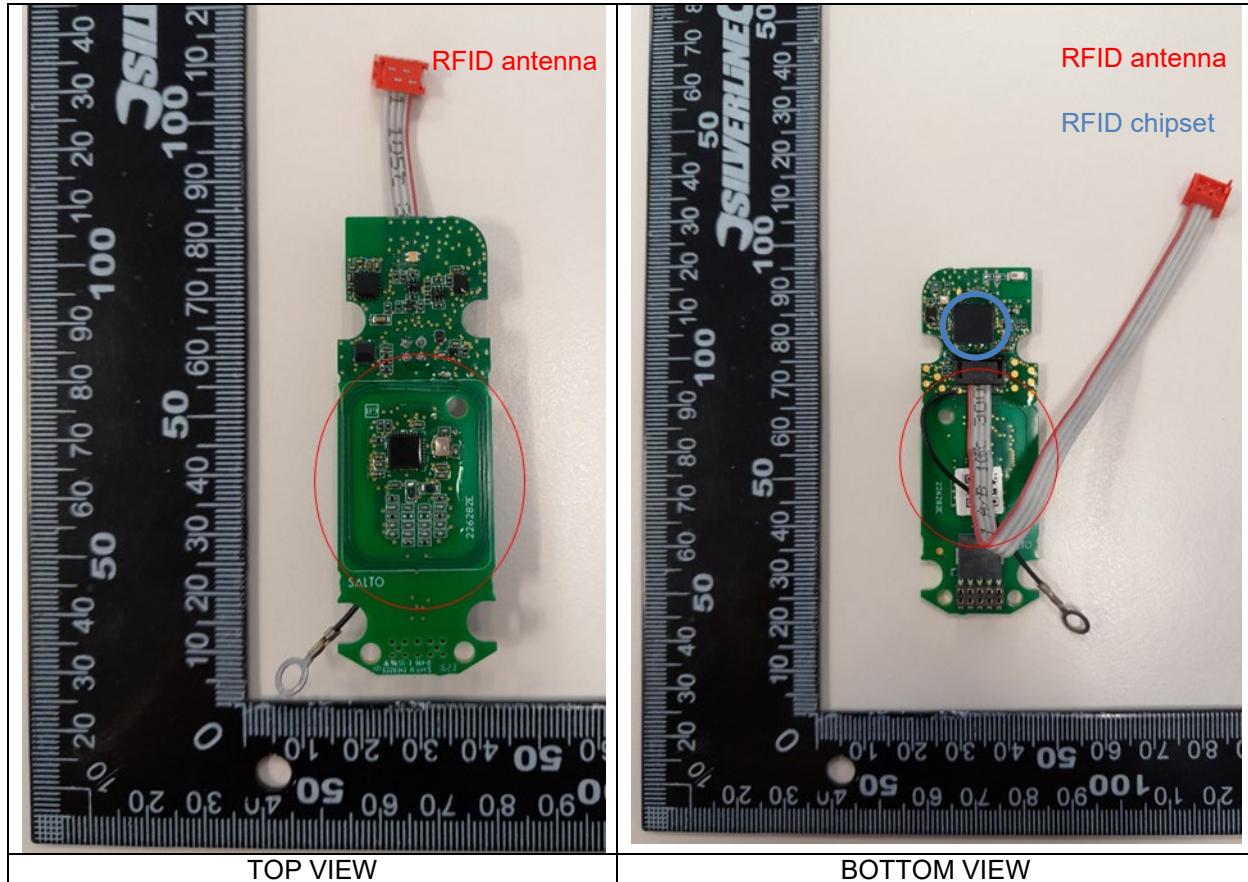
The remaining technical information of the antenna is described in the data sheet attached in Annex I.

## 2 W60T

XS4 Original+ and XS4 One S E2131		W60T
		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- 2 MHz 3- 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 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 Streight Measurement: Data Rate		1- 106 Kbit/s, 26.48 Kbit/s 2- 1 Mbit/s 3- 1 Mbit/s

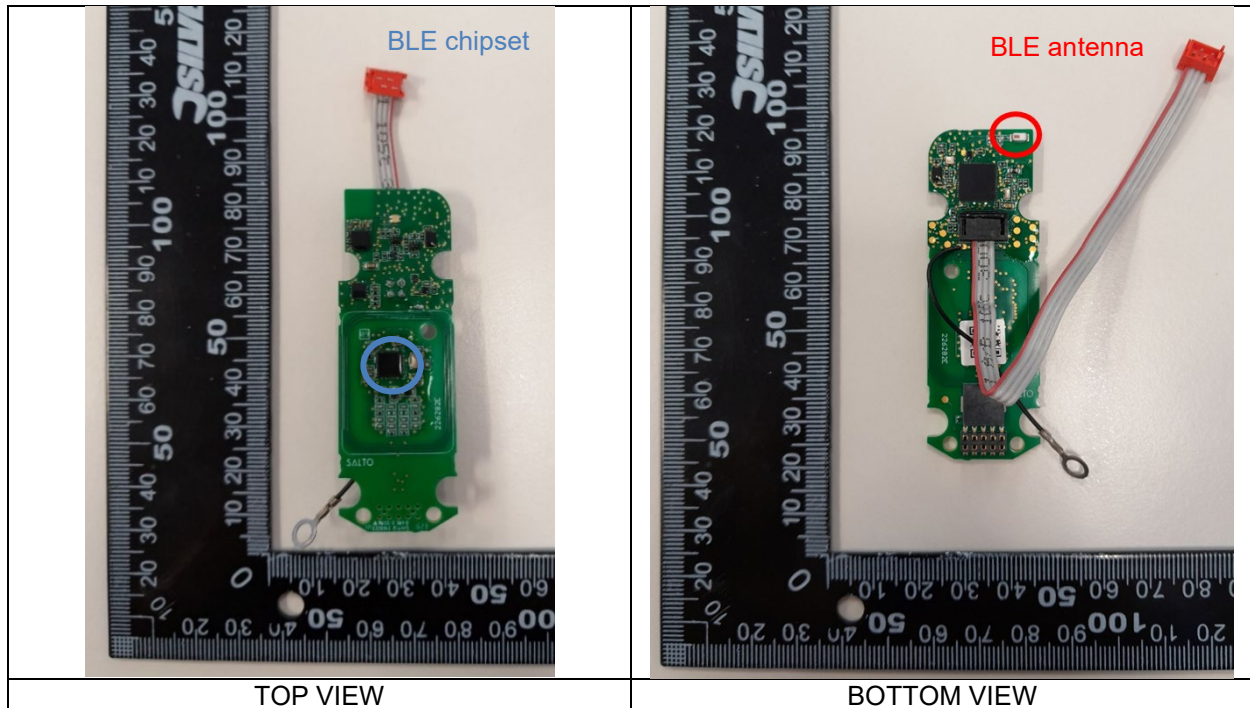
## RFID Antenna

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 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.

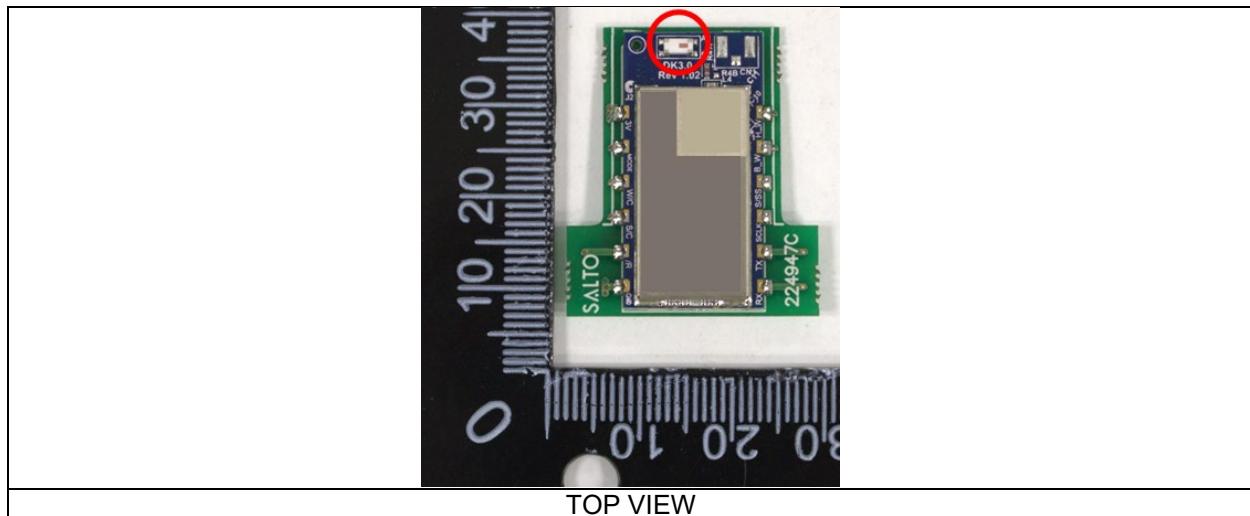


The remaining technical information of the antenna is described in the data sheet attached in Annex I.

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** P/N 2450AT18B100  
 Detail Specification: 08/10/09 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 Style	Bulk	Suffix = S	Eg. 2450AT18B100S
	Termination Style	T & R	Suffix = E	Eg. 2450AT18B100E
		100% Tin	Suffix = None	Eg. 2450AT18B100(E or S)
		Tin / Lead	Please consult Factory	

**Terminal Configuration**

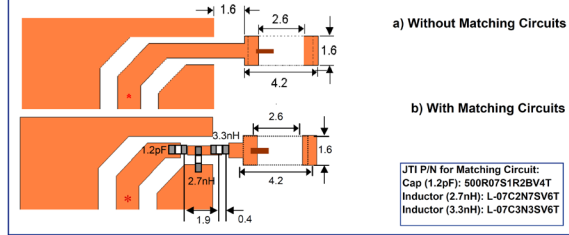
No.	Function
1	Feeding Point
2	NC

**Mechanical Dimensions**

	In	mm
L	0.126 ± 0.008	3.20 ± 0.20
W	0.063 ± 0.008	1.60 ± 0.20
T	0.051 ± 0.004/-0.008	1.30 +0.1/-0.2
a	0.020 ± 0.012	0.50 ± 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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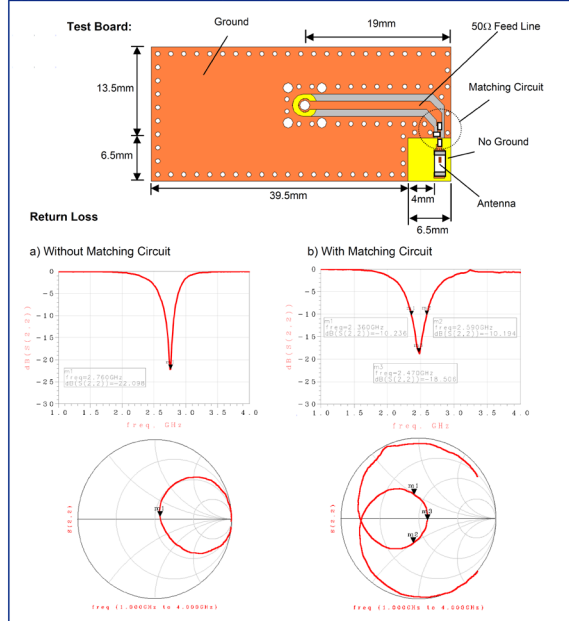


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## "High Frequency Ceramic Solutions"

**2450 MHz Antenna** P/N 2450AT18B100  
 Detail Specification: 08/10/09 Page 2 of 3

**Typical Electrical Characteristics (T=25°C)**



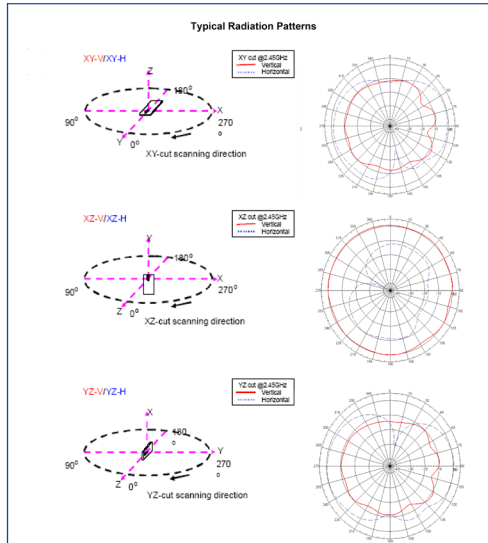
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## "High Frequency Ceramic Solutions"

**2450 MHz Antenna** P/N 2450AT18B100  
 Detail Specification: 08/10/09 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	Input/Output Power	2W max. (CW)
Frequency (MHz)	2400 - 2500	Impedance	50 Ω
Peak Gain	1.5 dBI typ. (XZ-total)	Reel Quantity	3,000
Average Gain	-1.0 dBI typ. (XZ-total)	Storage Temp	-40 to +85°C
Return Loss	10.0 dB min.	Total Radiation Efficiency <sup>1</sup>	72%
Operating Temperature	-40 to +125°C	<sup>1</sup> Efficiency measured on 2450AT18D0100-EB1SMA 40x20mm EVB on page 2	

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

Mechanical Specifications		
In	mm	
L	0.126 ± 0.008	3.20 ± 0.20
W	0.063 ± 0.008	1.60 ± 0.20
T	0.047 ± 0.008	1.20 ± 0.20
a	0.012 ± 0.004/-0.008	0.30 ± 0.1/-0.2
b	0.020 ± 0.008	0.50 ± 0.20

Need help designing the antenna in? Use our antenna design services! [www.johansontechnology.com/ipcanteservices](http://www.johansontechnology.com/ipcanteservices)  
<sup>2</sup> Free 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.

Want the layout file of this? Send us a message at: [www.johansontechnology.com/ask-a-question](http://www.johansontechnology.com/ask-a-question)

<sup>1</sup>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 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://www.johansontechnology.com> contributing and see how to obtain the new values yourself if you have a network analyzer.

### "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 pin (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/ipcanteservice](http://www.johansontechnology.com/ipcanteservice)

Want the layout file of the above? Send us a message at: [www.johansontechnology.com/ask-a-question](http://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](http://www.johansontechnology.com/request-a-sample)  
 Reference p/n: 2450AT18D0100-EB1SMA

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

Units in mm

No ground or metals in yellow area and must be located somewhere in the middle of the assembly, not the corner. Want the layout file of this example? Send us a message at: [www.johansontechnology.com/ask-a-question](http://www.johansontechnology.com/ask-a-question)

<sup>1</sup>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 unpredictable final mass production version 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.

Note: There's no orderable EVB available for the above reference "Mounting Considerations 2" reference design

Blue Area = LCD/Metal/CAN/GND/Battery etc.

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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 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

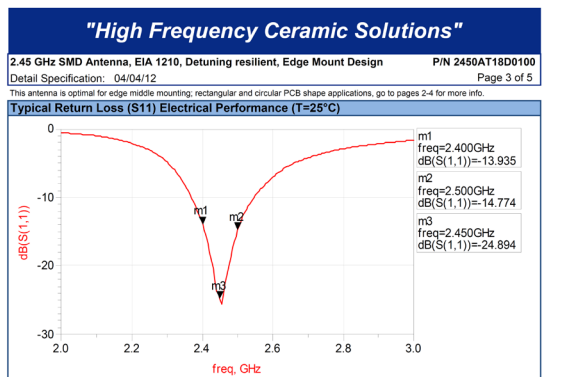
Want the layout file of this example? Send us a message at: [www.johansontechnology.com/ask-a-question](http://www.johansontechnology.com/ask-a-question)

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

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



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

